

Fueling Growth: Integrating Entrepreneurship Education into Medan's Small Business Sector

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Received: March 20, 2026; **Revised:** April 25, 2026; **Accepted:** June 30, 2026

Abstract: Entrepreneurship acts as a critical catalyst for mitigating structural unemployment and fostering economic resilience in developing nations such as Indonesia. Despite its strategic importance, the translation of psychological readiness into tangible business action remains a persistent challenge within the Micro, Small, and Medium Enterprise (MSME) sector. This study investigates the structural pathways of the Theory of Planned Behavior (TPB) to determine how cognitive antecedents drive actual entrepreneurial behavior, focusing specifically on the intervening role of entrepreneurship education. Data were collected from a purposive sample of 248 MSME practitioners in Medan, Indonesia, and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The empirical results reveal an asymmetrical structural mechanism that challenges conventional TPB assumptions. Specifically, Attitude toward the Behavior and Subjective Norms exert powerful, direct impacts on entrepreneurial execution, operating independently of educational interventions. In stark contrast, Perceived Behavioral Control (PBC) fails to influence behavior directly; rather, its structural utility is fully realized only when mediated by entrepreneurship education. These findings indicate that while intrinsic motivation and social expectations autonomously drive venture creation, perceived operational capacity requires the structural scaffolding of formal education to materialize into actual business practices. Consequently, this study provides a strategic blueprint for policymakers, demonstrating that MSME empowerment programs must pivot from purely motivational seminars toward practical, capability-building interventions that operationalize perceived control.

Keywords: Entrepreneurship Education, Theory of Planned Behavior, Entrepreneurial Behavior, MSMEs, PLS-SEM

How to Cite: Tamba, D., Simanihuruk, P., & Sianturi, R. F. (2026). The Fueling Growth: Integrating Entrepreneurship Education into Medan's Small Business Sector. *Journal of Economic Education and Entrepreneurship Studies*, 7(3), 295–309. <https://doi.org/10.62794/je3s.v7i3.276>
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INTRODUCTION

Indonesia faces a persistent challenge with high unemployment rates. Official reports from the Central Bureau of Statistics emphasize that fostering entrepreneurship is a strategic imperative for job creation, innovation, and economic self-reliance. However, the current rate of new business formation remains below government targets, necessitating intensive strategies to unlock the sector's potential for national prosperity.

When compared to ASEAN peers, Indonesia lags significantly in entrepreneurial activity. Data from late 2021 indicated an entrepreneurship rate of 3.47%, contrasted with 8.76% in Singapore and

4.74% in Malaysia. Despite a slight increase to 3.57% by early 2025, Indonesia remains behind regional competitors, underscoring a critical need for intervention. The Global Entrepreneurship Index (GEI) further highlights this disparity, placing Indonesia 75th out of 137 countries. To address the deficit of quality entrepreneurs and strengthen the fragile entrepreneurial ecosystem, integrated support systems—including Entrepreneurship Education and financial facilitation—are essential. This study addresses this need by examining how Entrepreneurship Education influences the transition from psychological readiness to Actual Entrepreneurial Behavior among MSME practitioners in Medan.

Additionally, data from the Global Entrepreneurship Index (GEI) indicates that Indonesia's entrepreneurial capacity is relatively constrained, occupying the 75th position among 137 countries with a score of 26. By trailing behind its ASEAN counterparts, it is evident that Indonesia's entrepreneurial potential remains underexploited. The principal barriers to sustainable and inclusive economic expansion are the deficit of quality entrepreneurs and a fragile entrepreneurial ecosystem. Consequently, augmenting this sector necessitates integrated support systems, including entrepreneurship education, vocational development, and facilitated financial access (Katadata.co.id). This condition underscores the urgency of executing targeted interventions to stimulate entrepreneurial intent, particularly among the youth and Micro, Small, and Medium Enterprise (MSME) sectors within strategic regions like Medan.

Despite the abundance of research on the Theory of Planned Behavior (TPB), the specific structural mechanism of entrepreneurship education as an intervening variable remains an area requiring deeper empirical investigation. Crucially, targeted education holds the potential to structurally bridge the gap between foundational cognitive elements and actual entrepreneurial execution. Addressing this gap is of utmost relevance for MSME actors in Medan, given their ongoing struggles with limited entrepreneurial literacy and a lack of orientation toward initiating new enterprises.

Motivated by this research gap, the current study raises a pivotal question: Can entrepreneurship education effectively mediate the relationship between attitude, subjective norms, perceived behavioral control, and actual business behavior? The core objective is to unpack this mediating role within the specific demographic of MSME actors in Medan. Through a quantitative methodology utilizing a modified conceptual structure and mediation analysis, this research delves into the structural impact of educational variables. Theoretically, it aims to broaden the academic understanding of how entrepreneurial cognitive antecedents materialize into actions in unique local environments. Practically, the insights generated will offer a valuable blueprint for policymakers to refine entrepreneurship education, tailor training programs, and enhance MSME empowerment strategies suited to Medan's specific economic landscape.

LITERATURE REVIEW

The Theory of Planned Behavior (TPB), developed by Ajzen (1985), extends the Theory of Reasoned Action (TRA) by incorporating Perceived Behavioral Control (PBC). While the TPB is a robust framework, critics note its disproportionate emphasis on cognitive rationality, often marginalizing affective and contextual variables that influence behavior. Werner (2004) highlighted that these models explain only approximately 40% of behavioral variance and often fail to account for the time lag between intent and action. The framework of this study centers on three TPB dimensions: 1) Attitude toward the Behavior: A personal evaluation of business ownership. 2) Subjective norms: The perceived social pressure from family and peers. 3) Perceived behavioral control (PBC): An individual's self-assessed capacity and confidence to execute business tasks, which is strongly linked to self-efficacy. Recent literature suggests that Entrepreneurship Education can act as an exogenous determinant that systematically shapes these three constructs. While some scholars position education as a mediator, this study advances the paradigm by analyzing its role as a structural intervention.

While both the TRA and TPB remain extensively applied frameworks for predicting intention-driven behavior, they inherently harbor fundamental shortcomings. Specifically, the TRA relies solely on personal attitudes and subjective norms to explain intention, entirely overlooking extrinsic variables and the individual's practical capacity to perform the action. Furthermore, as highlighted by Oduro-Appiah, Afful, and Osei-Tutu (2023), the TRA neglects to incorporate affective dimensions and distinct personal characteristics into its predictive model. The TPB addressed some gaps but has also

drawn critiques; it disproportionately emphasizes cognitive rationality, thereby marginalizing essential physiological and emotional states that are critical drivers of intention and decision-making. Moreover, the model's omission of affective and contextual variables—such as entrenched habits, self-identity, and dynamic situational contingencies—diminishes its explanatory power regarding impulsive or highly multifaceted behaviors.

Werner (2004) summarized several limitations of these models: 1) Motivational factors are not strictly limited to attitudes, subjective norms, and PBC alone. 2) These models typically explain only approximately 40% of the variance in behavior. 3) Intentions may shift before the actual behavior is performed due to the time lag between intention and action. 4) While both theories are predictive in nature, individuals do not always act in accordance with those predictions. The three core constructs of the TPB function as the cognitive bedrock that cultivates an individual's psychological propensity to pursue entrepreneurial endeavors:

1. **Attitude toward the Behavior:** This dimension represents an individual's personal evaluative judgment—whether positive or negative—concerning business ownership. This appraisal stems from core beliefs regarding the likely outcomes and a systematic weighing of the associated costs and benefits. Because of its strong and consistent predictive power across empirical studies, a favorable outlook significantly boosts the likelihood of forming a behavioral intention, functioning as a central driver of intent and execution.
2. **Subjective Norms:** This construct measures the perceived normative pressure from important referents—such as family members, peers, or coworkers—dictating whether a specific action should be performed. From a cultural perspective, subjective norms tend to be more dominant in developing nations with collectivistic cultures, such as Indonesia. In these settings, social group influence and environmental support are crucial aspects of decision-making (Urban, 2017; Maslakci et al., 2024; Maydiantoro et al., 2021). However, recent research by La Barbera and Ajzen (2020) suggests that the influence of subjective norms may diminish in individuals with high levels of PBC, indicating that a strong sense of personal control can reduce one's reliance on social pressure when forming intentions.
3. **Perceived Behavioral Control (PBC) and its Dual Pathways:** PBC encapsulates an individual's self-assessed capacity, access to requisite resources, and confidence in successfully navigating the target behavior. In entrepreneurial literature, PBC is frequently associated with self-efficacy—the belief in one's ability to successfully execute business operations—which has been proven to strengthen the nexus between entrepreneurial intention and action (Praswati et al., 2022; Setiaji, 2019; Yesmin et al., 2024). Within this conceptual framework, PBC is hypothesized to operate through a dual trajectory: it influences behavior indirectly by shaping Intention, while simultaneously exerting a direct impact on Actual Entrepreneurial Behavior, particularly when individuals possess adequate resources and volitional autonomy (Ajzen, 2020; Conner & Norman, 2021).

CONCEPTUAL FRAMEWORK AND HYPOTHESES

Entrepreneurship education serves as a cornerstone in cultivating the interests, intentions, and practical capabilities of individuals. Rather than functioning solely as a conduit for theoretical knowledge, such education nurtures the applied competencies and adaptive cognitive frameworks required to thrive in a volatile business landscape. Empirically, synergizing entrepreneurship education with social media utilization profoundly amplifies students' entrepreneurial inclinations. The utility of the TPB in analyzing entrepreneurial behavior is strongly supported by recent academic discourse. Self-efficacy acts as a primary driving variable in the relationship between entrepreneurship education and entrepreneurial interest, bolstering an individual's confidence in their capabilities. Furthermore, the efficacy of entrepreneurship education is simultaneously contingent upon socio-environmental elements, including institutional backing and prevailing social norms.

Viewed through the lens of the TPB, this study introduces a critical conceptual modification to evaluate how cognitive antecedents translate into concrete actions. While previous literature often positions education merely as an antecedent, this framework designates entrepreneurship education as a central mediating mechanism (intervening variable). It is anticipated to structurally bridge the foundational TPB constructs, thereby transforming the psychological propensity of MSME practitioners in Medan into actual entrepreneurial execution. This structural approach underscores a

crucial pedagogical implication: entrepreneurship education must transcend purely cognitive instruction to comprehensively engage the practical capacities of learners. Ultimately, the formulation of entrepreneurial curricula must be structurally holistic, context-sensitive, and practically oriented to produce a measurable impact on actual business creation.

The proposed conceptual framework adopts the Theory of Planned Behavior (TPB), originally conceptualized by Ajzen (1991), while introducing a structural extension. Whereas the conventional TPB framework asserts that an individual's behavior is dictated by Attitude toward the Behavior, Subjective Norms, and Perceived Behavioral Control (PBC), the present research expands this paradigm by incorporating Entrepreneurship Education as a mediating variable. The ultimate objective of this extended model is to reliably forecast and elucidate Actual Entrepreneurial Behavior, thereby shifting the academic focus from mere entrepreneurial aspirations to the tangible establishment of new ventures. The operational mechanisms of this proposed model are delineated through its principal antecedents and its mediating pathways.

The utility of the TPB in analyzing entrepreneurial outcomes is strongly supported by recent academic discourse. For example, Martin-Navarro et al. (2023) demonstrated that the transition from subjective norms to entrepreneurial intention is significantly influenced by an individual's attitude and perceived behavioral control. Furthermore, research by Yesmin et al. (2024) and Hartono et al. (2022) emphasizes that the foundational components of the TPB are instrumental in structural models assessing entrepreneurial aspirations. Despite the abundance of research on the TPB, the specific function of entrepreneurship education as an intervening mechanism requires further contextual validation. Empirical investigations by Anjum et al. (2024) and Shah et al. (2020) reveal that entrepreneurship education can serve as a vital mediator, actively bridging the nexus between cognitive dimensions and entrepreneurial intent. In this model, entrepreneurship education is evaluated to determine whether it acts as a necessary conduit translating the foundational TPB constructs into the subsequent actions of MSME practitioners in Medan.

Actual behavior constitutes the terminal outcome within the TPB paradigm, shaped by the interplay of attitude, subjective norms, and PBC. Nevertheless, the crystallization of these cognitive aspects into actual behavior is frequently impeded by extrinsic limitations, such as resource scarcity or environmental hurdles. Therefore, a comprehensive analysis of behavior mandates evaluating not only an individual's intrinsic motivation but also their practical capacity and situational opportunities. By integrating entrepreneurship education as a mediating variable, this framework deepens the understanding of factors influencing entrepreneurial decisions, providing a solid foundation for developing more contextualized and effective entrepreneurship curricula and training programs (Leong et al., 2023; Anjum et al., 2024; Ripollés & Blesa, 2023).

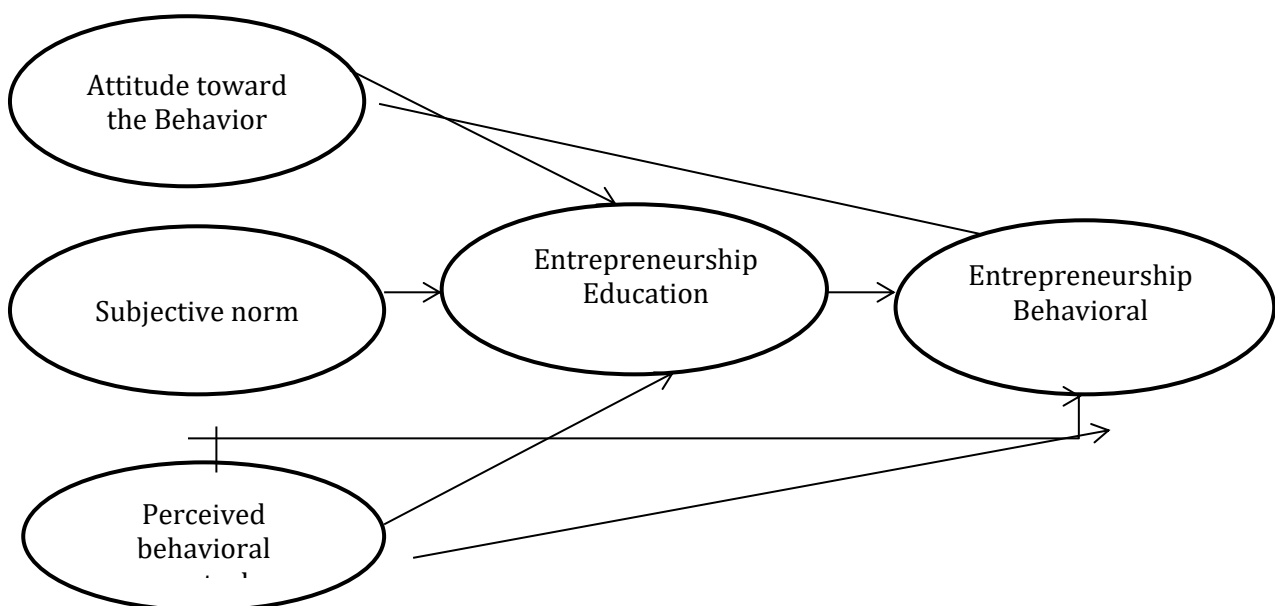


Figure 1. Conceptual Framework

Hypotheses Development

- H1: Attitude toward the Behavior has a significant and positive direct effect on Actual Entrepreneurial Behavior.
- H2: Subjective norms have a significant and positive direct effect on Actual Entrepreneurial Behavior.
- H3: Perceived behavioral control has a significant and positive direct effect on Actual Entrepreneurial Behavior.
- H4: Entrepreneurship education has a significant and positive direct effect on Actual Entrepreneurial Behavior.
- H5: Attitude toward the Behavior has a significant and positive effect on Entrepreneurship Education.
- H6: Subjective norms have a significant and positive effect on Entrepreneurship Education.
- H7: Perceived behavioral control has a significant and positive effect on Entrepreneurship Education.
- H8: Entrepreneurship education significantly mediates the relationship between Attitude toward the Behavior and Actual Entrepreneurial Behavior.
- H9: Entrepreneurship education significantly mediates the relationship between subjective norms and Actual Entrepreneurial Behavior.
- H10: Entrepreneurship education significantly mediates the relationship between perceived behavioral control and Actual Entrepreneurial Behavior.

METHOD

Population, Sampling and Data Collection

The target population for this study comprises Micro, Small, and Medium Enterprise (MSME) practitioners operating in Medan. To ensure the collected data strictly aligned with the research objectives, a purposive sampling technique was employed. Respondents were selected based on the following inclusion criteria: (1) the enterprise must be actively operating within the Medan metropolitan area; (2) the business must have been established for a minimum of three years to guarantee operational stability and adequate market experience; and (3) the respondent must be the owner or a manager directly involved in the daily strategic decision-making process. The resulting sample encompasses several key MSME sectors, primarily including culinary, retail, and services.

The data collection process spanned 6 months, employing both physical questionnaire distribution and online Google Forms to ensure a broader reach. Initially, the survey was administered to 400 MSME practitioners across different districts in Medan. Once data collection concluded, a stringent screening process was applied to filter out missing values, unengaged responses, and outliers. This data cleaning resulted in the exclusion of 152 questionnaires. This study utilized a purposive sampling technique to select 248 MSME practitioners in Medan who were actively involved in daily business operations. The survey, based on a 5-point Likert scale, was refined through a pilot study to ensure linguistic clarity and cultural relevance. Data were analyzed using SmartPLS 4, evaluating the measurement model through outer loadings, Cronbach's Alpha, Composite Reliability (CR), and the Heterotrait-Monotrait (HTMT) ratio to ensure construct validity and reliability.

The research instrument was constructed based on a comprehensive review of existing literature to ensure robust content validity, with all indicators adapted from established prior studies. To evaluate the latent constructs, a 5-point Likert scale was employed, ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"), enabling respondents to accurately convey their perceptions. Prior to the full-scale survey deployment, a pilot study was administered to a preliminary subset of MSME practitioners. This pre-testing phase was conducted to verify the clarity, cultural appropriateness, and readability of the questionnaire within the local context of Medan, ultimately confirming the initial reliability and validity of the measurement model.

Data Analysis Technique

Data collected from the valid sample of 248 respondents were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). Following standard PLS-SEM procedures, the analysis was systematically conducted in two distinct stages: the assessment of the measurement model (outer model) and the evaluation of the structural model (inner model). Before testing the structural relationships and moderation effects, a rigorous evaluation of the measurement model was conducted to verify that all constructs—namely attitude, subjective norms, perceived behavioral control, intention, behavior, and entrepreneurship education—were measured validly and reliably.

This assessment encompassed the following criteria: 1) Indicator reliability was established by examining the outer loadings of each measurement item, with a threshold of 0.708 considered satisfactory. Convergent validity was evaluated using the Average Variance Extracted (AVE). An AVE value equal to or greater than 0.50 was required, indicating that the latent construct explains more than half of the variance in its corresponding indicators. 2) The reliability of the constructs was evaluated using two metrics: Cronbach's Alpha and Composite Reliability (CR). For both measures, values exceeding the minimum threshold of 0.70 were required to confirm robust internal consistency. 3) To ensure that each latent construct is empirically distinct from other constructs within the model, discriminant validity was assessed using two approaches. First, the Fornell-Larcker criterion was applied, which requires the square root of each construct's AVE to be strictly greater than its highest correlation with any other construct. Second, the Heterotrait-Monotrait (HTMT) ratio of correlations was examined, with values required to be below the conservative threshold of 0.85 to establish definitive discriminant validity. 4) To prevent biased estimations in the structural model, lateral and vertical collinearity were assessed using the Variance Inflation Factor (VIF). VIF values for all inner and outer model variables were required to be below 3.0 (or optimally < 5.0) to confirm the absence of critical multicollinearity issues.

RESULTS AND DISCUSSION

Overview of Medan City

Medan, situated on the eastern coast of Sumatra near the Strait of Malacca, occupies a highly strategic geographical position as a vital hub in both national and international trade networks. The city features a lowland topography, averaging approximately 25 meters above sea level, and a tropical climate. While these conditions support agricultural activities, they also contribute to a heightened vulnerability to seasonal flooding. Historically, the Deli and Babura Rivers have served not only as primary water sources but also as essential transportation arteries.

As the capital of North Sumatra Province, Medan has experienced rapid population growth, reaching approximately 2.5 million residents. This growth is driven by significant urbanization and a rich ethnic diversity, including the Batak, Javanese, Malay, and Chinese communities. However, this demographic expansion is unevenly distributed; while certain districts exhibit dynamic development, the city center has shown signs of relative stagnation.

The Open Unemployment Rate (TPT) has shown a significant decline, falling from 10.74% in 2020 to 8.13% in 2024. This improvement is attributed to post-pandemic economic recovery, increased investment, infrastructure development, and the implementation of various labor training programs. In this context, the Micro, Small, and Medium Enterprise (MSME) sector remains the backbone of the local economy, with 38,343 business units recorded in 2022. These enterprises primarily operate in the trade, culinary, fashion, automotive, and agricultural sectors.

Despite its immense potential to drive sustainable economic development through its strategic location and urban dynamics, Medan faces several structural challenges. These include infrastructure limitations, long-term structural unemployment, and pressures on spatial planning. Consequently, adaptive policies and long-term strategic planning are essential to effectively address these hurdles.

Characteristics of Respondents

The MSME (Micro, Small, and Medium Enterprise) practitioners in Medan are characterized by a heterogeneous demographic profile, illustrating a cross-generational participation in entrepreneurial endeavors. A substantial majority of the respondents fall within the 50 to 59 age bracket, bringing extensive, long-term business acumen to the sector. Meanwhile, the 40–49 demographic exhibits robust managerial competencies, and younger entrepreneurs aged 30–39 are distinguished by their innovative tendencies and high adaptability to technological advancements.

Regarding gender dynamics, female participation is notably prevalent in sectors that afford high operational flexibility, such as the culinary and digital industries. Conversely, male actors are predominantly engaged in traditional sectors or enterprises of a larger scale. Educational attainment also displays significant variance; the majority of respondents hold secondary or vocational qualifications, heavily relying on practical, experiential skills. In contrast, those with tertiary education credentials are disproportionately concentrated within the service and technology-driven sectors.

Regarding business experience, most actors have been operating for 5 to 10 years, though a substantial number of early-stage entrepreneurs also contribute to the sector. Those with over 10 years of experience generally demonstrate higher resilience and business stability. The ventures encompass a wide range of sectors, including trade, culinary, services, food processing, workshops, handicrafts, and digital technology. The majority are micro-enterprises managed informally with a family-based structure, often facing constraints in capital and labor.

Geographically, most businesses operate in the city center to maximize market access; however, some actors choose suburban areas to optimize operational cost efficiency. Financing is dominated by personal funds and loans from formal financial institutions, while the utilization of grants remains relatively low. A significant number of business units have not yet obtained a Business Identification Number (NIB), which poses a hurdle in accessing government assistance and coaching programs. Furthermore, direct cash assistance programs are perceived to have reached entrepreneurs unevenly. In terms of revenue, most respondents record annual incomes exceeding IDR 100 million, although some remain below this threshold. Despite having no prior entrepreneurial experience, several individuals have participated in training or mentoring programs, indicating a promising potential for entrepreneurial growth in Medan.

Partial Least Square (PLS) Method

The structural framework of this study evaluates the interrelationships between cognitive antecedents—namely, Attitude toward the Behavior, Subjective Norm, and Perceived Behavioral Control—and their subsequent impact on Entrepreneurial Behavior, with a specific focus on the mediating role of Entrepreneurship Education. Based on the empirical data, the model demonstrates a complex mediating mechanism. Specifically, Perceived Behavioral Control does not influence Entrepreneurial Behavior directly; rather, its structural utility is fully realized through its transformation into Entrepreneurship Education. Conversely, Attitude toward the Behavior and Subjective Norm exert direct, significant impacts on Entrepreneurial Behavior without relying on Entrepreneurship Education as a mediator.

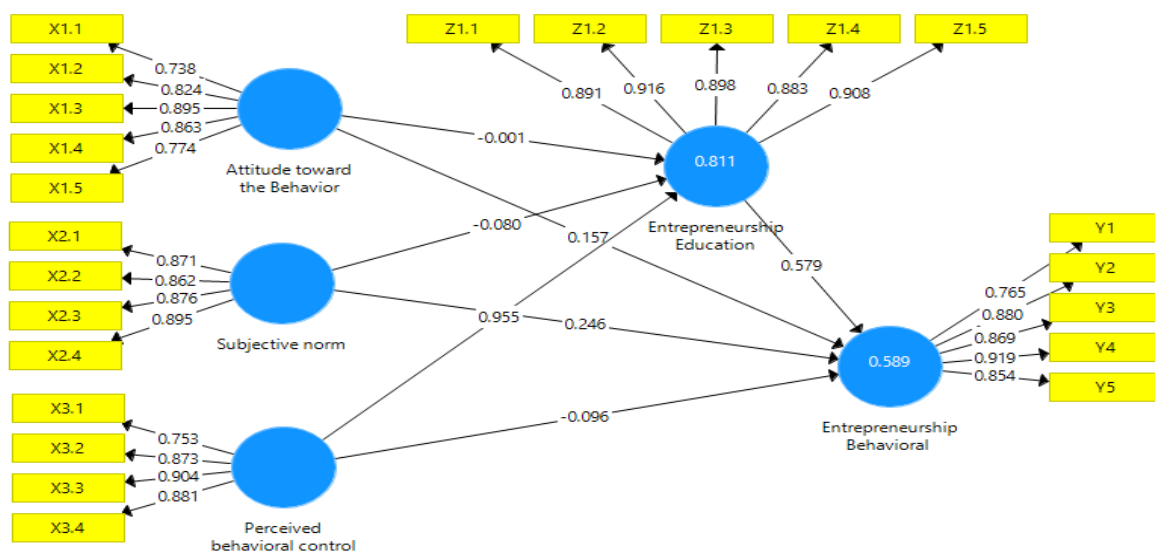


Figure 2. Outer Model

Source: Research Results, 2026 (processed data)

The empirical model demonstrates that while "Subjective norm " directly enhances "Entrepreneurship Behavioral," the impact of "Attitude toward the Behavior" and "Perceived behavioral control" on performance is not direct. Instead, these two capabilities must be leveraged to create a "Entrepreneurship Education," which in turn acts as a full mediator to significantly boost the overall "Entrepreneurship Behavioral."

In PLS-SEM, outer loadings are utilized to evaluate the convergent validity of the measurement model. These loadings gauge how effectively each specific survey item captures its corresponding latent construct. According to established academic standards, factor loadings should ideally exceed the 0.70 threshold to signify strong item reliability.

Table 1. Outer Loadings

Konstruk	Attitude toward the Behavior	Entrepreneurship Behavioral	Entrepreneurship Education	Perceived behavioral control	Subjective norm
X1.1	0,738				
X1.2	0,824				
X1.3	0,895				
X1.4	0,863				
X1.5	0,774				
X2.1					0,871
X2.2					0,862
X2.3					0,876
X2.4					0,895
X3.1				0,753	
X3.2				0,873	
X3.3				0,904	
X3.4				0,881	
Y1		0,765			
Y2		0,880			
Y3		0,869			
Y4		0,919			
Y5		0,854			
Z1.1			0,891		
Z1.2			0,916		
Z1.3			0,898		
Z1.4			0,883		
Z1.5			0,908		

Source: Research Results, 2026 (processed data)

Table 1 presents the outer loadings, which serve as the primary metric for convergent validity. The empirical results confirm that every indicator across all latent variables successfully exceeds the strict 0.70 threshold, thereby confirming the robust convergent validity of the measurement instruments.

Although Table 2 is titled "Discriminant Validity" in the source, the metrics provided (Cronbach's Alpha, rho_A, Composite Reliability, and Average Variance Extracted) are the standard indicators used in PLS-SEM to evaluate Construct Reliability and Convergent Validity. To ensure that the survey items consistently measure the same underlying construct, researchers look at Cronbach's Alpha, rho_A, and Composite Reliability. The general rule of thumb is that these values should be 0.70 or higher.

Table 2. Discriminant Validity

Konstruk	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Attitude toward the Behavior	0,877	0,879	0,911	0,674
Entrepreneurship Behavioral	0,910	0,916	0,933	0,738
Entrepreneurship Education	0,941	0,942	0,955	0,809
Perceived behavioral control	0,876	0,889	0,915	0,731
Subjective norm	0,899	0,901	0,930	0,768

Source: Research Results, 2026 (processed data)

As shown in Table 2, all constructs demonstrate excellent internal consistency, with Cronbach's Alpha, rho_A, and Composite Reliability values well above the recommended 0.70 benchmark. Furthermore, the AVE values for all variables comfortably exceed the 0.50 threshold, establishing strong convergent validity and allowing the analysis to proceed confidently to the structural model evaluation.

In Partial Least Squares Structural Equation Modeling (PLS-SEM), the Heterotrait-Monotrait ratio (HTMT) is the preferred and most robust criterion for evaluating the discriminant validity of latent constructs. Its purpose is to ensure that the constructs in the model are empirically distinct from one another. To establish strong discriminant validity, rigorous academic standards typically require HTMT values to fall below the strict threshold of 0.85.

Table 3. Heterotrait-Monotrait Ratio (HTMT)

Konstruk	Attitude toward the Behavior	Entrepreneurs hip Behavioral	Entrepreneurs hip Education	Perceived behavioral control	Subjective norm
Attitude toward the Behavior					
Entrepreneurship Behavioral	0,622				
Entrepreneurship Education	0,495	0,762			
Perceived behavioral control	0,622	0,757	0,782		
Subjective norm	0,874	0,704	0,631	0,801	

Source: Research Results, 2026 (processed data)

The results in Table 3 verify that discriminant validity has been flawlessly established for all variables within the structural model. With all values successfully satisfying the strict 0.85 benchmark, the measurement model is statistically robust, completely free of collinearity issues

This was done by examining the SmartPLS output estimation results for the SRMR value. The Standardized Root Mean Square Residual (SRMR) is the average covariance residual, based on the transformation of the sample covariance matrix and the predicted covariance matrix into a relationship matrix. A value of less than 0.10 is considered good fit (Henseler et al., 2021), as seen in Table 4:

Table 4. Model Fit Test Results

Model	Saturated Model	Estimated Model
SRMR	0,076	0,076
d_ULS	1,592	1,592
d_G	1,110	1,110
Chi-Square	1489,572	1489,572
NFI	0,751	0,751

Source: Research Results, 2026 (processed data)

The model fit assessment indicates a satisfactory structural configuration. With an SRMR value of 0.076, the model successfully satisfies the primary goodness-of-fit criterion of being less than 0.10 (Henseler et al., 2021), confirming that the theoretical framework adequately represents the observed empirical data.

In structural equation modeling (SEM), the coefficient of determination (R-Square) is utilized to evaluate the predictive accuracy and explanatory power of the structural model. It represents the proportion of variance in the endogenous (dependent) variables that is explained by the exogenous (independent) variables connected to them. The R-Square Adjusted metric provides a more conservative estimate by correcting for the number of predictor variables in the model.

Tabel 5. R-Square Value

Konstruk	R Square	R Square Adjusted
Entrepreneurship Behavioral _	0,589	0,583
Entrepreneurship Education	0,811	0,809

Source: Research Results, 2026 (processed data)

The structural model demonstrates a substantial level of predictive capability. By explaining 58.9% of the variance in the final endogenous variable, the proposed framework proves highly effective at predicting Entrepreneurial Behavior based on the selected exogenous variables. Furthermore, the model explains 81.1% of the variance in Entrepreneurship Education.

Hypothesis Testing

The hypothesis is accepted if the t-value is greater than the t-table, with a path coefficient alpha of less than 0.05. Explanation of the direct effect hypothesis test is shown in Table 6:

Table 6. Results of the Direct Effect Hypothesis Test

Konstruk	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Explanation
Attitude toward the Behavior -> Entrepreneurship Behavioral	0,157	0,162	0,071	2,228	0,026	Support
Attitude toward the Behavior -> Entrepreneurship Education	-0,001	0,000	0,051	0,013	0,990	Not Support
Entrepreneurship Education -> Entrepreneurship Behavioral	0,579	0,563	0,122	4,752	0,000	Support
Perceived behavioral control -> Entrepreneurship Behavioral	-0,096	-0,089	0,120	0,801	0,424	Not Support
Perceived behavioral control -> Entrepreneurship Education	0,955	0,952	0,063	15,128	0,000	Support
Subjective norm -> Entrepreneurship Behavioral	0,246	0,250	0,098	2,517	0,012	Support
Subjective norm -> Entrepreneurship Education	-0,080	-0,077	0,087	0,915	0,361	Not Support

Source: Research Results, 2026 (processed data)

Based on the mediation analysis in Table 6, the following structural mechanisms are confirmed:

1. Attitude toward the Behavior exerts a significant and positive direct effect on Entrepreneurial Behavior (O = 0.157, t = 2.228, p = 0.026).
2. Subjective Norm directly and significantly enhances Entrepreneurial Behavior (O = 0.246, t = 2.517, p = 0.012).
3. Perceived Behavioral Control demonstrates a massive and highly significant positive impact on Entrepreneurship Education (O = 0.955, t = 15.128, p = 0.000).
4. Entrepreneurship Education acts as a highly significant driver of actual Entrepreneurial Behavior (O = 0.579, t = 4.752, p = 0.000).
5. Conversely, Attitude toward the Behavior does not possess a significant direct impact on Entrepreneurship Education (O = -0.001, t = 0.013, p = 0.990).
6. The direct effect of Subjective Norm on Entrepreneurship Education is negative and statistically insignificant (O = -0.080, t = 0.915, p = 0.361).
7. Perceived Behavioral Control fails to demonstrate a significant direct influence on Entrepreneurial Behavior (O = -0.096, t = 0.801, p = 0.424).

Explanation of the hypothesis testing of indirect effects using intervening factors can be seen in Table 7:

Table 7. Results of the Hypothesis Testing of Indirect Effects Using Intervening Factors

Konstruk	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Explanation
Attitude toward the Behavior -> Entrepreneurship Education -> Entrepreneurship Behavioral	0,000	-0,002	0,030	0,013	0,990	Not Support
Perceived behavioral control -> Entrepreneurship Education -> Entrepreneurship Behavioral	0,553	0,537	0,127	4,366	0,000	Support
Subjective norm -> Entrepreneurship Education -> Entrepreneurship Behavioral	-0,046	-0,044	0,052	0,882	0,378	Not Support

Source: Research Results, 2026 (processed data)

Based on the mediation analysis in Table 7, the following structural mechanisms are confirmed:

1. Entrepreneurship Education significantly and fully mediates the relationship between Perceived Behavioral Control and Entrepreneurial Behavior (O = 0.553, t = 4.366, p = 0.000). This hypothesis

is strongly accepted, confirming that perceived control drives behavioral outcomes indirectly by first manifesting as robust educational engagement.

2. The indirect path from Attitude toward the Behavior to Entrepreneurial Behavior via Entrepreneurship Education is completely insignificant ($O = 0.000$, $t = 0.013$, $p = 0.990$), meaning education does not mediate this specific relationship.
3. Similarly, the indirect effect from Subjective Norm to Entrepreneurial Behavior through Entrepreneurship Education is not statistically significant ($O = -0.046$, $t = 0.882$, $p = 0.378$). Consequently, this mediation hypothesis is rejected.

DISCUSSION

Contrary to the initial hypothesis, the empirical findings of this research reveal that entrepreneurship education does not significantly act as an intervening factor in the relationship between attitude and actual entrepreneurial behavior. Instead, the data demonstrates that Attitude toward the Behavior exerts a direct, significant impact on execution without relying on an educational catalyst. This presents a compelling divergence from prior literature. For instance, Shah, Amjed, and Jaboob (2020) and Heuer and Kolvereid (2014) argued that educational exposure significantly magnifies the pathway connecting attitude to action within the TPB paradigm. Furthermore, while Amofah and Saladrighes (2022) and Martin-Navarro et al. (2023) posited that education and attitude function interactively as critical cognitive drivers, the current context suggests otherwise. For the Medan community, a strong personal disposition toward entrepreneurship is sufficient to propel concrete business ventures independently. The intrinsic drive to execute business actions overrides the need for the pedagogical stimulation suggested by Karimi et al. (2016) and Tahan (2025), indicating a highly self-motivated demographic.

Similarly, the empirical results demonstrate that entrepreneurship education does not significantly intervene in or enhance the impact of subjective norms on actual entrepreneurial execution. Rather, Subjective Norms directly and independently enhance entrepreneurial behavior. This outcome contrasts with existing literature that highlights the critical function of educational interventions in amplifying social expectations. Specifically, it diverges from the findings of Shah, Amjed, and Jaboob (2020) and Heuer and Kolvereid (2014), who established that pedagogical exposure actively magnifies the effect of subjective norms via the structural mechanisms of the TPB. While Amofah and Saladrighes (2022) and Yesmin et al. (2024) posit that education coupled with social reinforcement substantially catalyzes entrepreneurial success, the MSME actors in Medan appear to rely purely on direct communal and familial influence. Although Anjum et al. (2024) underscore a dynamic interplay between formal programs and normative influences, this study confirms that social expectations drive venture creation directly in this region, rendering formal educational interventions statistically redundant in this specific normative pathway.

In stark contrast to the other constructs, the empirical results reveal that entrepreneurship education serves as a potent and necessary intervening mechanism (a complete bridging effect), significantly translating the effect of Perceived Behavioral Control (PBC) into actual entrepreneurial execution. Because PBC demonstrated no significant direct effect on behavior in this study, its structural utility relies entirely on being effectively transformed through education. This outcome aligns seamlessly with prior literature, which emphasizes the crucial function of educational interventions in fortifying the link between PBC and tangible outcomes. Shah, Amjed, and Jaboob (2020) and Heuer and Kolvereid (2014) provided empirical evidence that pedagogical exposure actively shapes and enhances the role of PBC to catalyze actual business actions. Corroborating this, Sutrisno, Prabowo, and Kurniawan (2023) and Yesmin et al. (2024) found that education and PBC jointly drive behavior by enhancing practical self-efficacy. Furthermore, Anjum, Díaz Tautiva, Zaheer, and Heidler (2024) underscore the interplay between educational interventions and the cognitive dimensions of the TPB in determining outcomes. This definitively validates that for the Medan community, mere perceived control or confidence is insufficient; it must be systematically channeled and structured through entrepreneurship education to result in actual venture creation.

Previous scholarship extensively underscores the instrumental role of Entrepreneurship Education as a critical variable that fortifies the translation of behavioral intention into tangible business activities. Studies by Shah, Amjed, and Jaboob (2020), Heuer and Kolvereid (2014), and Sutrisno, Prabowo, and Kurniawan (2023) explicitly highlight how education strengthens the intention-behavior link. Similar support is found in Yesmin et al. (2024) and Anjum et al. (2024),

demonstrating that educational programs interact with cognitive factors to bolster both intentions and actions. However, based on the empirical PLS-SEM findings of this specific model, the traditional "Behavioral Intention" construct was bypassed to evaluate the direct translation of cognitive antecedents into actual behavior. Consequently, while the literature robustly supports education's role in the intention-to-behavior transition, this research advances the paradigm by demonstrating that in the practical context of Medan MSMEs, theoretical intention is less pivotal than the direct structural application of perceived behavioral control through educational empowerment.

The empirical confirmation that Entrepreneurship Education acts as a critical intervening mechanism for Perceived Behavioral Control (PBC) is highly significant when viewed through the lens of Medan's local economic landscape. For MSME practitioners in Medan, the transition from perceived confidence to actual business execution is not merely a psychological hurdle; it is a structural one. Many MSMEs in Medan operate informally, often lacking essential Business Identification Numbers (NIB), which systematically restricts their access to government support and formal credit facilities. Entrepreneurship Education functions as the necessary bridge, providing the technical knowledge required to formalize business operations and navigate the administrative requirements that currently stifle many micro-enterprises. While MSMEs in Medan are characterized by a high degree of entrepreneurial spirit, they frequently face severe capital constraints and reliance on limited personal or family funds. Formal education provides the structural scaffolding for these actors to move beyond informal financing, enabling them to understand, access, and manage formal institutional credit and government grants more effectively.

Given Medan's position as a regional trade hub, the market is increasingly defined by digital competition. The research findings indicate that while MSME actors possess a proactive spirit, the lack of digital capability hinders their market competitiveness. Structured educational interventions are thus vital to enhancing the digital literacy of Medan's entrepreneurs, allowing them to optimize their operations and maximize market access in a digital-first economy. MSME actors in Medan often operate in highly competitive environments—ranging from culinary to digital sectors—where resilience is paramount. Entrepreneurship Education in this context is not just theoretical; it serves as a mechanism for building adaptive competency. It empowers entrepreneurs to transform their perceived control (PBC) into concrete, resilient business strategies, effectively mitigating the risks posed by seasonal economic fluctuations and urban market volatility.

Ultimately, the structural importance of Entrepreneurship Education in Medan lies in its ability to convert the "latent potential" of local entrepreneurs into "active operational capacity." By directly addressing the logistical hurdles of legality, capitalization, and digital readiness, formal educational interventions convert an entrepreneur's confidence into a tangible, competitive, and sustainable business venture.

CONCLUSIONS

This research concludes that Entrepreneurship Education is an asymmetrical mediator. It is statistically essential for translating Perceived Behavioral Control into Actual Entrepreneurial Behavior but is redundant for the direct impacts of Attitude and Subjective Norms. Policymakers should pivot from generic motivational programs toward practical, capability-building curricula that directly support MSME operations. Drawing from the empirical results and hypothesis evaluations, this study yields the following primary conclusions:

This study was designed to rigorously investigate the structural mechanisms through which cognitive antecedents—specifically within the Theory of Planned Behavior (TPB) framework—translate into actual entrepreneurial behavior among Micro, Small, and Medium Enterprise (MSME) practitioners in Medan. Central to this investigation was evaluating the catalytic role of entrepreneurship education. Drawing from the empirical PLS-SEM results, this research yields several definitive conclusions regarding the urban MSME ecosystem:

1. Contrary to conventional assumptions that educational interventions are universally required to mobilize intent, this study concludes that Attitude toward the Behavior and Subjective Norms exert powerful, direct impacts on actual entrepreneurial execution. For the Medan community, intrinsic personal disposition and direct social or familial expectations are highly potent, independent drivers of business creation that do not strictly require formal educational mediation.

2. The most pivotal finding of this research is that Perceived Behavioral Control (PBC) is insufficient on its own to generate actual entrepreneurial behavior. Mere confidence and perceived capacity fail to translate into tangible business ventures unless they are systematically channeled through entrepreneurship education. Education serves as a necessary, full mediator in this specific pathway, transforming theoretical confidence into applied business execution.
3. The study ultimately concludes that the transition from psychological readiness to actual entrepreneurial behavior is not uniform across all cognitive constructs. While motivation (attitude) and social pressure (norms) drive immediate action, operational capability (PBC) demands the structural scaffolding of entrepreneurship education to bridge the gap between intention and realization.

The empirical analysis indicates that while Attitude toward the Behavior and Subjective Norms exert direct influences on Actual Entrepreneurial Behavior, Perceived Behavioral Control does not. Instead, the structural utility of Perceived Behavioral Control is fully realized only when mediated by Entrepreneurship Education. These findings challenge the traditional TPB application, suggesting that for Medan's MSME sector, operational capacity must be structured through formal education to manifest as tangible business outcomes

IMPLICATIONS

1. This research contributes a significant theoretical advancement to the entrepreneurship literature by refining the application of the Theory of Planned Behavior (TPB). By demonstrating that the cognitive antecedents of the TPB do not operate through identical structural pathways, this study challenges the traditional monolithic view of entrepreneurial intention. Specifically, it advances the paradigm by empirically establishing that entrepreneurship education functions as an asymmetrical mediator—highly critical for actualizing perceived behavioral control, yet statistically redundant for translating personal attitudes and subjective norms. Consequently, this study provides a more nuanced, contextually sensitive theoretical model that better captures the complex realities of venture creation in developing urban economies.
2. The empirical insights generated by this study offer a valuable, data-driven blueprint for policymakers, educational institutions, and MSME stakeholders aiming to optimize the entrepreneurial ecosystem in Medan and similar regions:
 - a. Targeted Educational Interventions: Since strong entrepreneurial attitudes and social support already drive direct action among the local demographic, government and institutional training programs should pivot away from purely motivational seminars. Instead, curricula must focus on practical, operational, and capability-building education that directly addresses the logistical gaps holding back individuals with high perceived behavioral control.
 - b. Fostering Sustainable Mentorship: To effectively bolster MSME resilience, policy frameworks must shift beyond basic theoretical instruction toward continuous, sustainable mentoring. Educational programs should be designed to equip practitioners with the concrete operational tools required to navigate a volatile market.
 - c. Integrating Education with Ecosystem Support: Because education acts as the critical bridge for actualizing business control, it must be integrated with broader ecosystem support. Policymakers should ensure that entrepreneurship education is directly linked to tangible resources, such as facilitated financial access, simplified business licensing (e.g., Business Identification Numbers/NIB), and localized business incubators. This holistic approach will guarantee that once entrepreneurial capabilities are refined through education, they can be immediately deployed to fuel sustainable economic growth.

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