International Journal of Innovative Research and Scientific Studies, 8(4) 2025, pages: 1667-1677

IJIRSS
International Journal of Innovative Research & Scientific Studies

ISSN: 2617-6548

URL: www.ijirss.com

Fostering future entrepreneurs: The interplay of motivation and education in Malaysian universities

Farzana Ferdouse[1], Abdullah Sarwar[2*], Nasreen Khan[3], Aysa Siddika[4]

[1]*Faculty of Management, Multimedia University, Persiaran Multimedia, 63100 Cyberjaya, Selangor, Malaysia.*
[2,3,4]*Center for Management and Marketing Innovation, Business Innovation and Communication, Faculty of Management, Multimedia University, Persiaran Multimedia, 63100 Cyberjaya, Selangor, Malaysia.*

Corresponding author: Abdullah Sarwar (*Email: sunabdullah@gmail.com*)

Abstract

Youth unemployment constitutes a substantial portion of the unemployed population, placing Malaysia's economic landscape in a precarious position. Therefore, entrepreneurship education (EE) is important in developing young people's entrepreneurial skills that can increase job creation and economic resilience by mitigating unemployment. However, a knowledge gap exists regarding how autonomous motivation (AM) and controlled motivation (CM) are integrated into students' entrepreneurial aspirations. Therefore, this study aimed to bridge this gap by hypothesizing how motivation steers the intention to be an entrepreneur (EI) and the moderating role of entrepreneurship education (EE). The sample of this study consisted of 338 final-year students from private and public universities. PLS-SEM was utilized for data analysis. The study finds that AM and CM directly affect EI. However, the moderating effects of EE on AM, CM, and EI show mixed results. Although the effects of AM on EI remain consistent regardless of the level of EE granted, the level of EE does moderate the interaction between CM and EI, weakening CM's negative influence on EI. The findings provide valuable insights for policymakers in formulating entrepreneurship policies and suggest avenues for educational programs to foster entrepreneurial motivation among students.

Keywords: Autonomous motivation, Controlled motivation, Entrepreneurial intentions, Entrepreneurship education, Malaysia.

DOI: 10.53894/ijirss.v8i4.8208
Funding: This study received no specific financial support.
History: Received: 22 April 2025 / **Revised:** 27 May 2025 / **Accepted:** 29 May 2025 / **Published:** 1 July 2025

Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.
Institutional Review Board Statement: The Ethical Committee of Multimedia University, Malaysia has granted approval for this study.
Publisher: Innovative Research Publishing

1. Introduction

Entrepreneurs drive industry growth by introducing innovative business concepts, contributing to social progress and economic prosperity [1]. Entrepreneurs wield considerable power to shape our lives and eventually our work, making successful entrepreneurial revolutions the most momentous improvement in quality of life. Then, business is a revenue source, and entrepreneurship has provided the masses with jobs, thereby acting as a cause for social advancement [2]. Consequently, entrepreneurship training is crucial for students to set up business ventures and put into practice the knowledge they have acquired in higher education. The creation of this global consensus has impelled governments to pump vast resources into constructing a robust policy framework that would further establish new institutions. Timely policy intervention to eliminate youth unemployment is vital for lowering the unemployment rate [3]. It is seen as a powerful tool to enhance economic skills both in the labor market and the larger economy [4]. The proliferation of entrepreneurship courses worldwide is another valuable testament to the immense potential impact that many entrepreneurs may have on the academic space.

In Malaysia, the increased unemployment rate further heightened concerns. Youth unemployment constituted a substantial portion of the unemployed population, placing the nation's economic landscape in a precarious position [5]. Also, the job market was more competitive during the pandemic, with massive job losses [5]. To attain high-income status and develop an innovation culture, the problems in the entrepreneurial ecosystem had to be addressed in Malaysia. Among these are problems such as restricted financial resources, complex regulatory protocols, low educational and training opportunities, low technological innovation, poor market entry, and interlinked support networks [6]. Even with multiple initiatives pushing entrepreneurship, there is a knowledge gap on key motivators that cause these students to pursue entrepreneurial ventures [7, 8].

This gap was important in designing successful policies to spur Malaysia's economic growth and international competitiveness by helping to spawn a new group of valuable entrepreneurs. Research has been conducted previously on motivation for entrepreneurial intention. However, there is a lack of studies on how autonomous and controlled motivation is integrated into the final year students' entrepreneurial aspirations. This paper hypothesizes how motivation steers the intention to be an entrepreneur (EI). The paper suggests that attitude, subjective norms (SN), and PBC mediate between motivation and EI. On the other hand, this research study investigates the moderating role of EE among the student population.

2. Literature Review

2.1. Entrepreneurship

Entrepreneurship identifies opportunities, takes risks, and creates value by inventing and implementing new ideas, goods, and services [9]. Understanding business opportunities involves identifying gaps and recognizing realistic risks [9]. In addition, entrepreneurial traits and attitudes towards entrepreneurship cultivated by entrepreneurs are essential for higher entrepreneurial activities [10]. Thus, developing control, originality, and creativity among aspiring entrepreneurs will drive a positive attitude and encourage involvement in entrepreneurial ventures [10].

The existing body of scholarly work has identified several important drivers of students' propensity towards entrepreneurship, and these drivers vary in the context of outcome determination. Passaro et al. [11] put entrepreneurial education at a critical determinant level and quality. Research studies have indicated that entrepreneurship training incorporated into the academic curriculum enhances students' EI and human capital. This course has an invaluable positive impact on students' emotional competencies, which have been shown to influence entrepreneurship interest and self-efficacy [12]. A series of earlier research papers indicates that factors such as the availability of financial resources and social relationships, including environmental factors, have a say in raising student interest in entrepreneurship programs [13].

In Malaysia, several initiatives have been introduced by the government to foster entrepreneurial values and mindset among graduates. These initiatives enhance graduates' entrepreneurial skills by providing professional training and education [14, 15]. Moreover, young entrepreneurs receive financial aid to provide them with the resources needed to start or maintain their companies [16, 17]. The government also encourages entrepreneurship training programs to develop marketing and economic skills [18]. The knowledge and skills these programs provide enable entrepreneurs and assist in developing the entrepreneurship industry in Malaysia [18].

2.2. Theoretical Background

According to self-determination theory (SDT), Deci and Ryan [19], it is a psychological framework that targets the quality of associated motivation and the underlying psychological needs. SDT discriminates between two major types of motivation: autonomous motivation (AM) and control motivation (CM) [20]. AM is the drive to participate in an activity because an individual genuinely wants to engage in it. This is one form of intrinsic motivation. In contrast, extrinsic motivation is another type that arises from the value an individual associates with an activity or its significance to them [21].

Autonomy and self-determination are defined by a sense of motivation in which individuals feel they choose and act according to their will. In contrast, controlled motivation (CM) is mostly comprised of external and introjected types. External refers to instances when external contingencies maintain individuals' actions; introjected consists of actions regulated by internal pressures such as guilt or pride [21].

This psychological framework is the foundation for understanding motivational dynamics in the present study. However, although psychological researchers have generally used traditional motivation theories such as SDT and TPB to investigate the effect of motivation on intention, these theories may not have explained everything about the complicated link between autonomous and regulated motivation and their effects on intention in the context of entrepreneurship [22].

Several studies have examined the factors influencing the EI of final-year undergraduate students. The findings indicate that entrepreneurial self-efficacy significantly impacts emotional competence [23] and entrepreneurial education [24]. Moreover, AM and CM are robust indicators of self-efficacy and attitude towards the targeted behavior [25]. According to the Theory of Planned Behavior (TPB), attitudes and self-efficacy are the most predictive intention variables [26].

Normative beliefs are constructed by people raised in families and with friends. Family members play a significant role in the career path choice and act as a source of support and motivation. A valid construct helps to quantify these beliefs, which are based on assistance expected from family and friends. Although family, friends, mentors, teachers, and guides may not directly influence entrepreneurial intentions, the degree to which they affect the outcomes is not to be underestimated [27]. In meta-analytical studies on various behaviors, attitudes, and PBC, they are moderate predictors of intention, but SN has a weaker effect [28]. This attitude significantly affects entrepreneurial intent. However, existing literature shows that attitudes do not seem to be important to Chinese entrepreneurs' intentions due to cultural differences [29], and many have difficulty explaining the problem of entrepreneurial intent.

Although the Theory of Planned Behavior (TPB) has successfully predicted various behaviors, it has been criticized for not capturing intrinsic motivation or emotional factors, which are important in Self-Determination Theory (SDT). The interaction between intrinsic and extrinsic motivations is poorly studied, particularly in workplace behavior and educational engagement. The constructs of TPB may not adequately address behaviors influenced by cultural and environmental factors, suggesting the need for additional constructs to fully understand these behaviors. Hence, there is a need to develop a higher-order theoretical model that incorporates both Autonomous Motivation (AM) and Controlled Motivation (CM) as intrinsic and extrinsic motivation, respectively.

2.3. Hypothesis Development

2.3.1. Autonomous and Controlled Motivation (AM and CM)

In the entrepreneurial context, AM leads to increased psychological well-being and behavioral persistence. In contrast, CM is associated with task resistance or avoidance and has negative psychological consequences [21]. Environmental factors can bolster or undermine AM [25, 30]. Environments that foster autonomy validate recommended entrepreneurial behaviors, present alternatives, acknowledge the individual's perspective, and address the challenges of behavior change [21]. Given that autonomous motives enhance behavioral engagement.

According to Uzun and Aydemir [31], extrinsic motivation includes external and introjected regulations, unlike intrinsic motivation. Individuals are compelled to think, feel, and behave in predetermined ways when controlled. Unlike motivation, which denotes a lack of direction and purpose, AM and CM energize and direct behavior [32]. Hence, the following hypotheses are developed:

$H_{1:}$ AM has an impact on EI.

$H_{2:}$ CM has an impact on EI.

2.3.2. Attitude and EI:

An entrepreneurial attitude is a positive mental inclination that motivates an individual to engage in entrepreneurial activities [33]. Studies on entrepreneurial attitudes and personality traits reveal that individuals willing to take risks and innovate, seeking new markets and business opportunities, tend to have a more positive inclination toward starting their ventures [34, 35]. People express their views towards a specific behavior, such as entrepreneurship, through their beliefs, which can be either positive or negative. These beliefs significantly impact the way individuals engage in a specific action. The more favorable and advantageous the perception of behavior, the higher the likelihood it will be practiced. Conversely, if behavior is seen as harmful or unfavorable, people are less inclined to engage in it. Hence, in the present context, the following hypotheses are developed.

$H_{3:}$ Attitudes mediate the relationship between AM and EI.

$H_{6:}$ Attitudes mediate the relationship between CM and EI

2.3.3. SN and EI

Research findings on SNs on EI show mixed results [36, 37]. Some studies suggest that the impact of SN is minimal or even non-existent. On the other hand, some research reveals that SN strongly predicts EI [38, 39]. Selecting entrepreneurship as a career is a profoundly social decision, as people very often look for both mentorship and inspiration from the people of their surroundings. As a result, significant others' opinions significantly impact whether someone participates in entrepreneurial activities. Furthermore, the present study assumes that attitudes are not always a robust predictor of EI for collectivist cultures [29]. While SN is initially considered less indicative of EI, further research has confirmed that SN influences intention. Therefore, the hypotheses are developed as follows:

$H_{4:}$ SN mediates the relationship between AM and EI

$H_{7:}$ SN mediates the relationship between CM and EI

2.3.4. PBC and EI

Perceived Behavioral Control (PBC) measures how easy or difficult an individual believes a particular task is [40]. If a task is easily achievable, people tend to take it on. Conversely, if a task is perceived as too challenging, it may deter people from doing it. Al-Jubari et al. [38] indicate that trust in PBC depends on the presence or absence of suitable opportunities. According to Ajzen [40], control beliefs are influenced by personal experience with behavior, indirect knowledge about the behavior, and events related to relationships, friendships, and other factors that determine how difficult the desired behavior

is thought to be. The hypotheses developed are as follows:

$H_{5:}$ PBC mediates the relationship between AM and EI

$H_{8:}$ PBC mediates the relationship between CM and EI

2.4. Entrepreneurship Education (EE)

EE equips students with motivation, knowledge, and skills to establish a successful business [41]. It empowers students to develop their skills, ideas, management abilities, and self-employment competencies [42]. Additionally, by fostering a positive attitude towards entrepreneurship in students, the goal is to inspire them to pursue entrepreneurial careers [43].

According to the theoretical foundations of entrepreneurial education for human capital development [44], increased human capital production- knowledge, skills, and related competencies—can lead to improved performance and outcomes, Bae and Choi [45]. Unger et al. [46] also found a positive association between human capital assets related to entrepreneurship and education in three areas: entrepreneurial abilities, knowledge, and positive perceptions of entrepreneurship in the public [47].

Furthermore, Bae et al. [48] argued that pre-entrepreneurship education significantly impacts post-entrepreneurship knowledge and human capital assets. Entrepreneurial pedagogical assessment has provided teachers with a framework for effectively embedding knowledge capital across various instructional strategies. Therefore, positive entrepreneurial outcomes related to human capital assets have been predicted based on the type of formal education, training, experience, skills, and knowledge acquired collectively to achieve the necessary level of human capital assets [49]. The dynamics of this learning process can impact an individual's capacity for knowledge utilization. This scenario includes an educational component to study the impact of entrepreneurial education. As a result, the following hypothesis has been proposed:

$H_{9:}$ EE moderates the relationship between AM and EI

$H_{10:}$ EE moderates the relationship between CM and EI

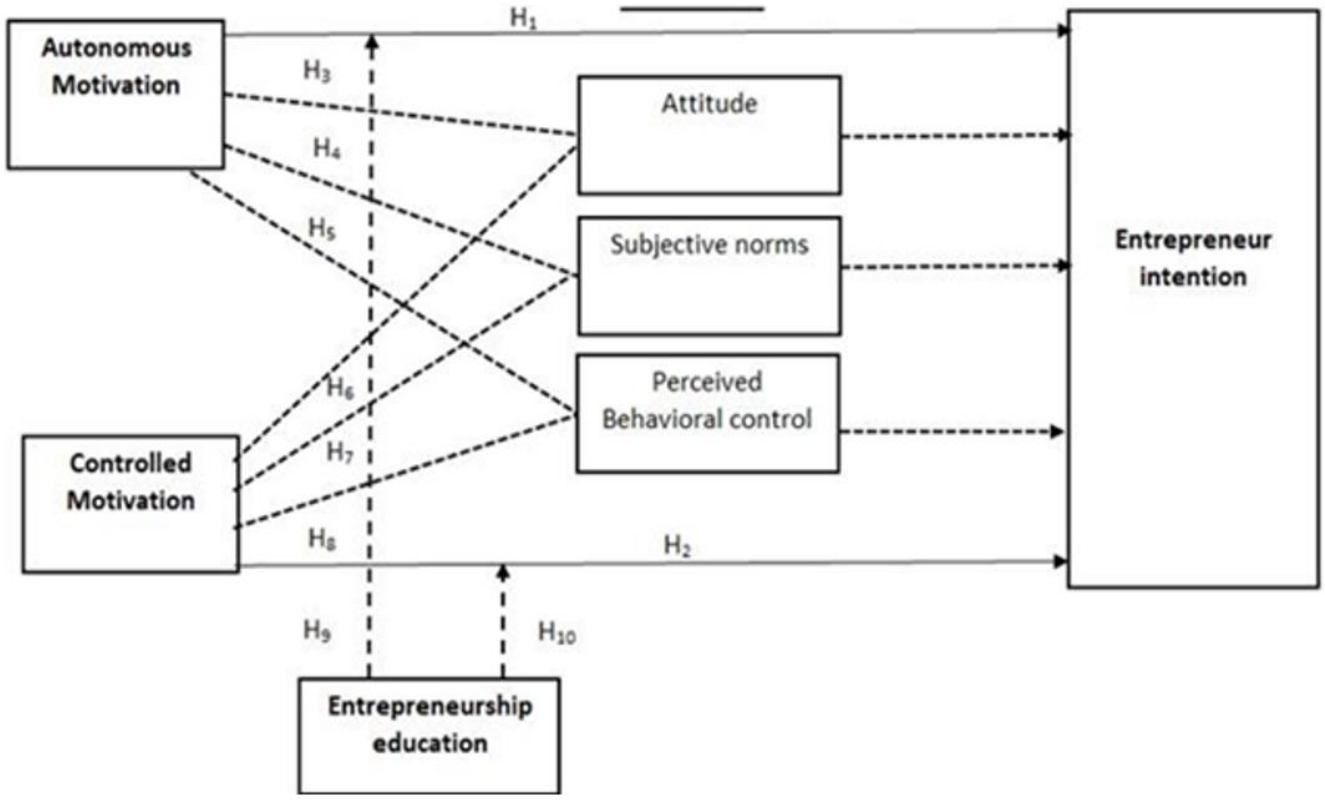

Figure 1.
The Framework of the Study.

3. Methodology

3.1. Sample and Data Collection

The sample of this study comprised final-year undergraduate university students due to their critical transitional phase, where career decisions are actively being formed. A thorough literature review validated this population's relevance to studying EI and motivational factors. The sample size was determined through statistical analysis and practical considerations. G*Power analysis indicated that with a medium effect size ($f^2 = 0.15$), α error probability of 0.05, and two predictors, a sample size of 68 was sufficient. However, to ensure robustness and account for a 70% response rate, the adjusted sample size was calculated as 97. The target sample size was raised to 350 to improve reliability, considering the study's complexity and the need for potential subgroup analyses. In total, 400 questionnaires were distributed through Google Forms, and out of these, 350 responses were received, of which 338 were usable. The study conducted a pilot study with a small number of students (40) and confirmed the appropriateness of the target population. The required adjustments were made

based on feedback from the pilot study. This study utilized validated sources and a five-point Likert scale ranging from 1 (strong disagreement) to 5 (strong agreement) for standardized variable assessment. The dependent variable, EI, was measured using Gieure et al. [50] four-item scale. Attitude, SN, and PBC scales were adopted from Al-Jubari et al. [38]. In addition to assessing AM and CM, the scale by Hagger et al. [25] was adopted. Finally, EE was adopted from Radzi and Ghani [51] and Staniewski [52].

The structured method enabled a quantitative assessment of data. The items with continuously weak item-total correlations were eliminated from the survey to improve the Cronbach's alpha values of the scales. The structural equation analysis used Smart PLS 4 with the Partial Least Squares (PLS) methodology. Statistically, the Harman single-factor test was employed, revealing that the total variance extracted by one factor was 37.265%, below the 50% threshold, indicating that common method variance (CMV) was not a significant concern in the present study. Moreover, Pearson correlation analysis was utilized to evaluate CMV further. These multifaceted approaches ensured a robust assessment of potential biases in the data.

4. Results

4.1. Demographic Analysis

Figure 2 presents the demographic profile of the present study's respondents. Most of the respondents were male (66%) and belonged to the 18-22 age group (60%). In addition, the respondents were primarily from private universities (77%) and had business backgrounds (66%).

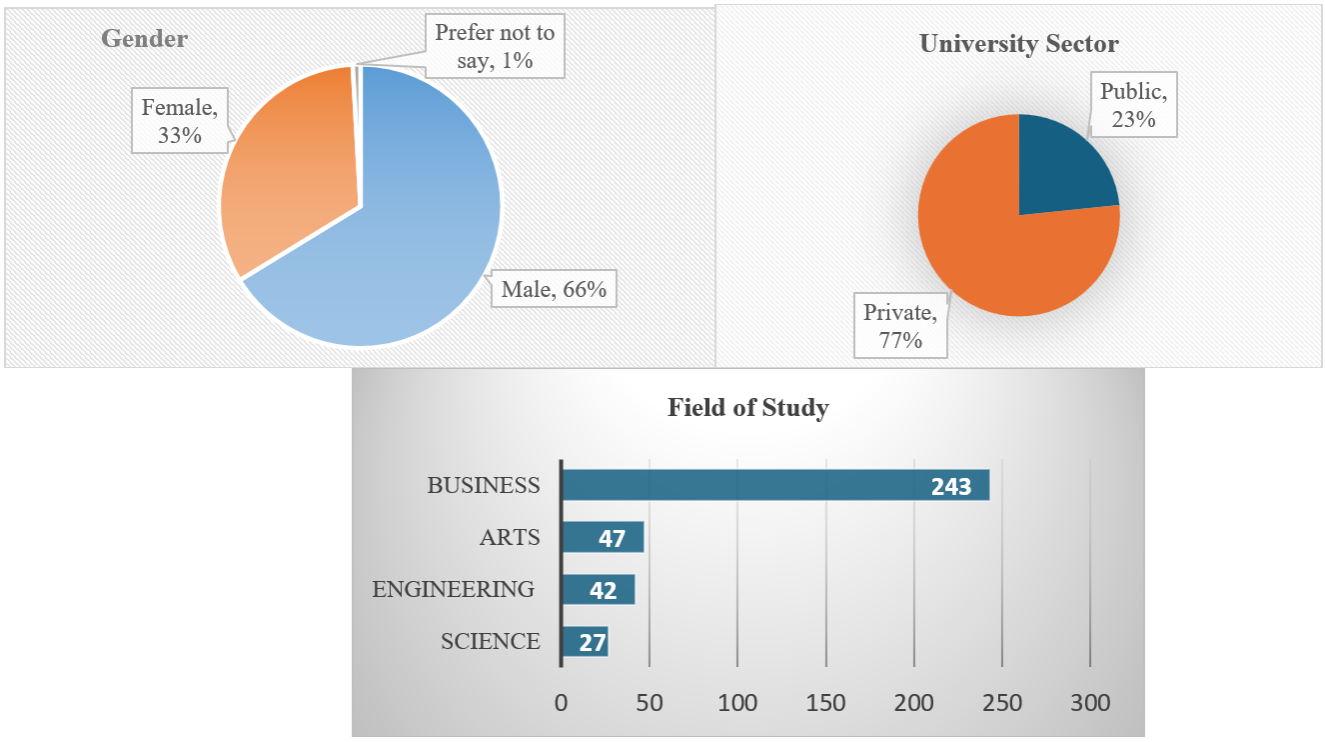

Figure 2.
Demographic Profile of the Respondents.

Table 1 presents descriptive statistics for the constructs. It exhibits the level of agreement or consistency of respondents' attitudes or perceptions regarding their attitudes towards entrepreneurship and motivation. The constructs' standard deviations lie between 0.78 and 0.98, and the mean values lie between 3.26 and 3.75.

Table 1.
Descriptive Statistics of the Constructs.

Constructs	AM	CM	EA	SN	PBC	EE	EI
Mean	3.65	3.26	3.58	3.51	3.51	3.75	3.53
Median	3.67	3.13	3.67	3.67	3.50	4.00	3.33
Mode	3.33	3.00	4.00	3.00	3.00	4.00	3.00
Std. Dev.	0.80	0.95	0.88	0.78	0.78	0.98	0.84

Note: Autonomous Motivation (AM), Controlled Motivation (CM), Entrepreneurial Attitude (EA), Subjective norms (SN), Perceived behavioral control (PBC), Entrepreneurship education (EE), Entrepreneur intention (EI).

4.2. Measurement Model Assessment

The Initial step of model evaluation involves examining the reliability and validity of the measurement model. Hair et al. [53] states that factor loading should not be less than 0.70 for an item to be reliable. This study's results show the performance of all items in the generated instrument above the threshold (Table 2) and thus trustworthy. The internal

consistency evaluation uses Cronbach's alpha and Composite Reliability (CR). Hair et al. [53] state that both metrics must be higher than 0.70 to be reliable. In the present study, Cronbach's alpha ranges from 0.764 to 0.90, and the composite reliability ranges from 0.853 to 0.933, far higher than the required threshold level of 0.70. Convergent validity and typical discriminant validity are examined. The Average Variance Extracted (AVE) assesses the convergent validity. Results from the study indicate that the AVE values exceed this threshold level (0.50 or above), supporting convergent validity. The Heterotrait-Monotrait ratio (HTMT) establishes discriminant validity, confirming that the constructions differ. Table 2 presents the HTMT ratio. The HTMT ratio should be less than 0.85 [54]. In the present study, the HTMT ratio ranges from 0.102 to 0.748, which meets the threshold level. Figure 3 presents the measurement model of the study.

Table 2.
Measurement Model Assessment

Constructs	Cr. Alpha	CR	AVE	HTMT
AM	0.786	0.853	0.543	Yes
CM	0.764	0.862	0.676	Yes
EA	0.864	0.903	0.654	Yes
SN	0.836	0.901	0.751	Yes
PBC	0.904	0.924	0.635	Yes
EI	0.844	0.888	0.580	Yes
EE	0.904	0.933	0.776	Yes

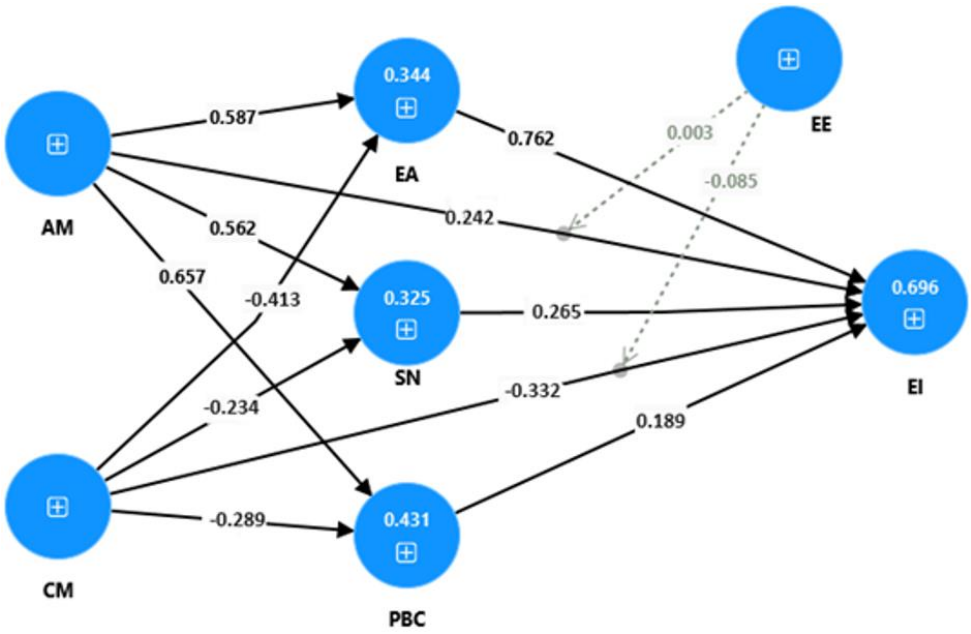

Figure 3.
Measurement Model of the study.

4.3. Assessment of the Structural Model

The structural model assessment includes measuring the explanatory power of the dependent variable, the coefficient of determination (R^2), multicollinearity assessment, direction coefficients (β), predictive relevance (Q^2), effect size (f^2), and the Goodness of Fit (GoF). Hair et al. [53] state that R^2 values of 0.25, 0.50, and 0.75 represent weak, moderate, and substantial predictive accuracy, respectively. In this study, the model exhibits a strong predictive capability for entrepreneurial intention and lower values for other constructs (Table 3).

Table 3.
R-square.

	R-square	R-square adjusted
EA	0.344	0.342
EI	0.696	0.674
PBC	0.431	0.427
SN	0.325	0.322
	R-square	R-square adjusted
EA	0.344	0.342
EI	0.696	0.674
PBC	0.431	0.427
SN	0.325	0.322

Effect size (f^2) measures the impact of a predictor on an endogenous construct [53]. f^2 values indicate the magnitude of a predictor's contribution to the R^2 of a dependent variable. Cohen [55] categorized f^2 values as 0.35 (substantial), 0.15 (moderate), and 0.02 (small). In the present study (Table 4), the effect size for PBC is substantial, while the effect sizes for all other constructs are considered moderate to small. According to Hair et al. [53], Q^2 values of 0.00, 0.25, and 0.50 signify negligible, moderate, and substantial predictive relevance, respectively. Given that the Q^2 value for EI is 0.298, hence, the construct has moderate predictive power. Thus, we can imply that EI has moderate significance.

Table 4.
Effect Size

f Square	EA	EI	PBC	SN
AM	0.512	0.047	0.729	0.455
CM	0.026	0.001	0.0331	0.002

4.4. Path Coefficient and Hypothesis Testing

The path coefficient is assessed to evaluate the hypothesized relationship between the constructs. Figure 4 shows the study's structural model.

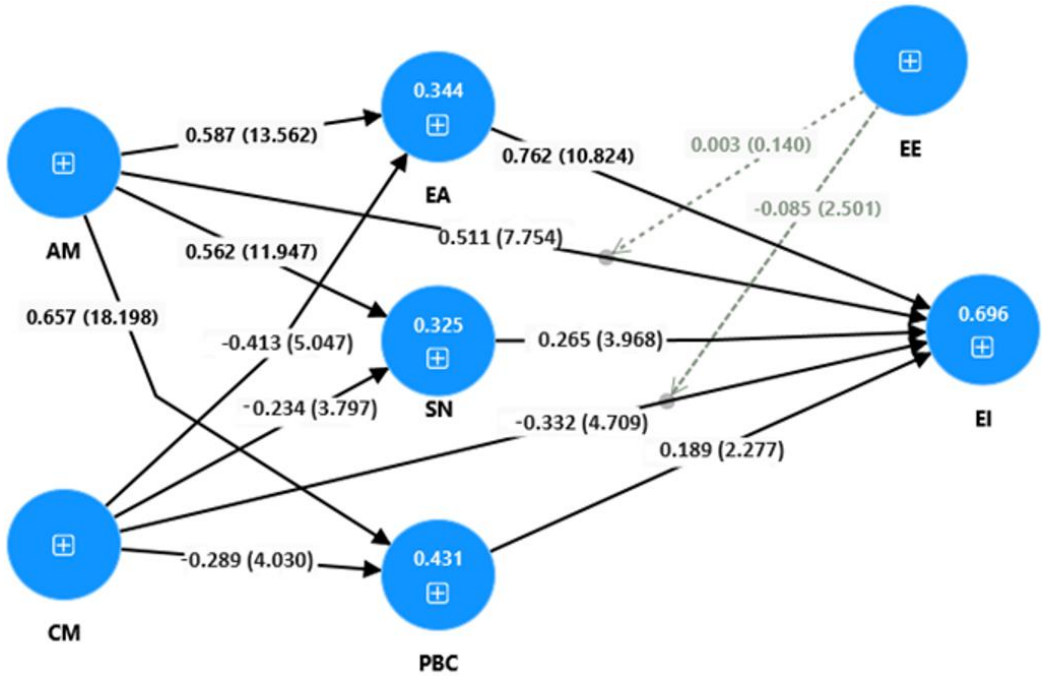

Figure 4.
The Structural Model.

Table 5 demonstrates the outcomes of the significance of all the direct paths. There was a significant positive relationship between AM and EI, as the results provided evidence in favor of (H1: T = 7.754, p = 0.000). Similarly, CM exhibited a significant negative relationship with EI (H2: T = 4.709, p = 0.000).

Table 5.
Direct Path Results

Paths	Beta	T Values	P values	Results
H1: AM -> EI	0.511	7.754	0.000	Accepted
H2: CM -> EI	-0.332	4.709	0.000	Accepted

Table 6 presents the mediation analysis, which analyzes the mediating effects of EA, SN, and PBC. As shown in the table, EA (t = 8.478, p < 0.000), SN (t = 6.956, p < 0.000), and PBC (t = 3.268, p < 0.000) significantly and positively mediate the relationship between AM and EI. Additionally, EA (t = 7.046, p < 0.000), SN (t = 3.465, p < 0.000), and PBC (t = 2.002, p < 0.003) mediate the relationship negatively between CM and EI. Thus, the results confirm that EA, SN, and PBC significantly mediate the relationships between AM, EI, and CM, EI.

Table 6.
Mediation Analysis.

Paths	Beta (β)	Sample mean	Std. deviation	T statistics	P values	Results
H3: AM -> EA -> EI	0.447	0.450	0.053	8.478	0.000	Accepted
H4: AM -> SN -> EI	0.337	0.339	0.038	6.956	0.000	Accepted
H5: AM-> PBC-> EI	0.258	0.064	0.046	3.268	0.000	Accepted
H6: CM -> EA -> EI	-0.402	-0.404	0.044	7.046	0.000	Accepted
H7: CM -> SN -> EI	-0.302	-0.307	0.055	3.465	0.000	Accepted
H8: CM ->PBC-> EI	-0.278	-0.283	0.047	2.002	0.000	Accepted

The main purpose of this study was to investigate the relationship between AM and EI, moderated by EE. As all of the constructs in the model are reflective, two pertinent reflective models, proposed by Hair et al. [53], are used to calculate an interaction term. The moderation analysis of the current study is presented in Table 7.

Table 7.
Moderation Effect of Entrepreneurship Education.

Path	Beta (β)	Sample mean	Std. dev	T statistics	P values	Decision
H1: AM -> EI	0.511	0.52	0.066	7.754	0	Accepted
H9: EE x AM -> EI	0.003	0.002	0.021	0.14	0.889	Rejected
H2: CM -> EI	-0.332	-0.439	0.051	4.709	0	Rejected
H10: EE x CM -> EI	-0.085	-0.08	0.034	2.501	0.013	Supported

The direct relationship between AM and EI is significant at the level of p ($t = 7.754$, $p < 0.000$). However, as expected, this relation does not hold if the moderating effect of EE is introduced ($\beta = -0.003$, $t = 0.140$, $p = 0.889$); that is, EE has no moderating effect on the AM-EI relationship. The finding also reflects the significant moderating effect of EE on the CM-EI relationship, where the variable CM has a significant negative impact on EI ($\beta = -0.085$, $t = 2.501$, $p = 0.013$). This indicates that CM significantly and negatively affects EI ($t = -4.709$, $p < 0.000$), suggesting a complex relationship between these variables. EE can thus diminish the negative effect of CM on EI.

5. Discussion

Investigating the relationship between AM and EI showed a strong, positive correlation. This supports the notion that autonomously motivated individuals, driven by intrinsic desires, personal values, and interests, are more likely to develop intentions to engage in entrepreneurial activities. This finding aligns with previous research, which highlights the importance of motivation in shaping entrepreneurial intentions. Existing studies show that different types of motivation are crucial in driving entrepreneurial intentions through various approaches [56, 57].

Similarly, controlled motivation also exhibited a significant negative relationship with EI, indicating that external factors, such as rewards or obligations, influence entrepreneurial intention. This finding integrates with existing literature suggesting that CM, often driven by external pressures or obligations, can lead to reduced entrepreneurial engagement and intention [58, 59]. For example, Iffan [58] highlights that various forms of motivation significantly influence the formation of entrepreneurial intentions, with controlled motivations potentially failing to foster the intrinsic drive necessary for entrepreneurial pursuits.

The study also tested the mediating roles of entrepreneurial attitudes, subjective norms (SN), and perceived behavioral control (PBC) in the relationship between motivation and entrepreneurial intention (EI). The results indicated that the mediators significantly influenced the relationship between both AM and CM with EI. Specifically, entrepreneurial attitudes, SN, and PBC were key factors in transforming external motivations into EI. This outcome is consistent with previous research [60-63].

The moderating role of EE on the relationship between motivation and EI revealed mixed results. Hypothesis 9 tested the moderation of EE on the relationship between AM and EI, which was not statistically significant. This suggested that the effect of AM on EI was consistent regardless of the level of EE.

However, H10 revealed that EE significantly and negatively moderates the relationship between CM and EI. When examining EE's moderating role, the significance of the interaction term highlights that EE can mitigate the negative effect of CM on EI. This implies that EE enhances the effect of CM on EI, indicating that individuals motivated by external factors might benefit more from EE when forming their EI. This finding is consistent with Wu et al. [59], who argue that EE enhances entrepreneurial self-efficacy, which, in turn, positively influences entrepreneurial intentions.

Moreover, findings from Duong [64] suggest that EE serves as a catalyst that enhances students' attitudes towards entrepreneurship and strengthens their PBC, a key factor in intention formation. This integrates with broader literature emphasizing the significance of educational interventions in shaping entrepreneurial mindsets and intentions, particularly among students exhibiting CM [24].

Overall, the results strongly support the influence of both AM and CM on EI, with AM having a more pronounced effect. The mediating roles of EA, SN, and PBC are significant in both cases. Additionally, EE plays a critical role in enhancing the influence of CM but does not appear to affect the relationship between AM and EI.

6. Contributions and Limitations

In summary, the collective contributions of the present study advance theoretical understanding of the complex interaction between motivational factors and EI within the context of entrepreneurial education (EE). This research enhances existing theoretical frameworks by exploring diverse motivational factors, contextual influences, and educational moderators. It offers valuable insights for educators and stakeholders striving to nurture entrepreneurial mindsets and intentions among students. This underscores the importance of developing educational strategies responsive to students' motivational dynamics, ultimately fostering a more robust entrepreneurial ecosystem.

Structured entrepreneurial leadership courses must be integrated into existing entrepreneurship programs to develop key competencies among students. Self-awareness, self-efficacy, and realization of one's identity are among the competencies that are critical to effective entrepreneurial leadership. Research proves that university entrepreneurship programs improve students' self-fulfillment and self-efficacy, affecting their realization of their identity as future entrepreneurs [65]. Through experiential learning techniques, educators can gain an advantage in their efforts to help students improve their entrepreneurial capabilities by focusing on self-awareness, self-efficacy, and identity realization.

Furthermore, incorporating real-world projects and simulations in entrepreneurship programs positively affects students' entrepreneurial motivation. According to Mensah et al. [66], EE should inspire students to identify opportunities within their environment and leverage practical training experiences. Anggadwita et al. [67] show that involvement in entrepreneurial activities permits students to develop entrepreneurial skills and reinforce attributes like innovation and leadership. Moreover, digital tools and platforms can stimulate more browsing and learning since they provide learners an unbridled avenue to resources and data [68]. Therefore, digital technology supports collaborative learning in the workplace.

The present study is based on a cross-sectional design. This poses some potential limitations that offer future research avenues. Future research can adopt longitudinal designs that track how motivation associated with entrepreneurial intentions shifts over time. The study relies on self-reported data from a single source. Hence, the use of a single data source may introduce bias. Therefore, triangulating data with other sources, such as behavioral observations, can decrease the risk of self-reporting bias.

The study's scope is limited to the final-year students from Selangor, Malaysia. However, the results may vary with different cultural and economic conditions. Therefore, future research can include a diverse sample from various regions within Malaysia and other countries in the Asian context. Examining actual behaviors, such as entrepreneurial activities, instead of confining the study to attitudes and behavioral intentions, yields a richer understanding of the dynamics associated with entrepreneurs. Future studies can also explore the moderating effect of gender on entrepreneurial intentions.

7. Conclusions

Entrepreneurs are pivotal in driving industry growth by introducing innovative business concepts. Developing young people's entrepreneurial skills can increase job creation and economic resilience by mitigating unemployment. This research aimed to assess how autonomous and controlled motivation can influence the entrepreneurial intentions of final-year undergraduate students in Malaysian universities. The research explored the effect of various motivational factors on entrepreneurial intentions (EI), focusing on the mediating roles of attitudes, subjective norms (SN), and perceived behavioral control (PBC) in these relationships. The study confirmed that autonomous motivation (AM) strongly influences EI. Conversely, controlled motivation (CM) significantly negatively affects EI. Additionally, entrepreneurial education (EE) played a critical role in enhancing the influence of CM but did not appear to affect the relationship between AM and EI. This implied that EE enhanced the effect of CM on EI, indicating that individuals motivated by external factors might benefit more from EE when forming their EI. These findings provide valuable insights for policymakers in formulating entrepreneurship policies and suggest avenues for further research and educational programs to foster entrepreneurial motivation among students.

References

[1] M. Israr and M. Saleem, "Entrepreneurial intentions among university students in Italy," *Journal of Global Entrepreneurship Research*, vol. 8, no. 1, pp. 1-14, 2018.

[2] A. Ranjan, "The role of entrepreneurship in economic development," *American Journal of Management Science and Engineering*, vol. 4, no. 6, pp. 87-90, 2019.

[3] C. Park, "A study on effect of entrepreneurship on entrepreneurial intention: focusing on ICT majors," *Asia Pacific Journal of Innovation and Entrepreneurship*, vol. 11, no. 2, pp. 159-170, 2017.

[4] G. Solomon, "An examination of entrepreneurship education in the United States," *Journal of Small Business and Enterprise Development*, vol. 14, no. 2, pp. 168-182, 2007.

[5] M. I. Hossain, M. I. Tabash, M. L. Siow, T. S. Ong, and S. Anagreh, "Entrepreneurial intentions of Gen Z university students and entrepreneurial constraints in Bangladesh," *Journal of Innovation and Entrepreneurship*, vol. 12, no. 1, p. 12, 2023.

[6] I. Al-Jubari and A. Mosbah, "Senior entrepreneurship in Malaysia: Motivations and barriers," *The Journal of Asian Finance, Economics and Business*, vol. 8, no. 6, pp. 277-285, 2021. https://doi.org/10.13106/jafeb.2021.vol8.no6.0277

[7] G. E. Rueda Barrios, J. F. R. Rodriguez, A. V. Plaza, C. P. Vélez Zapata, and M. E. G. Zuluaga, "Entrepreneurial intentions of university students in Colombia: Exploration based on the theory of planned behavior," *Journal of Education for Business*, vol. 97, no. 3, pp. 176-185, 2022.

[8] I. A. Shah, S. Amjed, and S. Jaboob, "The moderating role of entrepreneurship education in shaping entrepreneurial intentions," *Journal of Economic Structures*, vol. 9, pp. 1-15, 2020. https://doi.org/10.1186/s40008-020-00195-4

[9] S. Prince, S. Chapman, and P. Cassey, "The definition of entrepreneurship: is it less complex than we think?," *International Journal of Entrepreneurial Behavior & Research*, vol. 27, no. 9, pp. 26-47, 2021.

[10] G. Mahmood, S. Munir, S. G. Rasool, and R. Anum, "Impact of entrepreneurship competencies on entrepreneurship motivation among Pakistani students: Entrepreneurship education as moderation," *Journal of Accounting and Finance in Emerging Economies,* vol. 7, no. 2, pp. 497-510, 2021.

[11] R. Passaro, I. Quinto, and A. Thomas, "The impact of higher education on entrepreneurial intention and human capital," *Journal of intellectual capital,* vol. 19, no. 1, pp. 135-156, 2018.

[12] A. Ahamat and S. C. Chong, "Multi-methodological approaches in qualitative entrepreneurship research," *International Business Management,* vol. 9, no. 4, pp. 601-612, 2015. https://doi.org/10.3923/ibm.2015.601.612

[13] P. L. A. Luthan, N. Sitanggang, and C. G. G. T. Sibarani, "Interest in students' entrepreneurship building engineering education program," *E-Dimas: Jurnal Pengabdian kepada Masyarakat,* vol. 14, no. 1, pp. 38-43, 2023. https://doi.org/10.26877/e-dimas.v14i1.6466

[14] H. Hassan, A. B. Sade, and M. S. Rahman, "Shaping entrepreneurial intention among youngsters in Malaysia," *Journal of Humanities and Applied Social Sciences,* vol. 2, no. 3, pp. 235-251, 2020. https://doi.org/10.1108/jhass-02-2020-0029

[15] Ministry of Entrepreneur Development and Cooperatives, "Ministry of entrepreneur development and cooperatives [MEDC] protégé program," Retrieved: https://protege.gov.my/www/index.php?id=7&page_id=86&form=MG0AV3, 2023.

[16] Bernama, "Tekin business program," Retrieved: https://www.tekun.gov.my/en/tekun-entrepreneur/tekun-nasional-financing-scheme/conditions/?form=MG0AV3, 2023.

[17] Malaymail, "Entrepreneur Development Ministry allocates RM5m to implement entrepreneurship programmes for graduates," Retrieved: https://www.malaymail.com/news/malaysia/2023/03/13/entrepreneur-development-ministry-allocates-rm5m-to-implement-entrepreneurship-programmes-for-graduates/59366, 2023.

[18] M. R. Yaacob, N. S. A. Shaupi, and A. S. M. Shuaib, "Perception towards factors that affect the effectiveness of an entrepreneurship training program," *Journal of Entrepreneurship and Business,* vol. 4, no. 1, pp. 50-58, 2016. https://doi.org/10.17687/jeb.v4i1.95

[19] E. L. Deci and R. M. Ryan, *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press, 1985.

[20] R. M. Ryan and E. L. Deci, "Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions," *Contemporary educational psychology,* vol. 61, p. 101860, 2020. https://doi.org/10.1016/j.cedpsych.2020.101860

[21] R. M. Ryan and E. L. Deci, *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. The Guilford Press. https://doi.org/10.1521/978.14625/28806, 2017.

[22] F. Rehan, J. Block, and C. Fisch, "Entrepreneurship in Islamic communities: How do Islamic values and Islamic practices influence entrepreneurship intentions?," *Journal of Enterprising Communities: People and Places in the Global Economy,* vol. 13, no. 5, pp. 557-583, 2019.

[23] C.-C. Chu, B. Sun, H. Yang, M. Zheng, and B. Li, "Emotional competence, entrepreneurial self-efficacy, and entrepreneurial intention: A study based on China college students' social entrepreneurship project," *Frontiers in psychology,* vol. 11, p. 547627, 2020. https://doi.org/10.3389/fpsyg.2020.547627

[24] Y. Lv *et al.*, "How entrepreneurship education at universities influences entrepreneurial intention: Mediating effect based on entrepreneurial competence," *Frontiers in psychology,* vol. 12, p. 655868, 2021. https://doi.org/10.3389/fpsyg.2021.655868

[25] M. S. Hagger, N. L. Chatzisarantis, and J. Harris, "From psychological need satisfaction to intentional behavior: Testing a motivational sequence in two behavioral contexts," *Personality and social psychology bulletin,* vol. 32, no. 2, pp. 131-148, 2006.

[26] I. Ajzen, "Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior," *Journal of Applied Social Psychology,* vol. 32, no. 4, pp. 665–683, 2002.

[27] N. F. Krueger, "Entrepreneurial intentions are dead: Long live entrepreneurial intentions," *Revisiting the Entrepreneurial Mind: Inside the Black Box: An Expanded Edition,* pp. 13-34, 2017.

[28] C. J. Armitage and M. Conner, "Efficacy of the theory of planned behaviour: A meta-analytic review," *British journal of social psychology,* vol. 40, no. 4, pp. 471-499, 2001.

[29] W. s. Siu and E. S. c. Lo, "Cultural contingency in the cognitive model of entrepreneurial intention," *Entrepreneurship Theory and Practice,* vol. 37, no. 2, pp. 147-173, 2013.

[30] S. Kabir, A. Haque, and A. Sarwar, "Factors affecting the intention to become an entrepreneur: A study from Bangladeshi business graduates perspective," *International Journal of Engineering and Information Systems,* vol. 1, no. 6, pp. 10-19, 2017.

[31] B. Uzun and A. Aydemir, "Introjected regulation. In Encyclopedia of personality and individual differences." Cham: Springer International Publishing, 2020, pp. 2419-2422.

[32] N. Bachmann, R. Rose, V. Maul, and K. Hölzle, "What makes for future entrepreneurs? The role of digital competencies for entrepreneurial intention," *Journal of Business Research,* vol. 174, p. 114481, 2024. https://doi.org/10.1016/j.jbusres.2023.114481

[33] I. Ajzen, *Attitudes, personality, and behavior*. Chicago , IL: Dorsey, 1988.

[34] A. Sarwar, M. Raman, N. Khan, and V. O. K. Seng, "Critical Success Factors in Malaysian Women Entrepreneurs' Path to Success," *Journal of Leadership & Entrepreneurship,* vol. 1, no. 1, pp. 16-16, 2022.

[35] A. Utsch and A. Rauch, "Innovativeness and initiative as mediators between achievement orientation and venture performance," *European journal of work and organizational psychology,* vol. 9, no. 1, pp. 45-62, 2000.

[36] M. S. Abdullahi, N. Khalid, U. Ahmed, E. M. Ahmed, and A. M. Gumawa, "Effect of entrepreneurship education on entrepreneurial intention among university students," *Journal of Technical Education and Training,* vol. 13, no. 3, pp. 40-53, 2021. https://doi.org/10.30880/jtet.2021.13.03.005

[37] M. Pham, B. Q. Lam, and V. P. T. Le, "The e-entrepreneurial intention of students: The role of self-efficacy and education," *Entrepreneurial Business and Economics Review,* vol. 11, no. 1, pp. 127-143, 2023.

[38] I. Al-Jubari, A. Mosbah, and Z. Talib, "Do intrinsic and extrinsic motivation relate to entrepreneurial intention differently? A self-determination theory perspective," *Academy of Entrepreneurship Journal,* vol. 25, pp. 1-14, 2019.

[39] D. A. Razak, S. M. Sarif, and A. Sarwar, "Unveiling the Determinant of Humanized Business Intention Among Malaysia SMEs," *Administrative Sciences,* vol. 15, no. 2, p. 47, 2025. https://doi.org/10.3390/admsci15020047

[40] I. Ajzen, "The theory of planned behavior," *Organizational Behavior and Human Decision Processes,* vol. 50, no. 2, pp. 179-211, 1991. https://doi.org/10.1016/0749-5978(91)90020-T

[41] G. Boldureanu, A. M. Ionescu, A.-M. Bercu, M. V. Bedrule-Grigoruță, and D. Boldureanu, "Entrepreneurship education through successful entrepreneurial models in higher education institutions," *Sustainability,* vol. 12, no. 3, p. 1267, 2020. https://doi.org/10.3390/su12031267

[42] O. Owoseni and P. Akambi, "Entrepreneurial intentions: A theoretical framework," *Journal of management and corporate governance,* vol. 2, no. 4, pp. 132-148, 2010.

[43] A. G. Sahinidis and P. A. Tsaknis, "Shaping entrepreneurial intentions: The impact of entrepreneurship education on university students," *Zeszyty Naukowe Małopolskiej Wyższej Szkoły Ekonomicznej w Tarnowie,* vol. 48, no. 4, pp. 49-58, 2020.

[44] G. Becker, *Human capital-a theoretical and empirical analysis*. New York: Special Reference to Edification, 1964.

[45] B. Bae and S. Choi, "The effect of learning orientation and business model innovation on entrepreneurial performance: focused on South Korean start-up companies," *Journal of Open Innovation: Technology, Market, and Complexity,* vol. 7, no. 4, p. 245, 2021.

[46] J. M. Unger, A. Rauch, M. Frese, and N. Rosenbusch, "Human capital and entrepreneurial success: A meta-analytical review," *Journal of business venturing,* vol. 26, no. 3, pp. 341-358, 2011.

[47] A. Fayolle, W. Lamine, S. Mian, and P. Phan, "Effective models of science, technology and engineering entrepreneurship education: current and future research," *The Journal of Technology Transfer,* vol. 46, pp. 277-287, 2021.

[48] T. J. Bae, S. Qian, C. Miao, and J. O. Fiet, "The relationship between entrepreneurship education and entrepreneurial intentions: A meta–analytic review," *Entrepreneurship theory and practice,* vol. 38, no. 2, pp. 217-254, 2014.

[49] D. Sobakinova, Y. Zhou, and D. K. Durrani, "The role of human capital outcomes in generating business ideas," *VINE Journal of Information and Knowledge Management Systems,* vol. 50, no. 1, pp. 163-183, 2020.

[50] C. Gieure, M. del Mar Benavides-Espinosa, and S. Roig-Dobón, "The entrepreneurial process: The link between intentions and behavior," *Journal of Business Research,* vol. 112, pp. 541-548, 2020.

[51] N. M. Radzi and M. F. A. Ghani, "The design of effective school enterprise programme for vocational colleges in malaysia: An application of fuzzy delphi method," *MOJEM: Malaysian Online Journal of Educational Management,* vol. 9, no. 4, pp. 73-96, 2021.

[52] M. W. Staniewski, "The contribution of business experience and knowledge to successful entrepreneurship," *Journal of Business Research,* vol. 69, no. 11, pp. 5147-5152, 2016.

[53] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *European business review,* vol. 31, no. 1, pp. 2-24, 2019.

[54] J. Henseler, C. M. Ringle, and M. Sarstedt, "A new criterion for assessing discriminant validity in variance-based structural equation modeling," *Journal of the academy of marketing science,* vol. 43, pp. 115-135, 2015.

[55] J. E. Cohen, *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates, 1988.

[56] D. Purwana and U. Suhud, "Investigating the effect of motivation on entrepreneurial intention: three different approaches," *Problems and Perspectives in Management,* vol. 16, no. 2, pp. 200-208, 2018.

[57] S. Siswanto, "Religiosity and entrepreneurial motivation roles in the goal-specific relation: A case of Muslim students in Indonesia," *Journal of Islamic Accounting and Business Research,* 2023.

[58] M. Iffan, "Impact of entrepreneurial motivation on entrepreneurship intention," presented at the In International Conference on Business, Economic, Social Science and Humanities (ICOBEST 2018) (pp. 208-211). Atlantis Press, 2018.

[59] L. Wu, S. Jiang, X. Wang, L. Yu, Y. Wang, and H. Pan, "Entrepreneurship education and entrepreneurial intentions of college students: The mediating role of entrepreneurial self-efficacy and the moderating role of entrepreneurial competition experience," *Frontiers in psychology,* vol. 12, p. 727826, 2022.

[60] C. G. Iwu *et al.*, "Entrepreneurship education, curriculum and lecturer-competency as antecedents of student entrepreneurial intention," *The International Journal of Management Education,* vol. 19, no. 1, p. 100295, 2021.

[61] L. Mónico, C. Carvalho, S. Nejati, M. Arraya, and P. Parreira, "Entrepreneurship education and its influence on higher education students' entrepreneurial intentions and motivation in Portugal," *BAR-Brazilian Administration Review,* vol. 18, no. 03, p. e190088, 2021.

[62] P. E. Prasetyo, "The reliability of entrepreneurial productivity as driver of economic growth and employment," *International Journal of Entrepreneurship,* vol. 23, no. 4, pp. 1-15, 2019.

[63] S. Mukhtar, L. W. Wardana, A. Wibowo, and B. S. Narmaditya, "Does entrepreneurship education and culture promote students' entrepreneurial intention? The mediating role of entrepreneurial mindset," *Cogent Education,* vol. 8, no. 1, p. 1918849, 2021.

[64] C. D. Duong, "Exploring the link between entrepreneurship education and entrepreneurial intentions: the moderating role of educational fields," *Education+ Training,* vol. 64, no. 7, pp. 869-891, 2022.

[65] A. Bagheri and Z. A. Pihie, "On becoming an entrepreneurial leader: a focus on the impacts of university entrepreneurship programs," *American Journal of Applied Sciences,* vol. 8, no. 9, p. 884, 2011.

[66] I. K. Mensah, G. Zeng, C. Luo, Z. Xiao, and M. Lu, "Exploring the predictors of Chinese college students' entrepreneurial intention," *Sage Open,* vol. 11, no. 3, p. 21582440211029941, 2021.

[67] G. Anggadwita, V. Ramadani, A. Permatasari, and D. T. Alamanda, "Key determinants of women's entrepreneurial intentions in encouraging social empowerment," *Service Business,* vol. 15, no. 2, pp. 309-334, 2021.

[68] P. P. Rahayu, I. Mayasari, Q. Fitriyatinur, and M. T. Agustina, "Entrepreneurship education and the role of technology in driving business innovation," *Indo-MathEdu Intellectuals Journal,* vol. 4, no. 2, pp. 714-727, 2023.