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# How Attitude and Perceived Behavioral Control Mediate the Relationship between Entrepreneurial Cognition and Students' Entrepreneurial Intention under the TPB Framework

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### ABSTRACT

Understanding how entrepreneurial intention is formed is essential for fostering future entrepreneurs. This study extends the Theory of Planned Behavior (TPB) by incorporating Entrepreneurial Cognition as an antecedent and examining the mediating roles of personal attitude, perceived behavioral control, and social norms. Data were collected from 377 undergraduate students and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The measurement model demonstrated strong reliability and validity, while structural analysis revealed that entrepreneurial cognition significantly predicts all three TPB dimensions. Among these, personal attitude and perceived behavioral control significantly mediated the relationship between cognition and entrepreneurial intention, confirming their role as psychological mechanisms that translate knowledge into motivation. In contrast, social norms did not serve as a significant mediator, suggesting that students' entrepreneurial decisions are shaped more by internal beliefs and self-confidence than by external social pressures. This finding aligns with prior research indicating that subjective norms are often the weakest predictor within TPB models of entrepreneurial intention. The study contributes by clarifying the cognitive pathways to intention, highlighting the dominant influence of attitudes and perceived behavioral control, while questioning the strength of normative influences in student populations. Practical implications include the need for universities and policymakers to design entrepreneurship programs that prioritize mindset development, self-efficacy building, and experiential learning, rather than relying primarily on social endorsement.

## 1. Introduction

Entrepreneurship is widely regarded as a catalyst for innovation, job creation, and sustainable economic growth. For many countries facing challenges of graduate unemployment, fostering entrepreneurial intention among university students is seen as a practical solution to generate self-employment and new business ventures [1]. Entrepreneurial intention, defined as an individual's

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conscious state of mind that directs attention, experience, and action toward entrepreneurial behavior [2], is therefore a critical construct in entrepreneurship research.

The Theory of Planned Behavior (TPB) [3] has been one of the most frequently applied frameworks to explain entrepreneurial intention. TPB posits that intention is determined by three factors: personal attitude toward entrepreneurship, perceived social norms, and perceived behavioral control (PBC). While TPB has consistently demonstrated predictive power across cultures and contexts [1,4], scholars have argued that the model can be further enriched by integrating cognitive perspectives that explain how individuals process information and make decisions about entrepreneurship [5].

Entrepreneurial Cognition Theory [6] offers such a perspective. Cognition emphasizes the knowledge structures and scripts entrepreneurs use to recognize opportunities, evaluate risks, and decide to act. Integrating entrepreneurial cognition into TPB provides a deeper understanding of how cognitive mechanisms are translated into motivation through attitudes, perceptions of control, and sensitivity to social expectations. This integration allows us to examine whether individuals form entrepreneurial intentions and how cognitive skills shape the psychological pathways that lead to intention.

This study seeks to investigate the role of entrepreneurial cognition in shaping entrepreneurial intention among undergraduate students, with a focus on the mediating roles of personal attitude and perceived behavioral control. While subjective norms and social capital were also tested, they did not emerge as significant mediators in this context. The paper contributes to the literature by clarifying the cognitive pathways that influence intention, offering both theoretical insights and practical implications for entrepreneurship education and policy.

## **2. Literature Review**

Entrepreneurial intention is widely acknowledged as the most immediate predictor of entrepreneurial behavior [5]. The Theory of Planned Behavior (TPB) [3] provides a robust framework for explaining intention through three antecedents: personal attitude, subjective norms, and perceived behavioral control (PBC). Attitude reflects the degree to which entrepreneurship is evaluated positively or negatively, subjective norms represent perceived social pressure from significant others, and PBC captures perceived capability to perform entrepreneurial activities. Prior research has consistently shown that attitude and PBC are strong predictors of entrepreneurial intention, while the role of subjective norms has produced mixed results [1,7].

While TPB explains the motivational aspects of intention, scholars have highlighted the need to incorporate cognitive perspectives that account for how individuals process information and make entrepreneurial decisions [5,8]. Entrepreneurial Cognition Theory [6] addresses this gap by emphasizing individuals' knowledge structures and cognitive scripts to recognize opportunities, assess risks, and evaluate feasibility. Cognition thus provides the foundation for how individuals form attitudes, perceive control, and interpret social expectations.

Social capital has also been considered in entrepreneurial intention research as a factor that captures network ties and resource access[9]. However, empirical findings are inconsistent, and in the present study, social capital was tested but found not to significantly influence intention. This highlights the dominance of internal cognitive and psychological factors over external network resources in shaping students' entrepreneurial motivations.

Integrating entrepreneurial cognition with TPB allows us to examine both the cognitive antecedents and the psychological mechanisms through which entrepreneurial intention is formed.

## *2.1 Entrepreneurial Cognition*

Entrepreneurial cognition is defined as the knowledge structures and cognitive scripts that individuals use to make assessments, judgments, and decisions about opportunities and ventures [6, 10]. These cognitive structures influence how people recognize opportunities, interpret uncertainty, and evaluate risk. Entrepreneurial cognition can be cultivated in educational contexts through exposure to entrepreneurial tasks, case studies, and problem-solving exercises that train students to think like entrepreneurs [11]. Cognition provides the mental foundation upon which attitudes, efficacy, and perceptions of social approval are built, making it a logical antecedent in intention models.

## *2.2 Theory of Planned Behavior (TPB)*

TPB suggests that intention is influenced by three factors: attitude toward behavior, subjective norms, and perceived behavioral control [3]. Attitude reflects personal evaluation of entrepreneurship as desirable or undesirable. Subjective norms capture perceived social pressure from significant others to engage in entrepreneurship. PBC represents perceived capability and confidence in performing entrepreneurial activities. Numerous studies confirm that attitude and PBC are consistently strong predictors of entrepreneurial intention, while subjective norms often yield weaker or inconsistent effects [1,7].

## *2.3 Entrepreneurial Cognition and Attitude*

Attitude toward entrepreneurship plays a critical role in shaping intention. Individuals with high entrepreneurial cognition are more likely to perceive entrepreneurship positively, viewing it as rewarding and valuable [5]. Cognitive ability enhances perceptions of desirability by enabling students to assess opportunities and foresee potential outcomes. Studies confirm that entrepreneurial cognition has a positive influence on entrepreneurial attitude, which in turn fosters entrepreneurial intention [12-14].

H1: Entrepreneurial cognition positively influences personal attitude toward entrepreneurship

## *2.4 Entrepreneurial Cognition and Perceived Behavioral Control*

Entrepreneurial cognition also shapes perceptions of feasibility and capability. Cognitively skilled individuals are better able to handle ambiguity, problem-solve, and make decisions under uncertainty, thereby strengthening their sense of control [10]. This aligns with the construct of self-efficacy, which has been found to strongly predict entrepreneurial intention [11].

H2: Entrepreneurial cognition positively influences perceived behavioural control

### *2.5 Entrepreneurial Cognition and Social Norms*

Cognition may also influence how individuals perceive societal expectations. Awareness of opportunities and entrepreneurial thinking can heighten sensitivity to social approval or disapproval. However, empirical studies have often found that subjective norms are the weakest link in TPB models [15,16].

H3: Entrepreneurial cognition positively influences social norms.

### *2.6 Attitude and Entrepreneurial Intention*

Positive attitudes toward entrepreneurship consistently predict stronger intention [3,17]. Students who believe that entrepreneurship is attractive and rewarding are more likely to pursue it as a career path [18-20].

H4: Personal attitude positively influences entrepreneurial intention

### *2.7 Perceived Behavioral Control and Entrepreneurial Intention*

PBC, similar to self-efficacy, directly impacts intention by reinforcing perceptions of capability and feasibility [3]. Empirical evidence consistently shows PBC as one of the strongest predictors of entrepreneurial intention [17,21,22].

H5: Perceived behavioral control positively influences entrepreneurial intention

### *2.8 Social Norms and Entrepreneurial Intention*

Although included in TPB, social norms have shown inconsistent results across studies. Some research finds them significant [4], while others report weak or null effects [2,23].

H6: Social norms positively influence entrepreneurial intention

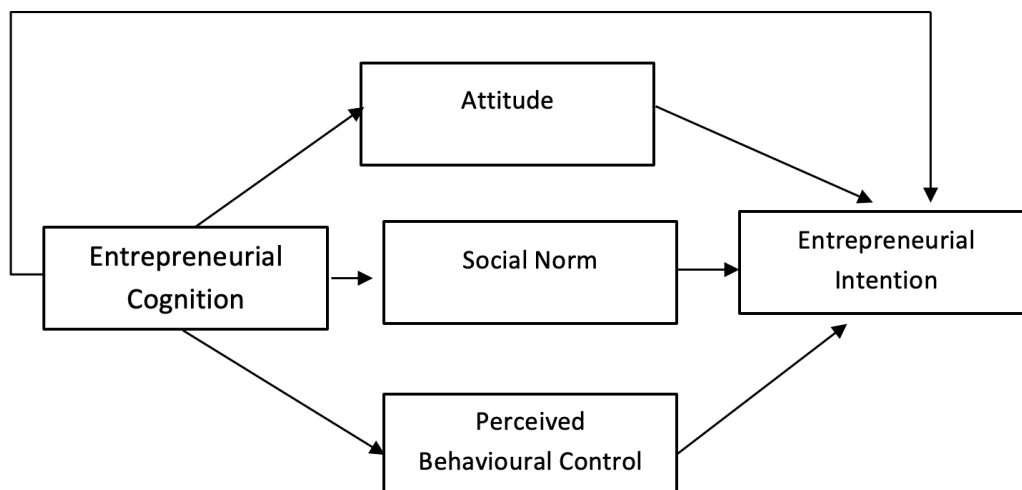
### *2.9 Mediation by TPB Dimensions*

Entrepreneurial cognition is theorized to influence intention indirectly by shaping attitude, PBC, and social norms. This reflects the psychological mechanisms through which cognitive abilities translate into motivational outcomes [5].

H7a: Attitude mediates the relationship between entrepreneurial cognition and entrepreneurial intention

H7b: Perceived behavioral control mediates the relationship between entrepreneurial cognition and entrepreneurial intention

H7c: Social norms mediate the relationship between entrepreneurial cognition and entrepreneurial intention



**Fig. 1.** Research framework

### 3. Methodology

#### 3.1 Research Design and Sample

A quantitative survey approach was employed. Data were collected from 377 undergraduate students across different faculties of a Malaysian public university. A structured questionnaire was used, drawing on validated scales from previous research. Entrepreneurial cognition items were adapted from Mitchell *et al.*, [6], while TPB constructs followed Linan and Chen [1].

#### 3.2 Data Analysis

Partial Least Squares Structural Equation Modeling (PLS-SEM) was applied using SmartPLS 4.0. This method is appropriate for complex models with latent constructs and does not require strict normality assumptions. The analysis proceeded in two stages: first assessing the measurement model for reliability and validity, and then evaluating the structural model for hypothesized relationships.

### 4. Results

#### 4.1 Measurement Model Assessment

All constructs achieved Cronbach's alpha and composite reliability values above 0.70, indicating good internal consistency. Average Variance Extracted (AVE) exceeded 0.50, supporting convergent validity. Fornell–Larcker criterion confirmed discriminant validity, with each construct's AVE square root greater than its inter-construct correlations. HTMT values were below 0.85, confirming construct distinctiveness.

**Table 1**  
Measurement model

| Constructs                    | Item | Loadings | AVE > 0.50 | CR > 0.70 | Cronbach's Alpha >0.7 |
|-------------------------------|------|----------|------------|-----------|-----------------------|
| Entrepreneurial cognition     | EC01 | 0.864    | 0.779      | 0.929     | 0.929                 |
|                               | EC02 | 0.886    |            |           |                       |
|                               | EC03 | 0.869    |            |           |                       |
|                               | EC04 | 0.893    |            |           |                       |
|                               | EC05 | 0.899    |            |           |                       |
| Entrepreneurial Intention     | EI01 | 0.875    | 0.767      | 0.900     | 0.899                 |
|                               | EI02 | 0.892    |            |           |                       |
|                               | EI03 | 0.858    |            |           |                       |
|                               | EI04 | 0.878    |            |           |                       |
| Attitude                      | PA01 | 0.899    | 0.815      | 0.944     | 0.943                 |
|                               | PA02 | 0.893    |            |           |                       |
|                               | PA03 | 0.908    |            |           |                       |
|                               | PA04 | 0.896    |            |           |                       |
|                               | PA05 | 0.919    |            |           |                       |
| Perceived Behavioural Control | PC01 | 0.885    | 0.762      | 0.922     | 0.922                 |
|                               | PC02 | 0.877    |            |           |                       |
|                               | PC03 | 0.870    |            |           |                       |
|                               | PC04 | 0.873    |            |           |                       |
|                               | PC05 | 0.859    |            |           |                       |
| Social Norm                   | SN01 | 0.874    | 0.757      | 0.921     | 0.920                 |
|                               | SN02 | 0.874    |            |           |                       |
|                               | SN03 | 0.863    |            |           |                       |
|                               | SN04 | 0.858    |            |           |                       |
|                               | SN05 | 0.882    |            |           |                       |

#### 4.2 Structural Model Assessment

The structural model demonstrated substantial explanatory power, with  $R^2$  for entrepreneurial intention at 0.64.  $Q^2$  values were above zero, confirming predictive relevance, while SRMR was below 0.08, indicating good model fit. Path coefficients showed that entrepreneurial cognition significantly influenced attitude, PBC, and social norms. Attitude and PBC significantly predicted entrepreneurial intention, while social norms did not. This suggests that intention is primarily shaped by internal factors rather than external social approval.

**Table 2**

Assessment of discriminant validity

| Construct                          | 1            | 2            | 3            | 4            | 5            |
|------------------------------------|--------------|--------------|--------------|--------------|--------------|
| Entrepreneurial Cognition (ECog)   | <b>0.883</b> |              |              |              |              |
| Entrepreneurial Intention (EI)     | 0.510        | <b>0.876</b> |              |              |              |
| Personal Attitude (PAttitude)      | 0.768        | 0.813        | <b>0.903</b> |              |              |
| Perceived Behavioral Control (PBC) | 0.794        | 0.840        | 0.860        | <b>0.873</b> |              |
| Social Norms (SNorm)               | 0.816        | 0.835        | 0.863        | 0.898        | <b>0.870</b> |

Note: Values in bold on the diagonal represent the square root of AVE. Off-diagonal values are the latent variable correlations.

### 4.3 Hypothesis Testing

**Table 3**

Results of hypothesis testing

| Hypothesis | Relationship     | Std. Beta | t-value | p-value | 95% CI (LL – UL) | Decision      |
|------------|------------------|-----------|---------|---------|------------------|---------------|
| H1         | ECog → EI        | 0.510     | 8.602   | 0.000   | [0.394 – 0.621]  | Supported     |
| H2         | ECog → PAttitude | 0.768     | 20.847  | 0.000   | [0.690 – 0.833]  | Supported     |
| H3         | ECog → PBC       | 0.794     | 25.681  | 0.000   | [0.729 – 0.852]  | Supported     |
| H4         | ECog → SNorm     | 0.816     | 31.934  | 0.000   | [0.763 – 0.864]  | Supported     |
| H5         | PAttitude → EI   | 0.165     | 2.515   | 0.012   | [0.039 – 0.295]  | Supported     |
| H6         | PBC → EI         | 0.166     | 2.631   | 0.009   | [0.040 – 0.287]  | Supported     |
| H7         | SNorm → EI       | 0.074     | 1.204   | 0.229   | [-0.049 – 0.193] | Not Supported |

The results of the structural model testing revealed that entrepreneurial cognition had a significant direct effect on entrepreneurial intention ( $\beta = 0.510$ ,  $t = 8.602$ ,  $p < 0.001$ ), as well as strong positive effects on personal attitude ( $\beta = 0.768$ ,  $t = 20.847$ ,  $p < 0.001$ ), perceived behavioral control ( $\beta = 0.794$ ,  $t = 25.681$ ,  $p < 0.001$ ), and social norms ( $\beta = 0.816$ ,  $t = 31.934$ ,  $p < 0.001$ ). Both personal attitude ( $\beta = 0.165$ ,  $t = 2.515$ ,  $p = 0.012$ ) and perceived behavioral control ( $\beta = 0.166$ ,  $t = 2.631$ ,  $p = 0.009$ ) were found to significantly influence entrepreneurial intention, while social norms showed no significant effect ( $\beta = 0.074$ ,  $t = 1.204$ ,  $p = 0.229$ ). Mediation analysis further confirmed that entrepreneurial cognition influenced entrepreneurial intention indirectly through personal attitude ( $\beta = 0.127$ ,  $t = 2.414$ ,  $p = 0.016$ ) and perceived behavioural control ( $\beta = 0.132$ ,  $t = 2.645$ ,  $p = 0.008$ ), whereas the mediating effect of social norms was not significant ( $\beta = 0.060$ ,  $t = 1.198$ ,  $p = 0.231$ ). Overall, these findings suggest that entrepreneurial cognition has both direct and indirect effects on entrepreneurial intention, with personal attitude and perceived behavioural control serving as significant mediators. At the same time, social norms do not play a substantial mediating role.

**Table 4**

Results of mediation testing (specific indirect effects)

| Hypothesis | Indirect Path         | Effect | t-value | p-value | 95% CI (LL – UL) | Decision      |
|------------|-----------------------|--------|---------|---------|------------------|---------------|
| H7a        | ECog → PAttitude → EI | 0.127  | 2.414   | 0.016   | [0.029 – 0.235]  | Supported     |
| H7b        | ECog → PBC → EI       | 0.132  | 2.645   | 0.008   | [0.032 – 0.228]  | Supported     |
| H7c        | ECog → SNorm → EI     | 0.06   | 1.198   | 0.231   | [-0.041 – 0.160] | Not Supported |

The mediation analysis (Table 3) shows that entrepreneurial cognition significantly influences entrepreneurial intention through personal attitude ( $\beta = 0.127$ ,  $p = 0.016$ ) and perceived behavioral control ( $\beta = 0.132$ ,  $p = 0.008$ ), confirming their roles as mediators. However, the indirect effect via social norms was not significant ( $\beta = 0.060$ ,  $p = 0.231$ ), indicating that social norms do not mediate the relationship between entrepreneurial cognition and entrepreneurial intention.

## 5. Discussion

The findings demonstrate that entrepreneurial cognition plays a vital role in shaping intention through the mediating mechanisms of attitude and PBC. Students who can recognize and evaluate opportunities are more likely to develop favorable perceptions of entrepreneurship and confidence in their abilities, which translate into stronger intention. This supports Krueger's [5] argument that cognition drives perceptions of desirability and feasibility, which align with TPB constructs.

Interestingly, subjective norms did not significantly predict entrepreneurial intention, echoing prior studies [2,7]. This suggests that social approval is less influential for university students, who may prioritize personal evaluations and self-efficacy over societal expectations when considering entrepreneurship. The results contribute to theory by integrating cognitive perspectives with TPB, highlighting that intention is shaped by both cognitive and psychological factors. For practice, the findings emphasize the need for entrepreneurship programs to strengthen cognitive skills and self-efficacy, rather than relying solely on social endorsement.

## 6. Conclusion and Implications

This study enriches entrepreneurial intention research by integrating entrepreneurial cognition with TPB. The results confirm that cognition shapes intention indirectly through attitude and PBC, while social norms exert little influence in this context. Theoretically, this advances TPB by clarifying the mechanisms through which cognition translates into intention.

Practically, the findings suggest that universities and policymakers should design entrepreneurship education that develops cognitive skills, enhances positive attitudes, and builds students' confidence in their entrepreneurial capabilities. Experiential learning, simulations, and mentorship programs could be effective in fostering these psychological drivers of intention.

Future research could expand the model by examining other mediators, such as entrepreneurial passion or resilience, and testing the framework across different cultural contexts to assess generalizability.

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