

An Integrated Structural Model of Big Five Personality Traits, Critical and Creative Thinking, and Entrepreneurial Intention in Vietnam: A Mathematical Framework

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Abstract

While prior research has separately examined creative and critical thinking as mediators between personality traits and entrepreneurial intention, few have tested an integrated model where both operate simultaneously. Addressing this gap, we propose a structural model for Vietnamese university students in the Southeast region. Drawing on the Theory of Planned Behavior and Social Cognitive Theory, the Big Five traits (Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism) influence entrepreneurial intention through two parallel cognitive pathways creative thinking and critical thinking with both direct and indirect effects. Using Structural Equation Modeling (SEM) with matrix equations (B and Γ), all path coefficients are estimated simultaneously. Methodologically, a mixed-methods design includes a quantitative survey of students in Ho Chi Minh City and nearby provinces. Expected contributions fill a theoretical void in Vietnam's entrepreneurship literature and offer practical guidance: entrepreneurship programs should deliberately foster both creativity and analytical reasoning, not just business planning skills.

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Big Five, personality traits; creative thinking; critical thinking; entrepreneurial intention; SEM; entrepreneurship education; Vietnam

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1. Introduction

Entrepreneurship drives innovation, job creation, and national competitiveness. The Global Entrepreneurship Monitor (GEM, 2023) reports rising entrepreneurial activity among youth and students worldwide. This signals a shift toward entrepreneurship as a viable career path. In Vietnam, the government has promoted startup ecosystems and emphasized the role of students in building an entrepreneurial culture (Ministry of Planning and Investment, 2025). However, despite an increase in new business registrations, long term survival rates remain low (Nguyen, Lam & Nguyen, 2023). A key reason is the lack of foundational skills such as creativity, critical thinking, risk management, and adaptability (Phan, 2022).

International studies suggest that creative and critical thinking serve as crucial mediators. They translate personality traits, particularly the Big Five, into

entrepreneurial intention and behavior (Li, Huang & Gao, 2022; Zhang et al., 2025). This study builds on two theories. The Theory of Planned Behavior (Ajzen, 1991) identifies entrepreneurial intention as a direct precursor to entrepreneurial behavior. Social Cognitive Theory (Bandura, 1986) highlights the role of self-efficacy and cognitive skills. We integrate both frameworks to explain how personality affects entrepreneurial intention through mediating cognitive skills.

Many studies have examined the relationship between personality traits, cognitive skills, and entrepreneurial intention. However, most have analyzed the mediating role of creativity or critical thinking in isolation. This has led to inconsistent findings. For example, extraversion and neuroticism show nonlinear effects on creativity (Phan, 2022; Vu & Nguyen, 2024). Furthermore, research in the Vietnamese context remains limited (Tran, Nguyen & Nguyen, 2025; Zhang et al., 2025). To date, no known



study has constructed and tested an integrated model that combines the Big Five traits with both creativity and critical thinking as parallel mediators. This is especially true for students in Vietnam's dynamic Southeast region. This research fills that theoretical gap. We provide a comprehensive model and empirical evidence to support the design of effective entrepreneurship training programs.

2. Theoretical background and hypotheses

2.1. Personality and cognitive mechanisms

The Big Five personality traits, also known as the Five Factor Model, were developed by McCrae and Costa (1987). This framework classifies human personality into five dimensions: Conscientiousness, Agreeableness, Neuroticism, Openness to Experience, and Extraversion. Openness to Experience reflects a person's imagination, curiosity, and intellectual openness. Individuals high in openness are bold, flexible, and creative. They show deep interest in new ideas and experiences. This trait links to abstract thinking, critical reasoning, and innovation, all essential for entrepreneurship (Li et al., 2022; Gao et al., 2020; Hamedinasab & Azizi, 2021; Zhang et al., 2025; Acevedo, 2022; Atherton et al., 2021).

Conscientiousness characterizes organized, responsible, goal-oriented, and disciplined individuals. They are reliable and persistent in pursuing their goals.

Extraversion reflects a tendency to seek social stimulation. Extraverts are assertive, sociable, and energetic in group settings.

Agreeableness refers to an individual's tendency to be kind, cooperative, and empathetic. Although entrepreneurs often score lower on this trait than managers, research shows a positive impact on social entrepreneurial intention in the Vietnamese context.

Neuroticism reflects a tendency to experience negative emotions such as anxiety and sadness. Emotional stability, the opposite of neuroticism, is a key factor for effective decision-making and resilience.

Creative thinking (CR) is the ability to generate new, original, and effective ideas and solutions. This skill combines imagination, analysis, and risk-taking. Research consistently shows a significant positive impact of openness and conscientiousness on creativity. Meanwhile, extraversion and neuroticism can have nonlinear effects (Li et al., 2022; Gao et al., 2020; Runco & Acar, 2012; Amabile, 1996).

Critical thinking (CT) is a deliberate, methodical intellectual process. It involves analyzing, evaluating, and synthesizing information based on universal intellectual standards such as clarity and logic. This skill enables individuals to make sound judgments, evaluate risks, and make effective decisions in uncertain contexts like entrepreneurship (Zhang et al., 2025; Paul & Scriven, 2003; Paul & Elder, 2001).

2.2. Cognitive mediators and entrepreneurial intention

According to the Theory of Planned Behavior (TPB), entrepreneurial intention depends on three factors: attitude toward behavior, subjective norms, and perceived behavioral control. In contrast, Social Cognitive Theory (SCT) emphasizes the dynamic interaction among personal factors (cognition, beliefs), behavior, and environment. Central to SCT is self-efficacy, an individual's belief in their ability to perform a specific behavior successfully.

Creative and critical thinking act as crucial cognitive mediators between personality and entrepreneurial intention. Creative thinking helps individuals maintain a positive attitude and high self-confidence in entrepreneurial pursuits. Critical thinking, supported by emotional stability, enables objective information assessment and logical decision-making. This, in turn, enhances perceived behavioral control.

Based on this theoretical foundation and prior research, we propose the following hypotheses.

H1: The Big Five personality traits have a significant effect on creative thinking.

H2: The Big Five personality traits have a significant effect on critical thinking.

H3: Creative thinking has a significant positive effect on entrepreneurial intention.

H4: Critical thinking has a significant positive effect on entrepreneurial intention.

H5: Creative thinking mediates the relationship between the Big Five personality traits and entrepreneurial intention.

H6: Critical thinking mediates the relationship between the Big Five personality traits and entrepreneurial intention.

3. Conceptual model and structural equations

3.1. Conceptual model

This study proposes an integrated model where the five Big Five personality traits (Openness, Conscientiousness,

Extraversion, Agreeableness, and Neuroticism) act as exogenous variables. Creative thinking (CR) and critical thinking (CT) are considered endogenous mediating variables, and entrepreneurial intention (EI) is the dependent variable. The model suggests that the Big Five traits influence entrepreneurial intention both directly and indirectly through the mediating roles of CR and CT.

3.2. Structural equation formulation

The relationships within the conceptual model can be formulated using the fundamental equations of Structural Equation Modeling (SEM). SEM uses two sets of equations: the measurement model and the structural model. The user specifically requests structural equations with the B and Γ matrices.

The general form of the structural model is:

$$\eta = B\eta + \Gamma\xi + \zeta$$

Where:

η (eta) is a vector of endogenous variables (dependent and mediating variables).

ξ (xi) is a vector of exogenous variables (independent variables).

B (beta) is a matrix of path coefficients representing the relationships among the endogenous variables (η→η).

Γ (gamma) is a matrix of path coefficients representing the relationships from the exogenous variables to the endogenous variables (ξ→η).

ζ (zeta) is a vector of disturbances (errors in the structural equations).

In this specific model, we have:

- Exogenous Variables (ξ):
 - ξ₁ = Openness (O)
 - ξ₂ = Conscientiousness (C)
 - ξ₃ = Extraversion (E)
 - ξ₄ = Agreeableness (A)
 - ξ₅ = Emotional Stability (ES, or 1-N)
- Endogenous Variables (η):
 - η₁ = Creative Thinking (CR)
 - η₂ = Critical Thinking (CT)
 - η₃ = Entrepreneurial Intention (EI)

The structural equations for this model can be written as:

1. η₁(CR) = γ₁₁ξ₁ + γ₁₂ξ₂ + γ₁₃ξ₃ + γ₁₄ξ₄ + γ₁₅ξ₅ + ζ₁
2. η₂(CT) = γ₂₁ξ₁ + γ₂₂ξ₂ + γ₂₃ξ₃ + γ₂₄ξ₄ + γ₂₅ξ₅ + ζ₂
3. η₃(EI) = β₃₁η₁ + β₃₂η₂ + γ₃₁ξ₁ + γ₃₂ξ₂ + γ₃₃ξ₃ + γ₃₄ξ₄ + γ₃₅ξ₅ + ζ₃

The corresponding matrices B and Γ would be:

$$B = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ \beta_{31} & \beta_{32} & 0 \end{bmatrix}$$

$$G = \begin{bmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} & \gamma_{14} & \gamma_{15} \\ \gamma_{21} & \gamma_{22} & \gamma_{23} & \gamma_{24} & \gamma_{25} \\ \gamma_{31} & \gamma_{32} & \gamma_{33} & \gamma_{34} & \gamma_{35} \end{bmatrix}$$

This formulation allows for the simultaneous estimation of all path coefficients, including direct effects (e.g., γ₃₁ for Openness → EI) and indirect effects through the mediating variables (e.g., the product of γ₁₁ and β₃₁ for Openness → CR → EI).

4. Methodological implications

We will test the proposed model using a mixed methods approach, with primary focus on quantitative analysis through SEM. The quantitative phase will collect data from university students in Vietnam's Southeast region. A survey instrument will measure all variables: the five Big Five traits, critical thinking, creative thinking, and entrepreneurial intention. We will analyze the collected data using statistical software such as AMOS, Mplus, or R's lavaan.

SEM is essential for this study because it examines complex relationships among multiple variables simultaneously. It captures both direct and indirect effects. This approach is well-suited for testing the mediating hypotheses (H5 and H6). Compared to traditional regression analysis, SEM provides a more comprehensive understanding of the psychological mechanisms involved.

5. Contributions and implications

5.1. Theoretical contributions

This study offers several theoretical contributions. First, it fills a research gap by proposing and testing an integrated model where creative and critical thinking act as parallel mediators between the Big Five traits and entrepreneurial intention. Second, by combining TPB and SCT, it provides a more holistic framework that links personality traits to cognitive and behavioral outcomes. Third, the research supplies empirical evidence from the Vietnamese context, which is currently scarce. It also highlights how cultural and social factors uniquely shape entrepreneurial intentions in this setting.

5.2. Practical implications

These findings have practical implications for policymakers, university administrators, and educators in Vietnam. Understanding how personality and cognitive skills directly and indirectly affect entrepreneurial intention can guide the design of targeted training



programs. Rather than focusing only on business knowledge, such programs should include modules that enhance creative thinking, critical thinking, and emotional resilience. Tailored interventions can help students identify their entrepreneurial strengths based on personality profiles, increasing venture success, and supporting the sustainable development of the national startup ecosystem.

6. Conclusion

This paper provides a theoretical and methodological framework to examine the interplay between personality, cognitive skills, and entrepreneurial intention. By proposing an integrated structural model with creative and critical thinking as parallel mediators, the study offers a more nuanced understanding of the psychological mechanisms driving entrepreneurial intention in Vietnam. The application of SEM enables robust

quantitative analysis. This contributes to academic theory and practical applications in entrepreneurship education and policy.

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Mô hình cấu trúc tích hợp giữa Năm yếu tố tính cách lớn, Tư duy phản biện và Sáng tạo, và Ý định khởi nghiệp tại Việt Nam: Khung lý thuyết Toán học

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Tóm tắt

Mặc dù các nghiên cứu trước đây đã xem xét riêng rẽ tư duy sáng tạo và tư duy phản biện với vai trò trung gian giữa đặc điểm tính cách và ý định khởi nghiệp, nhưng rất ít công trình kiểm định một mô hình tích hợp trong đó cả hai loại tư duy này cùng vận hành song song. Để lấp đầy khoảng trống đó, chúng tôi đề xuất một mô hình cấu trúc áp dụng cho sinh viên đại học khu vực Đông Nam Bộ, Việt Nam. Dựa trên Lý thuyết Hành vi Có kế hoạch và Lý thuyết Nhận thức Xã hội, năm đặc điểm tính cách Big Five (Tính cởi mở, Tính tận tâm, Tính hướng ngoại, Tính dễ chịu, Tính bất ổn cảm xúc) ảnh hưởng đến ý định khởi nghiệp thông qua hai con đường nhận thức song song là tư duy sáng tạo và tư duy phản biện, bao gồm cả tác động trực tiếp và gián tiếp. Sử dụng Mô hình Phương trình Cấu trúc (SEM) với hệ phương trình ma trận (B và Γ), tất cả các hệ số đường dẫn được ước lượng đồng thời. Về phương pháp luận, thiết kế hỗn hợp, bao gồm khảo sát định lượng dành cho sinh viên tại Thành phố Hồ Chí Minh và các tỉnh lân cận. Những đóng góp hy vọng sẽ lấp đầy khoảng trống lý thuyết trong tài liệu nghiên cứu về khởi nghiệp tại Việt Nam và cung cấp hướng dẫn thực tiễn: các chương trình đào tạo khởi nghiệp cần chủ động phát triển đồng thời cả tư duy sáng tạo lẫn tư duy phân tích, không chỉ đơn thuần là kỹ năng lập kế hoạch kinh doanh.

Từ khóa Mô hình Năm yếu tố lớn (Big Five); đặc điểm tính cách; tư duy sáng tạo; tư duy phản biện; ý định khởi nghiệp; SEM; giáo dục khởi nghiệp; Việt Nam

