

FROM PERSONALITY TO INNOVATION: A DUAL-ATTITUDE MECHANISM LINKING BIG FIVE PERSONALITY TRAITS TO START-UP INNOVATION IN EMERGING MARKETS

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ABSTRACT

This study investigates the behavioral mechanisms underlying start-up innovation by integrating personality traits, dual attitudes toward entrepreneurship, and innovation behavior within a unified framework. Drawing on the Theory of Planned Behavior and Prospect Theory, the research examines how students' Big Five personality traits influence both positive and negative attitudes toward start-up, which subsequently shape start-up innovation outcomes. Using a quantitative research design, data were collected from 790 undergraduate students and recent graduates from multiple disciplines, including in business, economics, natural sciences, and social sciences at member universities of Vietnam National University – Ho Chi Minh City. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that extraversion, conscientiousness, agreeableness, and openness to experience significantly enhance positive attitudes toward start-up, while neuroticism increases negative attitudes. Positive attitude strongly promotes start-up innovation. Notably, and contrary to conventional expectations, negative attitude also exhibits a positive effect on innovation. This unexpected finding represents the key theoretical novelty of the study, suggesting that in emerging market contexts, perceived risks and uncertainties may act not only as barriers but also as motivational drivers that stimulate adaptive and innovation-oriented behavior. The study thus advances the knowledge management literature by introducing a dual-attitude framework that captures both enabling and inhibiting psychological mechanisms in entrepreneurial processes. The findings offer important implications for entrepreneurship education and policy in Vietnam, emphasizing the need to leverage both positive and negative cognitive factors to foster innovation. Overall, this study contributes to a more nuanced understanding of behavioral entrepreneurship and the micro foundations of innovation in emerging economies.

Keywords: Behavioral entrepreneurship, start-up innovation, Big Five personality traits, dual attitudes, knowledge management.

1. INTRODUCTION

In recent years, start-up innovation has emerged as a critical driver of knowledge creation, economic growth, and competitive advantage, particularly in emerging economies.

From a knowledge management perspective, innovation is increasingly viewed as a process grounded in the mobilization of individual knowledge, cognition, and behavioral capabilities rather than solely organizational resources [1; 2].

Universities therefore play a pivotal role as knowledge-intensive environments that nurture entrepreneurial mindsets and foster innovation culture, and shape students' entrepreneurial behaviors [3; 4]. As future knowledge workers and entrepreneurs, university students constitute a crucial source of innovation capital in emerging economies such as Vietnam [5], where a young and dynamic workforce has become central to long-term economic transformation and growth [6]. Over the past decade, (Vietnam's startup ecosystem has expanded significantly driven by national startup policies, institutional support mechanisms, and increasing societal interest in entrepreneurship [7; 8].

Government initiatives, including the National Startup Program (Decision No. 844/QĐ-TTg) have promoted start-up activities across more than 150 universities, and increasingly emphasized innovation and digital transformation as strategic priorities [9]. Highlighted the accomplishments of the student startup support initiative (Project 1665) and introduced the 7th National Startup Day for Students (SV. STARTUP) [10]. Despite these efforts, empirical evidence indicates a persistent gap between entrepreneurial intentions and actual start-up innovation outcomes among Vietnamese students, suggesting that interest in entrepreneurship does not automatically translate into innovative entrepreneurial action [11; 12]. From a knowledge management perspective, this gap highlights that the transformation of individual knowledge and psychological predispositions into innovation outcomes is mediated by complex behavioral mechanisms. Prior research has extensively examined the role of personality traits using the Big Five framework in shaping entrepreneurial tendencies [13; 14]. These studies indicate that traits such as openness to experience, extraversion, and conscientiousness are positively associated with entrepreneurial cognition and performance, while neuroticism tends to inhibit entrepreneurial engagement. However, most of this research has primarily focused on entrepreneurial intention rather than actual innovation behavior, thereby overlooking the processes through which personality traits are translated into innovation outcomes [15; 16]. Moreover, existing studies often conceptualize attitudes toward entrepreneurship as a unidimensional construct, emphasizing positive evaluations such as desirability and feasibility [17; 18]. This perspective, while valuable, fails to account for the simultaneous presence of negative attitudes defined such as fear of failure, perceived risk, and uncertainty avoidance, which are particularly salient in entrepreneurial contexts characterized by high uncertainty. Insights from behavioral economics suggest that negative perceptions may exert disproportionately strong effects on decision-making due to loss aversion [19].

Importantly, recognizing the presence of negative attitudes does not imply that such attitudes merely suppress entrepreneurial action. Consistent with the Theory of Planned Behavior, attitudes may influence behavior differently depending on individuals' levels of involvement and perceived behavioral control [17]. From a behavioral and cognitive perspective, negative evaluations under conditions of bounded rationality may heighten cognitive vigilance, facilitate problem recognition, and stimulate more effortful information processing [24; 41]. Rather than leading to disengagement, these heightened cognitive states may activate adaptive learning and problem-solving behaviors that are central to entrepreneurial action and innovation. Accordingly, negative attitudes may function as motivational signals that prompt individuals to scrutinize ideas more carefully, mitigate potential risks, and refine solutions, thereby fostering innovative work behavior [37; 47]. Consequently, ignoring the dual nature of entrepreneurial attitudes therefore risks producing an incomplete understanding of entrepreneurial behavior. This limitation is especially critical in emerging markets such as Vietnam, where institutional voids, resource constraints, and evolving support systems shape entrepreneurial behavior in distinctive ways [20; 43]. In such

contexts, students often face heightened uncertainty and perceived risk due to imperfect market information and limited access to entrepreneurial resources, which may simultaneously amplify both positive and negative attitudes toward start-up activities [21; 5]. Importantly, these heightened negative attitudes do not merely signal perceived constraints; rather, they may intensify individuals' attentional focus on problem-solving and opportunity refinement, particularly among those exposed to supportive ecosystem elements such as universities and national innovation programs [3; 7]. From this perspective, emerging market conditions constitute a boundary context in which negative attitudes may activate more deliberate cognitive processing and adaptive behavioral responses, thereby shaping start-up innovation. Emerging market conditions thus constitute a boundary context in which negative attitudes may activate more deliberate cognitive processing and adaptive behavioral responses, shaping start-up innovation outcomes.

Despite growing interest in these issues, several gaps remain in literature. First, existing studies focus largely on entrepreneurial intention, with limited attention to start-up innovation as an outcome, despite innovation being central to entrepreneurial value creation [15; 23]. Second, although attitudes are a core component of the Theory of Planned Behavior [17], they are typically treated as a unidimensional construct, overlooking the potentially asymmetric effects of negative attitudes such as fear of failure or risk aversion, as suggested by prospect theory [19]. Third, the behavioral and psychological mechanisms linking personality traits to innovation remain underdeveloped, as prior research emphasizes direct effects while neglecting behavioral and psychological pathways shaped by bounded rationality [24]. Finally, much of the existing literature is derived from developed economies, limiting their applicability to emerging market contexts where institutional conditions and cultural norms may amplify both enabling and inhibiting attitudes toward entrepreneurship [20]. To address these gaps, this study proposes a dual-attitude framework to examine how students' Big Five personality traits—extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience—influence start-up innovation through dual attitudinal mechanisms (both positive and negative attitudes toward start-up), particularly within Vietnam's emerging entrepreneurial ecosystem. This study contributes to the entrepreneurship and knowledge management literature while offering practical insights for educators, policymakers, and ecosystem stakeholders seeking to foster innovation among the next generation of entrepreneurs.

2. LITERATURE REVIEW

2.1. Literature review

2.1.1. Personality traits and attitudes toward start-up

Within the knowledge management and entrepreneurship literature, individual-level characteristics, particularly personality traits, are widely acknowledged as important antecedents of entrepreneurial cognition and behavior [25-27], the Big Five personality traits, extraversion, agreeableness, conscientiousness, openness to experience, and neuroticism, remain a dominant approach for explaining how individuals evaluate entrepreneurial activities and develop attitudinal orientations toward start-up [28-30]. These traits influence how individuals process information, evaluate opportunities, and develop attitudes toward entrepreneurial activities [31; 32]. Drawing on the Theory of Planned Behavior, attitudes represent a key psychological mechanism through which individual dispositions are translated into behavior. Recent empirical studies confirm that attitudes toward entrepreneurship significantly mediate the relationship between individual characteristics and entrepreneurial outcomes, particularly among students, in this study, start-up innovation is conceptualized as students' self-reported engagement in innovation-

related behaviors and outputs (e.g., idea generation, opportunity development), rather than actual start-up performance [33; 34]. Individuals with favorable personality traits are more likely to develop positive evaluations of start-up activities, which subsequently influence their engagement in entrepreneurial processes [35].

Extraversion, characterized by sociability, assertiveness, and optimism, has been consistently linked to proactive opportunity recognition and entrepreneurial engagement in recent studies [28; 30]. Extraverted individuals tend to build stronger social networks, facilitating knowledge exchange and resource acquisition, thereby fostering positive attitudes toward start-up. Similarly, agreeableness enhances collaboration, trust, and social capital within entrepreneurial ecosystems, which positively influences individuals' perceptions of entrepreneurial feasibility [36].

Conscientiousness, associated with persistence, discipline, and goal orientation, has been shown to positively influence entrepreneurial outcomes by enhancing individuals' ability to plan and execute tasks effectively [37]. Individuals high in conscientiousness are more likely to perceive entrepreneurship as structured and achievable, thereby developing favorable attitudes. Openness to experience, characterized by creativity and curiosity, is strongly linked to innovation and opportunity recognition in recent entrepreneurship research [28; 31]. Consequently, individuals high in openness are more likely to exhibit positive attitudes toward start-up activities. Based on these arguments, the following hypotheses are proposed:

H1: Agreeableness positively influences students' positive attitude toward Start-up Innovation.

H2: Conscientiousness positively influences students' positive attitude toward Start-up Innovation.

H3: Extraversion positively influences students' positive attitude toward Start-up Innovation

H4: Openness to experience positively influences students' positive attitude toward Start-up Innovation.

In contrast, neuroticism reflects emotional instability and a tendency toward anxiety and risk aversion. Recent studies highlight that individuals with high neuroticism are more sensitive to uncertainty and perceived threats in entrepreneurial environments [29; 38]. From the perspective of Prospect Theory, individuals tend to outweigh potential losses relative to gains, thereby amplifying negative perceptions in uncertain contexts such as start-up activities [39]. Empirical evidence indicates that neuroticism is associated with fear of failure, reduced self-efficacy, and negative entrepreneurial perceptions [40; 32]. In student contexts, such tendencies manifest as negative attitudes toward start-up, including perceived barriers and uncertainty avoidance [34]. Therefore, the following hypothesis is proposed:

H5: Neuroticism positively influences students' negative attitude toward start-up.

2.1.2. Attitudes toward start-up and start-up innovation

Attitudes toward start-up play a pivotal role in transforming individual knowledge and psychological predispositions into innovation-related behaviors. According to the Theory of Planned Behavior, individuals with favorable attitudes are more likely to engage in entrepreneurial and innovative activities. Recent studies confirm that positive attitudes significantly predict entrepreneurial behavior, opportunity exploitation, and innovation outcomes among students [34]. Positive attitudes toward start-up encourage experimentation, knowledge recombination, and creative problem-solving, key processes emphasized in knowledge management literature [25; 27]. In university settings, students with positive attitudes are more likely to transform knowledge into innovative outputs, including new

products, services, and business models [42]. Accordingly, the following hypothesis is proposed:

H6: Positive attitude positively influences start-up innovation.

Conversely, negative attitudes toward start-up may inhibit innovation. Drawing on the Behavioral Theory of the Firm, individuals tend to avoid uncertain and risky actions when they perceive potential losses [24]. Negative attitudes, such as fear of failure and risk aversion, reduce individuals' willingness to engage in exploratory and innovative activities [40; 41]. These effects are particularly pronounced in emerging markets, where institutional uncertainty and limited resources amplify perceived risks [43]. As a result, negative attitudes significantly constrain innovation behavior. Therefore, the following hypothesis is proposed:

H7: Negative attitude negatively influences start-up innovation.

2.1.3. The mediating role of attitudes

Attitudes serve as a central mediating mechanism linking personality traits to entrepreneurial and innovative behavior. While prior research has primarily emphasized the mediating role of positive attitudes, the potential inhibiting role of negative attitudes has received comparatively less attention. This study addresses this gap by proposing a dual-attitude mediation framework that incorporates both enabling and inhibiting pathways.

Positive attitudes function as an enabling mechanism through which favorable personality traits, such as extraversion, agreeableness, conscientiousness, and openness, are translated into innovation outcomes. Individuals with these traits are more likely to develop favorable perceptions, which facilitate their engagement in innovative activities [27; 37]. In contrast, negative attitudes serve as an inhibiting mechanism, particularly in the case of neuroticism. Individuals high in neuroticism are more likely to develop negative attitudes to evaluate start-up activities, which subsequently reduce their willingness to engage in innovation processes [38; 41]. This dual-path perspective aligns with Prospect Theory, emphasizing the simultaneous influence of positive and negative evaluations. Accordingly, the following hypotheses are proposed:

H8: The relationships between agreeableness (H8a), conscientiousness (H8b), extraversion (H8c), and openness to experience (H8d) and start-up innovation are positively mediated by positive attitude.

H9: The relationship between neuroticism and start-up innovation is mediated by negative attitude.

3. METHODOLOGY

3.1. Research design and data collection

This study adopts a quantitative research design to empirically examine the relationships between students' Big Five personality traits, attitudes toward start-up, and start-up innovation. A structured questionnaire was employed as the primary data collection instrument, which is consistent with prior studies in entrepreneurship and knowledge management that emphasize the use of survey-based approaches to capture individual perceptions and behavioral tendencies [44; 46]. The target population of this study comprises undergraduate students (from the third year onward) and recent graduates (within one year after graduation) from multiple disciplines, including business, economics, natural sciences, and social sciences at member universities of the 'Vietnam National University – Ho Chi Minh City (VNU-HCM) system. These respondents were selected because they are at a critical transition stage from education to career development, where entrepreneurial cognition,

attitudes, and innovation related behaviors within university based entrepreneurial ecosystems are more likely to emerge.

Data were collected through both online and paper-based self-administered questionnaires. To ensure feasibility and access to respondents across different universities and academic disciplines, a combination of ‘convenience sampling’ and ‘snowball sampling techniques’ was employed. This approach is widely adopted in entrepreneurship and innovation research, particularly when targeting students and early-career populations within complex educational entrepreneurial ecosystems [44]. All respondents were informed about the purpose of the study and assured of anonymity and confidentiality to reduce social bias.

3.2. Sample size and sampling adequacy

The determination of sample size followed established guidelines for ‘structural equation modeling using partial least squares’ (PLS-SEM). According to Hair et al. [45], a minimum sample size can be estimated using a ratio of five observations per indicator. Given that the measurement model in this study includes approximately 43 observed variables, the minimum required sample size is 215 respondents (43×5).

To enhance the robustness and statistical power of the analysis, the study distributed and collected more than 215 questionnaires, resulting in a final sample of 790 valid responses ($N = 790$). This sample size exceeds the recommended threshold for ‘PLS-SEM’ and is considered sufficient for detecting medium to small effect sizes in complex models [44; 46]. The relatively large and diverse sample also strengthens the generalizability of the findings within the context of Vietnamese higher education and emerging entrepreneurial ecosystems.

3.3. Measurement scales

All constructs were measured using multi-item scales adapted from prior validated studies to ensure content validity and reliability. The Big Five personality traits, extraversion, agreeableness, conscientiousness, openness to experience, and neuroticism, were operationalized using established short-form personality measures commonly applied in entrepreneurship research [38]. Positive and negative attitudes toward start-up were measured by adapting scales from the entrepreneurial attitude literature. Positive attitude reflects favorable evaluations such as perceived desirability and attractiveness, whereas negative attitude captures inhibiting perceptions including fear of failure, perceived risk, and uncertainty [18; 40]. Start-up innovation was measured using established individual-level innovation behavior scales focusing on idea generation, experimentation, and implementation [47]. All items were rated on a ‘five-point Likert scale’ ranging from ‘1 (strongly disagree) to 5 (strongly agree)’. The questionnaire was developed in English and translated into Vietnamese using a back-translation procedure to ensure linguistic equivalence.

3.4. Data analysis

The dataset was analyzed using ‘Partial Least Squares Structural Equation Modeling’ (PLS-SEM) [44; 46] implemented in ‘SmartPLS’. This method is well suited to the present study because it can accommodate complex research frameworks involving multiple constructs, mediating effects, and data that may not follow a normal distribution. It is also particularly appropriate for exploratory and prediction-focused research, which is consistent with the aims of this study. A two-stage analytical procedure was applied, including assessment of the measurement model followed by evaluation of the structural model. In the first stage, the measurement model was examined to ensure reliability and validity. Internal consistency was assessed using Cronbach’s alpha and composite reliability, while convergent validity was evaluated based on the average variance extracted (AVE). Discriminant validity was tested using both the Fornell–Larcker criterion and the ‘heterotrait–monotrait’ (HTMT) ratio [48]. In the second stage, the structural model was analyzed by assessing path

coefficients, the coefficient of determination (R square), effect sizes (f square), and predictive relevance (Q square). The significance of the proposed relationships was tested bootstrapping with 2,000 resamples. Additionally, mediation effects were examined through indirect effect analysis in line with current recommendations in 'PLS-SEM' research [46]. Overall, this analytical strategy enhances the rigor of the study and supports the robustness of the results, offering reliable insights into the behavioral links between personality traits, attitudes, and start-up innovation, particularly within emerging market contexts.

4. RESULTS AND DISCUSSION

4.1. Sample profile

The demographic profile of the 790 valid respondents collected from undergraduate students and recent graduates across member universities of Vietnam National University–Ho Chi Minh City (VNU-HCM). The sample is relatively balanced in terms of gender, with 54.1% male ($n = 427$) and 45.9% female ($n = 363$). Reflecting the study's focus on the university context, the vast majority are aged 18–25 (96.8%) and are single (98.4%). Institutional Affiliation: Respondents were drawn from various member universities of VNU-HCM, including the University of Technology (21.0%), International University (20.6%), University of Science (18.9%), University of Economics and Law (18.0%), University of Social Sciences and Humanities (USSH) (12.5%), and University of Information Technology (UIT) (9.0%). The sample covers a diverse range of academic backgrounds, including Natural Sciences (51.9%), Business (35.6%), and Social Sciences (12.5%), reflecting the interdisciplinary nature of innovation-oriented entrepreneurial activity. Educational Level: The participants consist of third-year students (43.8%), final-year students (38.4%), and recent graduates (17.8%). This composition is appropriate for examining entrepreneurial transitions and innovation related processes, as these individuals are at different but closely related stages of academic and early career development during which entrepreneurial cognition, attitudes, and innovative behaviors are actively forming and evolving. Third and final-year students often engage in opportunity exploration and capability development, while recent graduates face more immediate transition into the labor market. Overall, the sample's diversity of educational stages in the sample aligns with the research objectives and provides a robust foundation for subsequent analysis.

4.2. Measurement model results

The measurement model was evaluated to verify the reliability and validity of the constructs in accordance with established PLS-SEM guidelines [44]. This assessment covered indicator reliability, internal consistency reliability, and convergent validity, using factor loadings, composite reliability (CR), and average variance extracted (AVE) as key criteria. Indicator reliability was first examined through factor loadings. As shown in Table 1, all items load strongly on their respective constructs, with values generally above the recommended threshold of 0.70. A small number of indicators fall slightly below this cutoff (above 0.68), which remains acceptable in exploratory studies. Overall, loadings range from 0.689 to 0.962, suggesting that the indicators adequately capture their intended latent variables. Next, internal consistency reliability was assessed using CR. All constructs exceed the recommended benchmark of 0.70, with values ranging from 0.791 to 0.915, indicating satisfactory reliability. Among them, extraversion demonstrates the highest level of consistency ($CR = 0.915$), followed by start-up innovation (0.877), agreeableness (0.832), neuroticism (0.827), conscientiousness (0.822), openness to experience (0.821), positive attitude (0.821), and negative attitude (0.791). These findings confirm that the constructs are measured consistently. Convergent validity was then evaluated based on AVE. All constructs achieve values above the minimum threshold of 0.50, ranging from 0.535 to

0.844. Extraversion again records the highest AVE (0.844), indicating that a substantial proportion of variance is explained by its indicators. The remaining constructs, including start-up innovation (0.782), neuroticism (0.710), agreeableness (0.624), conscientiousness (0.607), openness to experience (0.605), negative attitude (0.559), and positive attitude (0.535) also meet the required standard for convergent validity. In summary, the measurement model meets all recommended criteria for reliability and convergent validity. The constructs are measured with adequate accuracy, providing a reliable basis for subsequent analysis of the structural model. Although some constructs are measured with two items, this approach is consistent with prior entrepreneurship and psychological research where construct reliability and validity are empirically supported. All two-item constructs exhibit satisfactory composite reliability and AVE values, suggesting acceptable internal consistency and convergent validity. Nonetheless, we acknowledge that using more items could further enhance content coverage, which we recommend for future research.

Table 1. Measurement model evaluation

Constructs	Items	Factor Loadings	CR	AVE
Negative attitude toward Start-up (ABNe)	<i>ABNe1: Starting a business is very risky</i>			
	<i>ABNe2: Starting a business makes me spend more time and work effort</i>	0.732	0.791	0.559
	<i>ABNe3: Starting a business will greatly affect my stress level</i>	0.797 0.711		
Positive attitude toward Start-up (ABPo)	<i>ABPo3: Starting a business improves my working environment</i>	0.742	0.821	0.535
	<i>ABPo5: Starting a business brings me wealth</i>	0.689		
	<i>ABPo6: Starting a business helps improve my quality of life</i>	0.774		
	<i>ABPo7: Starting a business is an opportunity to contribute to the community</i>	0.719		
Extraversion (BF)	<i>BF1: I see myself who is outgoing and sociable</i>	0.916	0.915	0.844
	<i>BF2: I see myself who is generate a lot of enthusiasm</i>	0.921		
Agreeableness (BF)	<i>:BF4: I see myself as someone who is reserved</i>	0.707	0.832	0.624
	<i>BF7:I see myself as someone who can be cold and aloof</i>	0.813		
	<i>BF8:I see myself as someone who is sometimes rude to others</i>	0.844		
Conscientiousness (BF)	<i>BF9: I see myself as someone who do things efficiently</i>	0.773	0.822	0.607
	<i>BF10: I see myself as someone who do a thorough job</i>	0.784 0.780		
	<i>BF11: I see myself as someone who make plans and follows through with them</i>			
	<i>BF13: I see myself as someone who get nervous easily</i>	0.962	0.827	0.710
Neuroticism (BF)	<i>BF14: I see myself as someone who worry a lot</i>	0.703		
	<i>BF18: I see myself as someone who is curious about many different things</i>	0.778	0.821	0.605
Openness to New Experience (BF)		0.822 0.731		

BF19: I see myself as someone who have an active imagination

BF20: I see myself as someone who is ingenious, a deep thinker

Start-up Innovation (SI)	EI4: I see myself as someone who exploit the radical innovation for my own business	0.879	0.877	0.782
	IE5: I see myself as someone who exploit the incremental innovation for my own business	0.889		

CR = Composite Reliability; AVE = Average Variance Extracted

4.2.1. Discriminant validity

Discriminant validity was evaluated using the Fornell–Larcker criterion, which involves comparing the square root of the average variance extracted (AVE) for each construct with its correlations with other constructs. This method is commonly applied in PLS-SEM to verify that constructs are empirically distinguishable from one another.

As reported in Table 2, the diagonal values—representing the square roots of AVE—consistently exceed the corresponding inter-construct correlations. For example, extraversion shows a square root of AVE of 0.919, which is notably higher than its strongest correlation with another construct ($r = 0.396$ with openness), indicating clear discriminant validity. Similarly, start-up innovation has a square root of AVE of 0.884, surpassing its highest correlation with positive attitude ($r = 0.248$). Neuroticism also meets this criterion, with a value of 0.843 that is greater than its correlations with other constructs, including its negative relationship with agreeableness ($r = -0.210$). The same pattern is observed across the remaining constructs, including agreeableness (0.790), conscientiousness (0.779), openness to experience (0.778), negative attitude toward start-up (0.748), and positive attitude toward start-up (0.731), all of which display higher AVE square roots than their inter-construct correlations. Taken together, these findings confirm that the Fornell–Larcker criterion is satisfied for all constructs, demonstrating adequate discriminant validity. Each construct represents a distinct concept within the model, with minimal overlap, thereby reinforcing the soundness of the measurement model and supporting the validity of subsequent structural analyses.

Table 2. Discriminant Validity Coefficients-Fornell–Larcker criterion

	Mean	SD.	1	2	3	4	5	6	7	8
1. Agreeableness	3.41	1.12	0.790							
2. Conscientiousness	3.63	0.94	0.034	0.779						
3. Extraversion	3.75	0.99	0.328	0.241	0.919					
4. ABNe	3.96	0.92	0.064	0.326	0.255	0.748				
5. Neuroticism	3.32	1.07	0.210	0.049	0.059	0.146	0.843			
6. Openness	3.76	0.95	0.128	0.442	0.396	0.281	0.099	0.778		
7. ABPo	3.69	0.91	0.175	0.339	0.366	0.256	0.088	0.371	0.731	
8. SI	2.80	1.15	0.058	0.059	0.112	0.114	0.036	0.109	0.248	0.884

Diagonal terms (in bold) represent the square root of the AVE

Table 3. Heterotrait-Monotrait Ratio (HTMT)

	1	2	3	4	5	6	7	8
1. Agreeableness								
2. Conscientiousness	0.118							
3. Extraversion	0.432	0.324						
4. Negative Attitudes toward Start-up	0.096	0.506	0.350					
5. Neuroticism	0.361	0.114	0.072	0.220				
6. Openness to New Experience	0.170	0.658	0.530	0.429	0.138			
7. Positive Attitudes toward Start-up	0.230	0.469	0.464	0.366	0.130	0.523		
8. Start-up Innovation	0.175	0.354	0.295	0.329	0.086	0.448	0.445	

Discriminant validity was further assessed using the HTMT criterion, with all values below the recommended threshold.

4.3. Structural model evaluation

After confirming the reliability and validity of the measurement model, the structural model was evaluated to test the proposed relationships among the constructs. This assessment considered path coefficients, their statistical significance (based on t-values and p-values), as well as mediation effects. A bootstrapping approach with 2,000 resamples was applied, the structural model demonstrates acceptable explanatory and predictive power. The R^2 values indicate that the model explains 12.6% of the variance in Start-up Innovation, 2.0% in Student Negative Attitude toward Start-up Innovation, and 23.4% in Student Positive Attitude toward Start-up Innovation. Furthermore, all Q^2 values are greater than zero (0.097, 0.010, and 0.118, respectively), Although the explanatory power is moderate, the positive Q^2 results suggest that the structural model is satisfactory and has acceptable predictive capability, in line with current practices in PLS-SEM research [44; 46]. Overall, the structural model shows adequate explanatory capacity and predictive relevance, with all proposed relationships reaching statistical significance. These results offer strong empirical evidence for the behavioral framework connecting personality traits, attitudes toward start-ups, and innovative start-up behavior.

Direct effects and hypothesis testing: All hypothesized paths are statistically significant except for H7, thereby supporting hypotheses H1 through H6 in full (see Table 4). Specifically, agreeableness has a positive and significant effect on students' positive attitude toward start-up ($\beta = 0.072$, $t = 2.018$, $p < 0.05$), so the hypothesis H1 was confirmed. Although the magnitude of the effect is relatively modest, it suggests that cooperative and socially oriented individuals tend to develop favorable perceptions of entrepreneurial activities. Conscientiousness exhibits a stronger positive effect on positive attitude ($\beta = 0.217$, $t = 5.984$, $p < 0.001$), so the hypothesis H2 was confirmed. This finding indicates that individuals who are disciplined, organized, and goal-oriented are more likely to perceive entrepreneurship as a viable and desirable career path. Similarly, extraversion shows a significant positive impact on positive attitude ($\beta = 0.223$, $t = 5.472$, $p < 0.001$), so the hypothesis H3 was confirmed, highlighting the importance of sociability and proactiveness in shaping entrepreneurial perceptions. Openness to experience also has a positive and significant influence on positive attitude ($\beta = 0.178$, $t = 4.615$, $p < 0.001$), so the hypothesis H4 was confirmed. This result underscores the role of creativity and curiosity in fostering favorable attitudes toward entrepreneurial activities. In contrast, neuroticism positively influences negative attitude toward start-up ($\beta = 0.146$, $t = 3.816$, $p < 0.001$), so the hypothesis H5 was confirmed. This finding confirms that individuals with higher emotional

instability and anxiety are more likely to develop unfavorable perceptions of entrepreneurship, particularly in terms of risk and uncertainty.

Regarding the effects of attitudes on start-up innovation, both positive and negative attitudes demonstrate significant impacts. Positive attitude has a strong positive effect on start-up innovation ($\beta = 0.290$, $t = 7.863$, $p < 0.001$), so the hypothesis H6 was confirmed, indicating that favorable perceptions of entrepreneurship enhance individuals' engagement in innovative activities. Interestingly, contrary to Hypothesis 7, negative attitude toward start-up innovation shows a positive and significant effect on start-up innovation, negative attitude also shows a significant positive relationship with start-up innovation ($\beta = 0.148$, $t = 3.610$, $p < 0.001$), therefore, the hypothesis H7 was not confirmed, as the effect of negative attitude on start-up innovation is positive rather than negative. This unexpected finding suggests that, in some cases, perceived risks and challenges may stimulate innovation-oriented behavior, potentially reflecting a risk-driven or pressure-induced innovation mechanism in emerging market contexts. Given this unexpected positive effect, an alternative relationship between negative attitude and students' self-reported engagement in start-up innovation is explored.

Table 4. Direct path coefficient and hypothesis testing results

Hypothesis	Relationship	Path Coefficient	P-value	T-value	Decision
H1	Agreeableness -> Positive Attitude	0.072	0.022	2.018	Supported
H2	Conscientiousness -> Positive Attitude	0.217	0.000	5.984	Supported
H3	Extraversion -> Positive Attitude	0.223	0.000	5.472	Supported
H4	Openness to New Experience -> Positive Attitude	0.178	0.000	4.615	Supported
H5	Neuroticism -> Negative Attitude	0.146	0.000	3.816	Supported
H6	Positive Attitude -> Start-up Innovation	0.290	0.000	7.863	Supported
H7	Negative Attitude -> Start-up Innovation	0.148	0.000	3.610	Rejected (opposite direction)

All hypothesized paths are statistically significant. However, Hypothesis 7 is not supported, as the effect of negative attitude on start-up innovation is positive rather than negative.

Indirect effects and mediation analysis: The mediation effects were examined using bootstrapping procedures. Overall, the findings support the mediating role of attitudes in linking personality traits to start-up innovation. Positive attitude significantly mediates the relationships between agreeableness and start-up innovation ($\beta = 0.021$, $t = 1.951$, $p < 0.05$), conscientiousness and start-up innovation ($\beta = 0.063$, $t = 4.795$, $p < 0.001$), extraversion and start-up innovation ($\beta = 0.065$, $t = 4.531$, $p < 0.001$), and openness to experience and start-up innovation ($\beta = 0.052$, $t = 3.766$, $p < 0.001$). These results provide support for H8, confirming that positive attitude serves as a key psychological mechanism through which favorable personality traits are translated into innovation outcomes. Among these effects, extraversion and conscientiousness exhibit the strongest indirect effects, suggesting that proactive and disciplined individuals are more likely to leverage positive attitudes to engage in innovative entrepreneurial activities.

Table 5. Indirect path coefficients and hypothesis testing results

Hypothesis	Relationship	Path Coefficient	P-value	T-value	Decision
H8a	Agreeableness -> Positive Attitude -> Start-up Innovation	0.021	0.026	1.951	Supported
H8b	Conscientiousness -> Positive Attitude -> Start-up Innovation	0.063	0.000	4.795	Supported
H8c	Extraversion -> Positive Attitude -> Start-up Innovation	0.065	0.000	4.531	Supported
Hd	Openness to New Experience -> Positive Attitude -> Start-up Innovation	0.052	0.000	3.766	Supported
H9	Neuroticism -> Negative Attitude -> Start-up Innovation	0.022	0.006	2.521	Supported

Furthermore, negative attitude significantly mediates the relationship between neuroticism and start-up innovation ($\beta = 0.022$, $t = 2.521$, $p < 0.01$), so the H9 was confirmed. This finding indicates that individuals with higher levels of neuroticism are more likely to develop negative attitudes, which in turn influence their engagement in innovation. Interestingly, the positive sign of the indirect effect aligns with the earlier finding that negative attitude positively influences innovation, suggesting a complex behavioral mechanism in which perceived risks may act as both barriers and motivators. Figure 1 summarizes the proposed research model, illustrating the hypothesized relationships between personality traits, attitudes toward start-up, and start-up innovation. Specifically, extraversion, agreeableness, conscientiousness, and openness to experience are expected to influence start-up innovation indirectly through positive attitudes, whereas neuroticism is hypothesized to exert a negative indirect effect via negative attitudes.

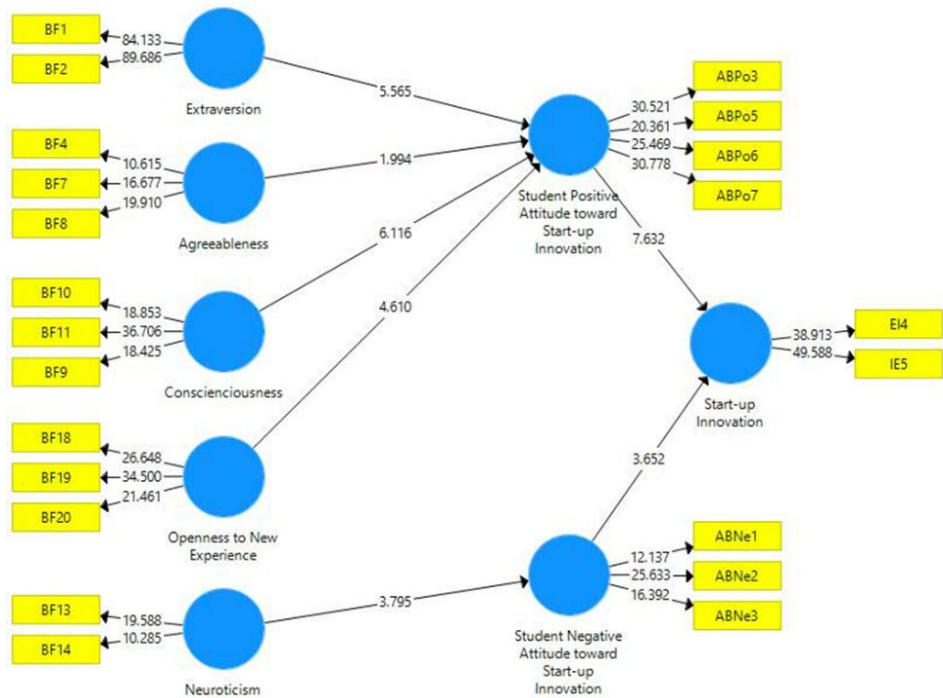


Figure 1. The results of path analysis. Source: Authors' elaboration

4.4. Discussion

The present study advances the understanding of behavioral mechanisms underlying start-up innovation by integrating personality traits, dual attitudes (positive and negative), and innovation behavior within a unified framework. The findings provide strong empirical support for the role of personality traits as antecedents of entrepreneurial attitudes, which subsequently shape innovation outcomes. Consistent with prior research, extraversion, conscientiousness, agreeableness, and openness to experience significantly enhance positive attitudes toward start-up, confirming that proactive, disciplined, socially oriented, and creative individuals are more likely to perceive entrepreneurship as desirable and feasible [28; 37].

The results also reaffirm the critical role of attitudes as a mediating mechanism, aligning with the logic of the Theory of Planned Behavior, which posits that attitudes serve as a key cognitive pathway linking individual characteristics to behavior [33]. In line with knowledge management literature, positive attitudes facilitate the transformation of individual knowledge, creativity, and cognitive resources into innovation-oriented actions [25; 27]. This reinforces the view that innovation is not solely a function of knowledge availability but also depends on individuals' willingness and motivation to mobilize that knowledge. However, one of the most notable contributions of this study lies in its unexpected finding that negative attitude toward start-up exerts a positive effect on start-up innovation. This result contrasts with conventional assumptions in entrepreneurship research, which typically conceptualize negative attitudes, such as fear of failure and perceived risk, as barriers to entrepreneurial behavior [40]. Instead, the finding suggests a more nuanced behavioral mechanism, particularly in the context of emerging markets such as Vietnam. This counterintuitive result can be interpreted through the lens of behavioral decision theory and the Prospect Theory. Individuals facing perceived risks and uncertainties may engage in more cautious, adaptive, and effort-intensive behaviors, which can paradoxically enhance innovation outcomes [39]. In this sense, negative attitudes may not purely inhibit action but can also act as a "motivational tension" that drives individuals to innovate to mitigate perceived risks. Furthermore, this finding aligns with recent perspectives in the Behavioral Theory of the Firm, which emphasize that organizations and individuals often respond to uncertainty and performance gaps by engaging in problematic search and innovative behaviors [24]. In the context of Vietnamese students, who operate within a dynamic yet uncertain entrepreneurial ecosystem, perceived risks may stimulate greater effort, experimentation, and creativity as adaptive responses. This highlights the importance of considering both enabling and constraining psychological mechanisms in understanding entrepreneurial behavior. Although negative attitude was hypothesized to inhibit start-up innovation, the positive effect suggests that, in a student context, negative evaluations may stimulate increased caution, reflection, and exploratory learning rather than withdrawal from innovative activities. As students are not exposed to actual financial or reputational loss, negative attitudes may function as a form of prevention-focused motivation.

5. CONCLUSION

This study provides a comprehensive behavioral framework for understanding start-up innovation by integrating personality traits, attitudes, and innovation behavior. The findings confirm that personality traits significantly influence both positive and negative attitudes toward start-up, which in turn shape innovation outcomes. Importantly, the study reveals a novel insight that negative attitudes may also contribute positively to innovation, particularly in emerging market contexts. This highlights the complexity of entrepreneurial behavior and underscores the need for more nuanced theoretical and empirical approaches in future research. Overall, the study contributes to the growing body of literature on behavioral entrepreneurship and knowledge management by emphasizing the critical role of individual

cognition and psychological mechanisms in driving innovation.

5.1. Theoretical contributions

Theoretical implications: This study offers several important theoretical contributions to literature on knowledge management, entrepreneurship, and behavioral strategy. First, it extends the knowledge management literature by integrating personality traits into the micro foundations of innovation. While prior studies have emphasized knowledge processes and organizational capabilities, this study highlights the role of individual-level behavioral factors in shaping how knowledge is perceived, interpreted, and transformed into innovation [25; 26]. By linking personality traits to innovation through attitudes, the study provides a more comprehensive understanding of the human side of knowledge management. Second, the study contributes to entrepreneurship research by introducing a dual-attitude framework that simultaneously considers both positive and negative attitudes toward start-up. Most prior studies focus primarily on positive attitudes, thereby overlooking the potential role of negative perceptions as drivers of behavior. By demonstrating that negative attitudes can also positively influence innovation, this study challenges traditional linear assumptions and proposes a more complex, bidirectional perspective. Third, the study advances the application of the Theory of Planned Behavior by incorporating both facilitating and inhibiting attitudinal mechanisms within a single model. This approach responds to recent calls for more nuanced and context-sensitive applications of behavioral theories in entrepreneurship research [33].

5.2. Practical contributions

Practical implications: The findings of this study provide several practical implications for policymakers, educators, and university administrators in Vietnam. First, entrepreneurship education programs should not only focus on developing positive attitudes toward start-up but also address students' negative perceptions, such as fear of failure and risk aversion. Rather than attempting to eliminate these negative attitudes, educators should help students reinterpret them as sources of motivation and learning. Training programs that emphasize resilience, risk management, and adaptive thinking can help students channel perceived risks into innovative behaviors. Second, universities should design experiential learning environments that simulate real-world uncertainty, such as start-up incubators, business competitions, and project-based learning. These environments can help students develop both confidence and adaptive capabilities, enabling them to respond effectively to entrepreneurial challenges. This is particularly important in Vietnam, where the entrepreneurial ecosystem is rapidly evolving but still characterized by institutional uncertainty. Third, policymakers should recognize the dual role of psychological factors in entrepreneurship. Support policies should not only provide resources and incentives but also address cognitive and behavioral barriers. For example, mentorship programs and failure-tolerant policies can help reduce the negative psychological impact of entrepreneurial risk while still preserving its motivational benefits.

5.3. Limitations and future research

While this study offers valuable insights, several limitations should be considered. First, the use of cross-sectional data restricts the ability to establish causal relationships. Future studies could employ longitudinal approaches to better understand how personality traits and attitudes develop over time and how they shape innovative behavior. Second, reliance on convenience and snowball sampling may affect the generalizability of the results. Although the sample is relatively large and heterogeneous, subsequent research could apply probability-based sampling methods or examine different geographical contexts to improve external validity.

Third, this study focuses on students, whose characteristics may not fully reflect those of practicing entrepreneurs, particularly in terms of experience and access to resources.

Future research could test the proposed model using samples of start-up founders or early-stage entrepreneurs to assess its applicability in real-world settings. Finally, further studies may investigate the influence of emerging technologies, especially artificial intelligence on entrepreneurial cognition and behavior. Examining the integration of AI-supported decision-making with behavioral perspectives could provide meaningful contributions to both theory and practice.

REFERENCES

- [1] I. Nonaka and H. Takeuchi, "The knowledge-creating company," *Harvard Business Review*, vol. 85, no. 7/8, pp. 162-171, 2007. [Online]. Available: <https://hbr.org/2007/07/the-knowledge-creating-company>
- [2] R. M. Grant, "Toward a knowledge-based theory of the firm," *Strategic Management Journal*, vol. 17, no. S2, pp. 109-122, 1996, doi: <https://doi.org/10.1002/smj.4250171110>
- [3] D. G. Ierapetritis, "Discussing the role of universities in fostering regional entrepreneurial ecosystems," *Economies*, vol. 7, no. 4, p. 119, 2019, doi: <https://doi.org/10.3390/economies7040119>
- [4] G. Andrews, K. Sanderson, J. Corry, C. Issakidis, and H. Lapsley, "Cost-effectiveness of current and optimal treatment for schizophrenia," *The British Journal of Psychiatry*, vol. 183, no. 5, pp. 427-435, 2003, doi: <https://doi.org/10.1192/bjp.183.5.427>
- [5] UNDP Vietnam, "State of the Ecosystem for Youth Entrepreneurship in Viet Nam," 2025. [Online]. Available: <https://www.undp.org/vietnam/publications/state-ecosystem-youth-entrepreneurship-viet-nam>
- [6] Vietnam Investment Review (VIR), "Innovative startup ecosystem garnering attention," 2025. [Online]. Available: <https://vir.com.vn/innovative-startup-ecosystem-garnering-attention-121561.html>
- [7] National Startup Support Center (NSSC), "National Program to Support the Startup Ecosystem (Decision No. 844/QĐ-TTg, May 18, 2016)," 2025. [Online]. Available: <https://nssc.gov.vn/startup-stories/insights/legal-framework-and-policy-mechanisms/>
- [8] H. C. Nguyen and T. L. Nguyen, "Perfecting Vietnam's Current Policies To Support Startups and Innovation," *International Journal of Business and Management Invention*, vol. 14, no. 7, pp. 56-61, 2025. [Online]. Available: [https://ijbmi.org/papers/Vol\(14\)7/14075661.pdf](https://ijbmi.org/papers/Vol(14)7/14075661.pdf)
- [9] National Startup Support Center (NSSC), "Vietnam's National Startup Program," 2024. [Online]. Available: <https://nssc.gov.vn/startup-stories/insights/vietnams-national-startup-program-a-two-decade-journey-of-empowering-young-entrepreneurs-by-vcci/>
- [10] VnEconomy, "Student entrepreneurship encouraged to develop," 2025. [Online]. Available: <https://en.vneconomy.vn/student-entrepreneurship-encouraged-to-develop.htm>
- [11] T. N. L. Do, A. L. Nguyen, B. M. A. Nguyen, and D. M. C. Nguyen, "Factors Affecting Entrepreneurial Behavior of Students in Hanoi City: The Role of Entrepreneurial Intention and Innovation Capacity," in *Proceedings of the 21st Asian Academic Accounting Association (FourA) Annual Conference 2024*, Hanoi, Vietnam, Nov. 24-26, 2024. [Online]. Available: https://www.foura.org/download/foura_2024/proceedings/352.pdf
- [12] N. T. Tran, "The influence of the university entrepreneurial ecosystem on the entrepreneurial intentions of students in Vietnam," *Asia Pacific Journal of Innovation*

- and *Entrepreneurship*, pp. 1-30, 2025, doi: <https://doi.org/10.1108/APJIE-03-2025-0038>.
- [13] H. Zhao, S. E. Seibert, and G. T. Lumpkin, "The relationship of personality to entrepreneurial intentions and performance: A meta-analytic review," *Journal of Management*, vol. 36, no. 2, pp. 381-404, 2010, doi: <https://doi.org/10.1177/0149206309335187>
- [14] M. Caliendo, F. Fossen, and A. S. Kritikos, "Personality characteristics and the decisions to become and stay self-employed," *Small Business Economics*, vol. 42, no. 4, pp. 787-814, 2014, doi: <https://doi.org/10.1007/s11187-013-9514-8>.
- [15] A. Rauch and M. Frese, "Let's put the person back into entrepreneurship research: A meta-analysis on the relationship between business owners' personality traits, business creation, and success," *European Journal of Work and Organizational Psychology*, vol. 16, no. 4, pp. 353-385, 2007, doi: <https://doi.org/10.1080/13594320701595438>
- [16] M. Obschonka, R. K. Silbereisen, and E. Schmitt-Rodermund, "Entrepreneurial intention as developmental outcome," *Journal of Vocational Behavior*, vol. 77, no. 1, pp. 63-72, 2010, doi: <https://doi.org/10.1016/j.jvb.2010.02.008>.
- [17] I. Ajzen, "The theory of planned behavior," *Organizational Behavior and Human Decision Processes*, vol. 50, no. 2, pp. 179-211, 1991, doi: [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T).
- [18] F. Liñán and Y. W. Chen, "Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions," *Entrepreneurship Theory and Practice*, vol. 33, no. 3, pp. 593-617, 2009, doi: <https://doi.org/10.1111/j.1540-6520.2009.00318.x>.
- [19] D. Kahneman and A. Tversky, "Prospect theory: An analysis of decision under risk," in *Handbook of the Fundamentals of Financial Decision Making: Part I*, World Scientific, 2013, pp. 99-127, doi: https://doi.org/10.1142/9789814417358_0006.
- [20] G. D. Bruton, D. Ahlstrom, and H. L. Li, "Institutional theory and entrepreneurship: where are we now and where do we need to move in the future?," *Entrepreneurship Theory and Practice*, vol. 34, no. 3, pp. 421-440, 2010, doi: <https://doi.org/10.1111/j.1540-6520.2010.00390.x>.
- [21] E. Autio, S. Pathak, and K. Wennberg, "Consequences of cultural practices for entrepreneurial behaviors," *Journal of International Business Studies*, vol. 44, no. 4, pp. 334-362, 2013, doi: <https://doi.org/10.1057/jibs.2012.15>.
- [22] N. J. Foss, T. Pedersen, M. Reinholt Fosgaard, and D. Stea, "Why complementary HRM practices impact performance: The case of rewards, job design, and work climate in a knowledge-sharing context," *Human Resource Management*, vol. 54, no. 6, pp. 955-976, 2015, doi: <https://doi.org/10.1002/hrm.21659>.
- [23] N. F. Krueger Jr, M. D. Reilly, and A. L. Carsrud, "Competing models of entrepreneurial intentions," *Journal of Business Venturing*, vol. 15, no. 5-6, pp. 411-432, 2000, doi: [https://doi.org/10.1016/S0883-9026\(98\)00033-0](https://doi.org/10.1016/S0883-9026(98)00033-0).
- [24] G. Gavetti, H. R. Greve, D. A. Levinthal, and W. Ocasio, "The behavioral theory of the firm: Assessment and prospects," *Academy of Management Annals*, vol. 6, no. 1, pp. 1-40, 2012, doi: <https://doi.org/10.1080/19416520.2012.656841>.
- [25] N. J. Foss and T. Pedersen, "Microfoundations in international management research: The case of knowledge sharing in multinational corporations," *Journal of International Business Studies*, vol. 50, no. 9, pp. 1594-1621, 2019, doi: <https://doi.org/10.1057/s41267-019-00270-4>.

- [26] T. Felin, N. J. Foss, and R. E. Ployhart, "The microfoundations movement in strategy and organization theory," *Academy of Management Annals*, vol. 9, no. 1, pp. 575-632, 2015, doi: <https://doi.org/10.1080/19416520.2015.1007651>.
- [27] M. Du Plessis, "The role of knowledge management in innovation," *Journal of Knowledge Management*, vol. 11, no. 4, pp. 20-29, 2007, doi: <https://doi.org/10.1108/13673270710762684>.
- [28] A. S. Kritikos, "Personality and entrepreneurship," in *Handbook of Labor, Human Resources and Population Economics*, 2022, pp. 1-20. [Online]. Available: https://link.springer.com/referenceworkentry/10.1007/978-3-319-57365-6_349-1
- [29] X. Xie, J. Lv, and Y. Xu, "The role of the entrepreneurial personality in new ventures," in *Inside the Mind of the Entrepreneur: Cognition, Personality Traits, Intention, and Gender Behavior*, Cham: Springer International Publishing, 2017, pp. 91-108, doi: https://doi.org/10.1007/978-3-319-62455-6_7
- [30] M. Haj Youssef, N. Sayour, N. Valaei, H. Hussein, and M. Harakeh, "The impact of Big Five Personality Traits on entrepreneurial orientation," *Entrepreneurship & Regional Development*, vol. 38, no. 1-2, pp. 185-209, 2026, doi: <https://doi.org/10.1080/08985626.2025.2570320>.
- [31] Y. Zhang, P. Wang, and Y. Zhao, "Big Five Personality, Academic Entrepreneurial Motivation, and Academic Entrepreneurial Intention: A Research Method Based on Fuzzy Set Qualitative Comparative Analysis," *Frontiers in Psychology*, vol. 12, 2022, Art. no. 799770, doi: <https://doi.org/10.3389/fpsyg.2021.799770>.
- [32] H. H. Ta, G. Layeghi, S. Delladio, V. H. A. Nguyen, and A. Caputo, "Examining the impact of big five personality traits and digital competencies on digital entrepreneurial intention: the mediating role of digital self-efficacy," *International Entrepreneurship and Management Journal*, vol. 21, no. 1, p. 112, 2025, doi: <https://doi.org/10.1007/s11365-025-01143-z>.
- [33] F. Liñán, G. Nabi, and N. Krueger, "British and Spanish entrepreneurial intentions: A comparative study," *Revista de Economía Mundial*, no. 33, pp. 73-103, 2013. [Online]. Available: <https://www.redalyc.org/pdf/866/86628362004.pdf>
- [34] J. M. Martins, M. F. Shahzad, and S. Xu, "Factors influencing entrepreneurial intention to initiate new ventures: Evidence from university students," *Journal of Innovation and Entrepreneurship*, vol. 12, no. 1, p. 63, 2023, doi: <https://doi.org/10.1186/s13731-023-00333-9>.
- [35] E. Autio, R. Mudambi, and Y. Yoo, "Digitalization and globalization in a turbulent world: Centrifugal and centripetal forces," *Global Strategy Journal*, vol. 11, no. 1, pp. 3-16, 2021, doi: <https://doi.org/10.1002/gsj.1396>.
- [36] P. T. Luc, "Social entrepreneurial intention: A review based on bibliographic coupling analysis," *The Journal of Entrepreneurship*, vol. 33, no. 4, pp. 815-838, 2024, doi: <https://doi.org/10.1177/09713557241306882>.
- [37] M. Frese and M. M. Gielnik, "The psychology of entrepreneurship: Action and process," *Annual Review of Organizational Psychology and Organizational Behavior*, vol. 10, no. 1, pp. 137-164, 2023, doi: <https://doi.org/10.1146/annurev-orgpsych-120920-055646>.
- [38] S. P. Kerr, W. R. Kerr, and T. Xu, "Personality traits of entrepreneurs: A review of recent literature," *Foundations and Trends in Entrepreneurship*, vol. 14, no. 3, pp. 279-356, 2018, doi: <https://doi.org/10.1561/03000000080>

- [39] D. Kahneman, O. Sibony, and C. R. Sunstein, *Noise: A flaw in human judgment*. Hachette UK, 2021.
- [40] R. S. Shinnar, O. Giacomini, and F. Janssen, "Entrepreneurial perceptions and intentions: The role of gender and culture," *Entrepreneurship Theory and Practice*, vol. 36, no. 3, pp. 465-493, 2012, doi: <https://doi.org/10.1111/j.1540-6520.2012.00509.x>.
- [41] D. A. Shepherd, T. A. Williams, and H. Patzelt, "Thinking about entrepreneurial decision making: Review and research agenda," *Journal of Management*, vol. 41, no. 1, pp. 11-46, 2015, doi: <https://doi.org/10.1177/0149206314541153>
- [42] H. N. Nam and M. T. Thuong, "Entrepreneurial intention and innovation among students: A bibliometric analysis 2014–2024," *Problems and Perspectives in Management*, vol. 22, no. 4, p. 635, 2024, doi: [https://doi.org/10.21511/ppm.22\(4\).2024.48](https://doi.org/10.21511/ppm.22(4).2024.48).
- [43] G. D. Bruton, S. A. Zahra, and L. Cai, "Examining entrepreneurship through indigenous lenses," *Entrepreneurship Theory and Practice*, vol. 42, no. 3, pp. 351-361, 2018, doi: <https://doi.org/10.1177/1042258717741129>.
- [44] J. F. Hair, G. T. M. Hult, C. M. Ringle, M. Sarstedt, N. P. Danks, and S. Ray, *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook*. Springer International Publishing, 2021, doi: <https://doi.org/10.1007/978-3-030-80519-7>.
- [45] J. F. Hair Jr, M. Sarstedt, L. Hopkins, and V. G. Kuppelwieser, "Partial least squares structural equation modeling (PLS-SEM) an emerging tool in business research," *European Business Review*, vol. 26, no. 2, pp. 106-121, 2014, doi: <https://doi.org/10.1108/EBR-10-2013-0128>
- [46] M. Sarstedt, C. M. Ringle, and J. F. Hair, "Partial least squares structural equation modeling," in *Handbook of Market Research*, Cham: Springer International Publishing, 2021, pp. 587-632, doi: https://doi.org/10.1007/978-3-319-57413-4_15.
- [47] O. Janssen, "Job demands, perceptions of effort-reward fairness and innovative work behavior," *Journal of Occupational and Organizational Psychology*, vol. 73, no. 3, pp. 287–302, 2000, doi: <https://doi.org/10.1348/096317900167038>
- [48] J. Henseler and F. Schuberth, "Partial least squares as a tool for scientific inquiry: Comments on Cadogan and Lee," *European Journal of Marketing*, vol. 57, no. 6, pp. 1737-1757, 2023, doi: <https://doi.org/10.1108/EJM-06-2021-0416>