



## Bridging Ecological Cognition and Entrepreneurial Intention: A TPB–SCCT Integration on Green Entrepreneurship among Vocational Students in Chongqing, China

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### Abstract

**Background and Aim:** Amid escalating environmental challenges and sustainability concerns, green entrepreneurship has become increasingly important for sustainable economic development. Nevertheless, a significant gap persists between environmental awareness and entrepreneurial action among young people. This study investigates the psychological and institutional determinants of green entrepreneurial intention (GEI) among vocational college students in Chongqing, China. By integrating the Theory of Planned Behavior (TPB) and Social Cognitive Career Theory (SCCT), the research aims to explain how cognitive, social, and motivational factors influence students' intentions to engage in green entrepreneurship.

**Materials and Methods:** This study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to analyze data collected from 398 valid responses. The proposed framework incorporates Environmental Entrepreneurship Factors (EEF) as a higher-order construct consisting of Green Entrepreneurial Orientation, University Support, and Green Consumption. The model further examines the mediating roles of Attitude toward Behavior and Entrepreneurial Self-Efficacy (AB+ES), Subjective Norms (SN), Perceived Behavioral Control and Outcome Expectations (PBC+OE), and Interest (IN) in shaping green entrepreneurial intention.

**Results:** The findings indicate that Environmental Entrepreneurship Factors significantly influence cognitive and normative dimensions associated with green entrepreneurship. Interest emerged as the strongest predictor of green entrepreneurial intention, whereas the direct effects of AB+ES and PBC+OE on GEI were not statistically significant. Instead, these variables exerted indirect effects through motivational interest pathways. The structural model explained 55.6% of the variance in GEI, emphasizing the crucial role of motivational activation in transforming environmental awareness into entrepreneurial commitment.

**Conclusion:** This study contributes to the literature by integrating TPB and SCCT into a unified framework that captures cognitive, motivational, and intentional dimensions of green entrepreneurship. The results highlight the importance of emotional engagement, institutional support, and sustainability-oriented educational environments in promoting green entrepreneurial behavior among vocational students in developing economies. The findings also provide practical implications for policymakers and educational institutions seeking to strengthen sustainability-driven entrepreneurial ecosystems.

**Keywords:** Green Entrepreneurial Intention; Vocational Students; TPB; SCCT; Interest; Environmental Entrepreneurship; PLS-SEM; China

### Introduction

Given the phenomenon of global warming and the ongoing degradation of the environment, green entrepreneurship has emerged as a vital component of sustainable development, emphasizing its significant role in fostering technological innovation and promoting economic growth (Alvarez-Risco et al., 2021). Green enterprises prioritize environmental protection, tackling ecological challenges while generating profits and benefiting society (Nuringsih & Mn, 2021). Achieving China's goal of carbon neutrality by 2060 requires tech-savvy entrepreneurs to focus on green development (Wang et al., 2022). Vocational students must learn practical skills, receive entrepreneurship education, and intern at green institutions to foster green entrepreneurship (Mabhandu et al., 2024). Despite their environmental awareness, few are keen to start businesses, leaving a significant gap between their aspirations and actions (Yurtkoru et al., 2014).

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To enhance the understanding of the "cognitive-action" disconnect, this study integrates the TPB and the SCCT (Lent et al., 1994). The TPB explains the formation of intentions through attitudes, subjective norms, and perceived behavioral controls. Meanwhile, the SCCT emphasizes motivational processes, including self-efficacy, outcome expectations, and interest. This study integrates theoretical frameworks to show how cognitive assessment, social context, and motivation influence GEI.

The TPB often overlooks interest (IN), but it is crucial in SCCT for understanding why entrepreneurship remains just a thought. Research indicates that even with optimism and a belief in success (a positive attitude combined with high self-efficacy), entrepreneurship mostly remains a thought without genuine interest and motivation. Interest is the inner strength that can keep people's hearts racing and ultimately drive them to start working. Without it, it is not enough. This study fills an important gap in previous theories by bridging the gap between cognitive beliefs and entrepreneurial intentions. Previous studies analyzed university support, green values, and ecological consumption as separate factors, lacking a cohesive perspective. This study addresses this by integrating these elements into a unified "Environmental Entrepreneurial Factors" (EEF) framework. It constructs it into a second-order structure that includes three dimensions: Green Entrepreneurship Orientation (GEO) (Ameer & Khan, 2023; Makhoulfi, 2024; Tuncer & Korchagina, 2024), University Support (US) (Alvarez-Risco et al., 2021; Qazi et al., 2020), and Green Consumption (GC) (Huang et al., 2023). This design enhances the model's explanatory power, making research on green entrepreneurship more realistic and complete (Y. Li et al., 2022; Pratono et al., 2019). It improves the model's effectiveness and clarity while streamlining its structure.

At the methodological level, this study proposes a potential scoring second-order modeling method based on the PLS-SEM framework. This method effectively addresses the inherent limitations of traditional methods, including the use of repeated indicators and two-step approaches. These traditional methods often lead to a decrease in discriminant validity or an increase in model complexity when dealing with multiple secondary constructs. (Benitez et al., 2020; Hair & Alamer, 2022)

This study validated the TPB and SCCT framework using data from 398 vocational college students in Chongqing, thereby contributing to the theoretical, empirical, and methodological aspects of the framework. It enhances understanding of incentive pathways for green entrepreneurship and offers practical ideas for educators and policymakers to promote sustainable development-oriented entrepreneurial ecosystems.

## Objectives

Develop a Theory of Planned Behavior-Social Cognitive Career Theory (TPB–SCCT) model to enhance understanding of Global Environmental Issues (GEI) by incorporating rational factors, such as attitudes and norms, alongside motivational components, including self-efficacy and outcome expectations. Investigate the role of IN in linking cognitive predictors and environmental factors to entrepreneurial intention within the SCCT framework. Define and evaluate the EEF as a second-order construct that integrates ecological values, institutional support, and the effects of pro-environmental behaviors on GEI.

## Literature review

### 1. Green Entrepreneurship: Scope and Challenges

Green entrepreneurship combines environmental responsibility with creative business approaches to generate economic benefits while addressing ecological challenges (Saari & Joensuu-Salo, 2019). Nonetheless, it faces hurdles such as elevated start-up expenses, fluctuating market demand, limited access to green financing, and insufficient technical expertise (Galkina & Hultman, 2016; Linnanen, 2002). These challenges are particularly pronounced for youth in emerging markets, where support systems are still developing (Pratono et al., 2019).

Entrepreneurship education addresses the challenges faced by vocational college students, focusing on practical skills. Custom green entrepreneurship courses, including sustainable project practices, business





simulation training, and incubator programs, can spark interest in learning and boost entrepreneurial confidence and willingness. This educational approach is closer to their actual needs and more conducive to transforming green concepts into concrete entrepreneurial actions (Fayolle & Gailly, 2015; Jena, 2020; Nabi et al., 2017). In China, vocational institutions are integrating modules focused on environmental sustainability into their training programs; however, a considerable intention–behavior gap persists. Therefore, it is essential to examine how cognitive, normative, and motivational factors interact within these educational environments to promote green entrepreneurial intention.

## **2. Theory of Planned Behavior (TPB) in Entrepreneurship Research**

The TPB provides a critical foundation for understanding entrepreneurial intentions, as it identifies three key factors: attitude toward the behavior, perceived social pressure (subjective norms), and perceived behavioral control (PBC) (Ajzen, 1991). If students have a positive attitude towards environmental business and believe it is feasible, they are more likely to participate (Utami, 2017; Wei & Nordin, 2019). However, an increasing number of voices remind us that relying solely on these three elements of TPB may not be sufficient to inspire people's commitment to green entrepreneurship (Liñán & Fayolle, 2015).

TPB offers a theoretical framework for analyzing behavioral intent through attitudes, subjective norms, and perceived behavioral control, but it lacks depth in interpreting motivation for environmentally responsible entrepreneurship. It does not explicitly mention 'self-efficacy' or the question of 'can I do it?'. Green entrepreneurship is more complex and impractical than traditional business, and a lack of confidence in basic skills makes success impossible. Second, TPB also missed the "expected outcome", which is the thought people have in their minds about "what can we do with this?" - is it a sense of personal achievement? Social recognition? Did they contribute to the environment? These tangible rewards are often the driving force behind everyone's commitment to sustainable causes (Krueger & Welp, 2014). Third, TPB did not view "interest" (IN) as an independent power bridge. In educational settings, entrepreneurial enthusiasm should be gradually cultivated (Lent et al., 1994). Relying solely on TPB may underestimate key psychological mechanisms underlying green entrepreneurial intention, particularly among vocational students who require practical confidence and emotional engagement to act.

## **3. Social Cognitive Career Theory (SCCT) and Motivational Pathways**

From the perspective of SCCT, the TPB has been expanded to include three key decision-making elements: self-efficacy (SE), expected outcomes (OE), and interests (IN) (Lent et al., 1994). SE concerns an individual's capability and confidence in the unpredictable realm of entrepreneurship, while OE focuses on the perceived rewards that specific actions may yield. Collectively, these constructs influence interest (IN), which serves as the fundamental mediator that converts cognitive processes (e.g., beliefs) into intentions (e.g., entrepreneurial intentions) (Krueger Jr et al., 2000). Empirical research underscores the significance of SE and OE in fostering sustainable entrepreneurial intentions within the context of sustainable entrepreneurship.

## **4. Integrating TPB and SCCT for Green Entrepreneurial Intention (GEI)**

Numerous recent studies indicate that the integration of the TPB and SCCT may provide a more comprehensive understanding of college students' willingness to engage in green entrepreneurship and facilitate more accurate predictions of their behavior. The TPB posits that individuals make decisions based on rational thought. In contrast, the SCCT highlights intrinsic factors such as motivation, interests, and emotions. This integration is essential in green entrepreneurship as it examines the potential for environmental values to develop into genuine personal interests and actions (Lent et al., 2002; Liguori et al., 2018). Furthermore, interest has emerged as a critical yet underexplored mediating variable linking knowledge and action (Nuringsih & Mn, 2021).

## **5. Environmental Entrepreneurship Factors (EEF)**

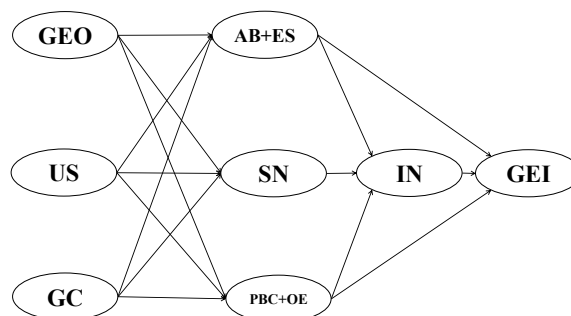
The EEF is a second-order latent structure made up of three first-order reflective structures: Green Entrepreneurship Orientation (GEO), University Support (US), and Green Consumption (GC). The selection of GEO, US, and GC as EEF components is based on both theoretical and empirical evidence. GEO indicates an individual's proactive attitude towards environmental opportunities, aligning with



strategic literature, making it crucial for forming a green business. The US promotes entrepreneurship education, green incubation programs, and mentoring that enhance self-efficacy and entrepreneurship willingness in vocational education(Saeed et al., 2015; Shahid & Reynaud, 2022). GC reflects real-world patterns of environmentally friendly practices and attitudes that are necessary as a vehicle to translate environmental concern into business action (Pratono et al., 2019). In summary, these three dimensions represent the cognitive (GEO), structural (US), and behavioral (GC) characteristics of environmental cues, providing a multi-dimensional yet succinct representation of EEF. Treating them as second-order constructs is consistent with previous work, which suggests combining environmental predictors to explain less common variance, as well as making the model more parsimonious.

These dimensions encourage vocational students to pursue green careers and entrepreneurship. GEO reflects their environmental values and ability to recognize sustainability opportunities. The US encompasses academic institutions' structural and educational supports, including green curricula and incubator programs. GC denotes the behavioral alignment of students with sustainable lifestyles and responsible consumption (G. Li et al., 2022; Pratono et al., 2019). Within the integrated TPB–SCCT framework, EEF functions as a stimulus (or exogenous input) that activates various cognitive, normative, and motivational mechanisms, ultimately leading to GEI (Ajzen, 1991; Lent et al., 1994).

Figure 1 illustrates that each EEF dimension (GEO, US, GC) directly influences specific mediating variables, based on their respective functions. GEO and US factors influence entrepreneurial self-efficacy and attitudes towards behavior (AB+ES). In contrast, GC plays a more significant role in shaping perceived behavioral control and outcome expectations (PBC and OE). The EEF component influences SNs and reinforces the social context of entrepreneurial intent. These intermediaries unite through a key motivation – interest (IN) – which catalyzes the transformation of awareness into green entrepreneurial action. Thus, the final output, GEI, is indirectly formed through these interdependent pathways, illustrating the multidimensional transmission of influences of beliefs, motivations, and intentions. This study's theoretical latent fractional approach models EEF as a second-order construct in PLS-SEM. The proposed method retains theoretical alignment compared to the repeated indication method, which often leads to discriminant validity problems (Hair & Alamer, 2022), or a two-stage approach that requires configuring the first-order structure according to the structure of the second-order variable (Benitez et al., 2020). Each first-order structure is independently estimated by its theoretical role. Its standardized latent score is subsequently used as an indicator in the second-order model. This approach guarantees conceptual clarity and scalability of multi-layer models while avoiding redundancy in metric utilization, which is particularly advantageous when dealing with multiple second-order structures or serial intermediaries.



**Figure 1** First-order construct of Environmental Entrepreneurship Factors (EEF) and its cognitive-motivational mediation pathways toward Green Entrepreneurial Intention (GEI).

## 6. Attitude toward Behavior (AB) and Entrepreneurial Self-Efficacy (ES)

In the TPB and SCCT framework, AB and ES predict GEI. AB encapsulates an individual's assessment of the attractiveness and feasibility of establishing a green business(Ajzen, 1991; Elshaer &

Azazz, 2022), while ES represents a person's confidence in their capabilities to successfully execute such entrepreneurial ventures (Lent et al., 1994). Empirical studies indicate that both constructs are fostered directly or indirectly through motivational interest (Y. Li et al., 2022). Although enhancing self-efficacy can stimulate entrepreneurial engagement, an excessive level of ES may engender overconfidence and result in suboptimal decision-making (Hayward et al., 2006; Newman et al., 2019).

**Why combining AB+ES:** Integrating AB and ES into a construct (AB+ES) is based on their shared evaluative predispositions toward entrepreneurial action. Ajzen's Theory of Planned Behavior posits that attitudes are an individual's evaluation of performing a behavior, like launching a green enterprise. SCCT suggests that self-efficacy reflects confidence in one's ability to execute a task (Lent et al., 1994). Though distinct, these constructs are closely related, shaping perceptions of action feasibility and desirability (Krueger Jr et al., 2000). Research shows that entrepreneurial attitudes and self-efficacy mutually activate motivational pathways, influencing intention (Liñón & Fayolle, 2015; Newman et al., 2019). A positive perception of green entrepreneurship, coupled with confidence in one's abilities, greatly enhances motivation to take action. Viewing these elements as one latent variable makes modeling motivational beliefs more efficient while preserving their conceptual links. This approach aligns with integrated intention models used in entrepreneurship education, where both attitudinal beliefs and self-efficacy are examined together as key drivers of intention.

### 7. Subjective Norms (SN)

Subjective norms (SNs) refer to the social expectations that individuals perceive from essential audiences, including partners, teachers, or institutions, about whether or not to participate in green entrepreneurship (Ajzen, 1991) and these norms influence students' behavioral intentions by amplifying perceived, legitimate, and supportive of sustainable enterprises (Utami, 2017; Wedayanti & Giantari, 2016). A positive normative environment—driven by institutional recognition, peer encouragement, and social recognition—fosters enhanced entrepreneurial dynamics (Mohammed & Aparna, 2011).

### 8. Perceived Behavioral Control (PBC) and Outcome Expectations (OE)

PBC denotes a person's perceived capacity to manage entrepreneurial tasks while facing limitations in resources, skills, and context (Ajzen, 1991). OE, which stems from SCCT, describes the expected benefits (economic, reputational, or social) of engaging in green entrepreneurship (Goethner et al., 2012; Lent et al., 1994). These constructs evaluate feasibility and the alignment of expectancy-value, critical components for nurturing intention and sustained commitment.

**Why combining PBC+OE:** Combining PBC and OE into a construct (PBC+OE) supports their impact on entrepreneurial intention. In TPB, PBC reflects a person's perception of performing a behavior and their confidence in overcoming obstacles (Ajzen, 1991). In SCCT, OE refers to the anticipated outcomes, including financial success or social impact, that are expected when behavior is executed effectively (Lent et al., 1994). Collectively, these elements influence an individual's perceived utility and viability of entrepreneurship, particularly in challenging sectors such as green ventures.

Research indicates that strong intentions arise when individuals believe in their ability to perform a behavior (PBC) and expect valuable outcomes (OE). These beliefs interact: a strong sense of control enhances positive expectations and vice versa. This interaction is especially pronounced among vocational students, who must weigh their resource capabilities against the potential returns of green entrepreneurship. By modeling PBC and OE as one latent variable, their complementary functions in action readiness are emphasized, which is essential for career decision-making (Liguori et al., 2018). This approach maintains both model simplicity and explanatory strength in integrating the TPB and SCCT.

### 9. Interest (IN)

In the SCCT framework, intrinsic motivation serves as the primary factor that connects personal cognition, such as ability and outcome evaluation, with intentions, particularly in the domain of entrepreneurship. This intrinsic motivation denotes a positive inclination towards sustainable entrepreneurship, which is influenced by perceptions of one's abilities and the appeal of potential outcomes (e.g., whether it is worthwhile). (Lent et al., 1994; Liguori et al., 2018). Research has confirmed that this



interest serves as a precursor to goal setting and a driving force behind behavior, playing a significant role in industries such as green enterprises that emphasize value alignment (Krueger Jr et al., 2000; Lanero et al., 2015). More importantly, interests effectively connect self-efficacy and expected outcomes, jointly promoting the formation and long-term maintenance of entrepreneurial intentions (Wang et al., 2022).

### 10. Green Entrepreneurial Intention (GEI)

GEI signifies a purposeful commitment to undertake environmentally sustainable initiatives that harmonize ecological considerations with business objectives (Alvarez-Risco et al., 2021; Wei & Nordin, 2019). As the conclusive phase of the cognitive–motivational pathway, GEI signifies both the readiness and willingness to embrace green opportunities. This idea includes the internalization of values, self-efficacy, and contextual support in practical entrepreneurial planning (Saari & Joensuu-Salo, 2019).

### 11. Research Gap

Despite interest in sustainable entrepreneurship among youth, the literature reveals fragmentation in key areas.

**Insufficient Theoretical Integration:** A limited number of studies have successfully integrated the Theory of Planned Behavior (TPB) with Social Cognitive Career Theory (SCCT), resulting in a lack of theoretical consistency and an underutilization of their complementary benefits. The majority of existing models tend to examine cognitive or motivational predictors in isolation, rather than in a sequential manner (Aurellia & Nuringsih, 2023; Liguori et al., 2018).

**Underspecified Mediation Processes:** Although AB, ES, PBC, and OE have been shown to predict GEI, their transmission through IN—a core motivational element—is often underexplored or omitted, leaving a critical gap in explaining how awareness is transformed into action (Krueger & Welpe, 2014).

**Conceptual Ambiguity in Environmental Stimuli:** Factors such as environmental support, green education, and ecological values are often considered distinct rather than being combined into a unified second-order framework, as seen in the Environmental Education Framework (EEF). This lack of integration reduces both the explanatory power and the clarity of the models.

**Measurement Limitations in Higher-Order Constructs:** Traditional modeling approaches (e.g., repeated indicator and two-stage methods) pose validity or complexity challenges when multiple second-order constructs are present. This study presents a theoretical latent-score alternative that addresses limitations while preserving theoretical coherence (Benitez et al., 2020; Hair & Alamer, 2022).

By addressing these theoretical and methodological gaps, the current study offers a unified and empirically grounded framework that links environmental stimuli, cognitive evaluations, motivational triggers, and entrepreneurial intention, delivering a novel contribution to green entrepreneurship education.

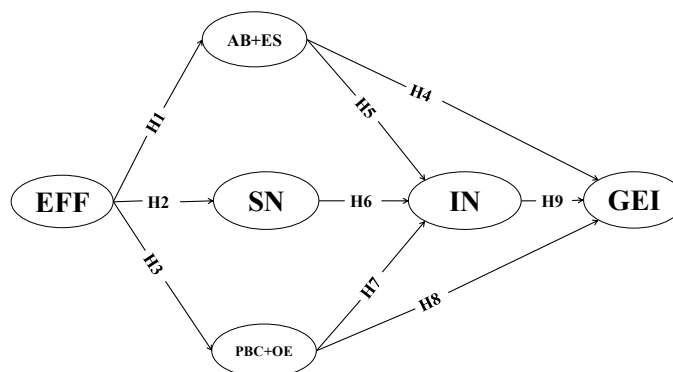
## Conceptual Framework and Hypothesis Development

The model integrates the TPB and SCCT to provide a comprehensive examination of GEI for vocational students. The second-order construct EEF is the core construct of the model, comprising three theoretically based components: Green Entrepreneurial Orientation (GEO), University Support (US), and Green Consumption (GC). EEF is the driving force that represents personal ecological values and institutional enablers of green entrepreneurship.

The EEF was treated as a second-order reflecting construct with three first-order constituents, GEO, US, and GC, as its reflecting indicators. Because these components covary, they reflect the same latent construct (i.e., environmental entrepreneurial climate), and the specification is theoretically justified. The decision to use such modeling is further facilitated by recognized PLS-SEM guidelines, which are applicable under reflective-reflective structures for hierarchical component models with latent scoring procedure (Benitez et al., 2020; Hair & Alamer, 2022).

These are all less proximal Cognitions that correspond with the cognitive, normative, and control paths of the TPB. SCCT complicates this model by incorporating self-efficacy and outcome expectations. In this context, the three paths have no direct effect on intention but instead affect an underlying motivation-like construct, interest (IN). Interest bridges the gap between beliefs and intentions, serving as an

intermediary between the antecedents (attitudinal, normative, and control factors) and intentions. This antecedent interest intention cascade is consistent with the theoretical core of the SCCT model, which posits that interest serves as a bridge between cognition and action.



**Figure 2** Conceptual Framework and Hypotheses.

This model has direct and indirect effects on GEI through EFF and first-level mediators, highlighting a complex web of causal links. It merges TPB's rational decision-making tenets with SCCT's motivational and environmental factors, providing a clear understanding of how environmental cues, personal beliefs, and social influences drive student involvement in green entrepreneurship. The following sections introduce the research hypotheses (H1-H9) developed in this theoretical framework.

### 1. Environmental Entrepreneurship Factors and Attitude–Self-Efficacy

Environmental entrepreneurship education, institutional support, and sustainable consumption behaviors enhance students' perceptions of green ventures and their confidence in their entrepreneurial capabilities. Studies show that sustainability programs in the curriculum have beneficial effects of improving positive attitudes towards environmental practices and entrepreneurial self-efficacy (Newman et al., 2019; Shahid & Reynaud, 2022). Every educational effort to promote green entrepreneurship ensures that sustainability facets have a significant impact on stimulating entrepreneurial behavior and developing a positive attitude towards sustainable opportunities. Indicates that sustainability curricula are significantly contributing to the development of entrepreneurship and the cultivation of

H1: Environmental Entrepreneurship Factors positively affect green entrepreneurship attitudes and self-efficacy.

### 2. Environmental Entrepreneurship Factors and Subjective Norms

Support for sustainability at the institutional level, rich education on green entrepreneurship, and active participation in eco-friendly consumption practices shape students' understanding of social expectations for creating green enterprises. Educational institutions that endorse sustainability create normative environments where green entrepreneurship is perceived as socially desirable and supported (Su et al., 2021). When universities integrate environmental values into their curricula and provide visible support for sustainable ventures, students develop stronger perceptions that significant others approve of and expect green entrepreneurial behavior.

H2: Environmental Entrepreneurship Factors positively influence subjective norms.

### 3. Environmental Entrepreneurship Factors and Perceived Control–Outcome Expectations

By receiving environmental education, institutional resource support, and the experience of sustainable consumption activities, college students' perception of the results of green entrepreneurship will be enhanced, and their expectations of the positive results of environmental entrepreneurship will be raised. A green entrepreneurial orientation enhances innovation capabilities and competitive positioning (Wang et al., 2022), while university support strengthens students' perceived behavioral control and outcome expectations (Saeed et al., 2015). These factors collectively build confidence in one's capacity to manage



sustainable ventures and increase expectations of achieving meaningful environmental and economic outcomes.

H3: Environmental Entrepreneurship Factors positively influence the combined construct of perceived behavioral control and outcome expectations.

#### **4. Attitude–Self-Efficacy and Green Entrepreneurial Intention**

Favorable evaluations of green entrepreneurship and strong beliefs in one's entrepreneurial capabilities directly enhance intentions to pursue sustainable ventures. Meta-analytic evidence confirms that attitudinal favorability and entrepreneurial self-efficacy are robust predictors of entrepreneurial intentions (Caha et al., 2022; Wei & Nordin, 2019). When individuals hold favorable views of environmental business opportunities and possess confidence in their ability to execute such ventures, they are more likely to form concrete intentions to engage in green entrepreneurship.

H4: The combined construct of attitude toward behavior and entrepreneurial self-efficacy has a positive influence on green entrepreneurial intention.

#### **5. Attitude–Self-Efficacy and Interest**

Positive attitudes toward green entrepreneurship, in conjunction with strong self-efficacy, foster a heightened interest in environmental business activities by augmenting perceived competence and intrinsic motivation. Social cognitive theory suggests that individuals cultivate stronger interests in areas where they believe in their abilities and uphold a positive outlook (Lent et al., 1994). Favorable evaluations of green entrepreneurship, along with confidence in one's abilities, establish a psychological foundation for sustained interest in environmental ventures.

H5: The combined construct of attitude towards behavior and entrepreneurial self-efficacy exerts a positive influence on interest.

#### **6. Subjective Norms and Interest**

The social expectations and approval perceived from significant others augment students' interest in green entrepreneurship by establishing supportive normative environments that affirm sustainable business endeavors. Social approval and institutional endorsement function as motivational catalysts, transforming external expectations into internalized interests (Eisenberger & Aselage, 2008). When students perceive that family, peers, and institutions value and support green entrepreneurship, they cultivate a more substantial personal interest in exploring sustainable business opportunities.

H6: Subjective norms positively influence interest.

#### **7. Perceived Control–Outcome Expectations and Interest**

Perceived behavioral control and positive outcome expectations enhance interest in green entrepreneurship by boosting perceived feasibility and expected rewards. Research indicates motivation rises significantly when individuals believe they can manage environmental projects and anticipate positive outcomes (Gore & Leuwerke, 2000; Kraft et al., 2005). A high level of perceived control over green business activities, combined with the expectation of meaningful environmental and economic benefits, fosters a continued interest in sustainable entrepreneurship.

H7: The combined construct of perceived behavioral control and outcome expectations positively influences interest.

#### **8. Perceived Control–Outcome Expectations and Green Entrepreneurial Intention**

The perceived capacity to influence the outcomes of environmentally sustainable ventures, along with the anticipation of favorable results, directly bolsters the intention to participate in green entrepreneurship. The theory of planned behavior posits that perceived behavioral control plays a crucial role in determining behavioral intentions (Ajzen, 1991). Social cognitive career theory emphasizes the importance of outcome expectations in the context of career decisions (Lent et al., 1994). If students perceive themselves as competent in dealing with sustainable initiatives and expect positive outcomes, they are more likely to have the intention to engage in green entrepreneurship.

H8: The combination of perceived control and outcome expectations positively influences the intention to engage in green entrepreneurship.



## 9. Interest and Green Entrepreneurial Intention

Interest acts as a core motivational channel that converts cognitive assessments and environmental awareness into dedicated entrepreneurial efforts. Interest is recognized in social cognitive career theory as an important predictor of career behavior (Lent et al., 1994). Ultimately, students interested in green entrepreneurship show a stronger intention to pursue sustainability by investing cognitive and emotional energy in business planning. Environmental awareness is transformed into entrepreneurial commitment through interest.

H9: Intention to engage in green entrepreneurship is positively influenced by interest in green entrepreneurship.

## Methodology

### 1. Measurement instrument

The measurement items employed in this study were adapted from validated scales documented in prior literature (see Appendix A for item details). All constructs were conceptualized as reflective and were assessed using a seven-point Likert scale. The questionnaire comprised seven sections. The initial section collected information regarding the demographic and background characteristics of the respondents, which included educational attainment, academic major, year of study, and family background. The EEF, GEO, US, and GC of (Y. Li et al., 2022) were assessed. AB and ES referred to (Ajzen, 1991), (Lent et al., 1994), and (Newman et al., 2019), among others. SN focused on items from (Su et al., 2021), (Wu & Chen, 2014), and (Yasir et al., 2023). PBC and OE referred to (Kraft et al., 2005) and (Segal et al., 2002). IN was based on the work of (Lent et al., 1994). GEI was based on (Wei & Nordin, 2019) and (Alvarez-Risco et al., 2021).

### 2. The sample and population

This research examined students at private vocational colleges in Chongqing, China, with a focus on institutions that offer active entrepreneurship programs and diverse student demographics. In this study, “active entrepreneurship programs” refer to institutional initiatives that provide formal or semi-formal support for student entrepreneurship. These include, but are not limited to, dedicated entrepreneurship courses, green business incubation programs, startup pitch competitions, mentorship schemes, and access to campus-based entrepreneurial resources such as maker spaces or innovation labs. Only vocational colleges that offered at least two of these program types during the academic years 2022–2024 were included in the sampling frame to ensure adequate exposure to entrepreneurship education. A stratified random sample was used to ensure representativeness in terms of gender, field of study (i.e., business, engineering, design), and year of study. The “10-fold rule” in PLS-SEM requires a minimum sample size of 400 participants to fulfill the model's complexity requirements. The questionnaire was completed online via WeChat groups, campus entrepreneurship centers, and student forums from November 2024 to March 2025. Data quality was ensured through logical validation, attention checks, and IP restrictions. A total of 641 responses were collected; after screening for incomplete and invalid entries, 398 valid questionnaires remained, corresponding to a validity rate of 62.1 %.

### 3. Demography of the sample

The final dataset comprised 398 respondents, all of whom were currently enrolled students from diverse academic backgrounds. More than 80% of respondents were in their third or final year of study, and approximately 85% indicated that they had already participated in courses or campus activities related to entrepreneurship. The majority of participants specialized in subjects such as management, design, or environmental sciences, which are closely related to green entrepreneurship. The gender distribution was approximately 80% male, with most students coming from urban or peri-urban areas in Chongqing. Table 1 shows a comprehensive demographic profile, including education level, entrepreneurial involvement, and interests in sustainability.

**Table 1** Demographic characteristics

| Variable | Category | Frequency | Percentage |
|----------|----------|-----------|------------|
| Age      | 17–20    | 118       | 29.65%     |
|          | 21–24    | 274       | 68.84%     |
|          | Above 24 | 6         | 1.51%      |
| Gender   | Male     | 319       | 80.15%     |





| Variable            | Category                  | Frequency | Percentage |
|---------------------|---------------------------|-----------|------------|
| Education           | Female                    | 79        | 19.85%     |
|                     | Vocational Undergraduate  | 314       | 78.89%     |
|                     | Vocational Junior College | 84        | 21.11%     |
|                     | Under 100,000             | 296       | 74.37%     |
| Annual Income (CNY) | 100,001–300,000           | 81        | 20.35%     |
|                     | 300,001–500,000           | 10        | 2.51%      |
|                     | 500,001–1,000,000         | 3         | 0.75%      |
|                     | Above 1,000,000           | 8         | 2.01%      |
| Enrollment Year     | 2020                      | 7         | 1.76%      |
|                     | 2021                      | 38        | 9.55%      |
|                     | 2022                      | 125       | 31.41%     |
|                     | 2023                      | 108       | 27.14%     |
|                     | 2024                      | 120       | 30.15%     |

#### 4. Analysis Method

This study used PLS-SEM to analyze the complex relationships in the conceptual framework. PLS-SEM is ideal for exploratory research, particularly when hierarchical latent variables, reflective constructs, and mediation are involved. It handles non-normal data and moderate sample sizes (Hair & Alamer, 2022). Following the two-step analytical approach (Anderson & Gerbing, 1988), the analysis had two stages: Measurement model assessment and Structural model evaluation.

##### Model Fit Assessment

Traditional PLS-SEM prioritizes prediction over fit, with some goodness-of-fit indices enhancing the evaluation. SRMR values below 0.08 signify good model-data consistency (Hu & Bentler, 1999). D\_ULS and D\_G are discrepancy measures that, compared with bootstrapped confidence intervals, assess model consistency.

##### Measurement Model Assessment

For reflective constructs, the quality of the measurement model is assessed as follows:

Indicator reliability: external loadings must be above 0.708, which confirms sufficient explanation of the latent construct.

Internal consistency reliability: Composite reliability values (CR) should be between 0.70 and 0.95, whereby Cronbach's alpha and Dijkstra–Henseler's rho\_A are also specified.

Convergent validity: The average variance extracted (AVE) for each construct should be  $\geq 0.50$ , which means that the construct explains more than half of the variance of its indicators (Fornell & Larcker, 1981).

Discriminant validity: Assessed using the heterotrait-monotrait matrix (HTMT) criterion; HTMT values should be below 0.85 (or 0.90 in less stringent settings). Confidence intervals based on bootstrapping must not exceed 1.0 (Henseler et al., 2015). In addition, customized criteria such as HTMT or HTMT2 can improve the robustness of complex models (Becker et al., 2022).

##### Structural Model Assessment

In the second stage, the structural (inner) model is assessed using the following criteria:

Collinearity Diagnostics: To confirm the absence of multicollinearity, Variance Inflation Factor (VIF) values should be below 5.0 and preferably under 3.3.

Path Coefficients and Significance Testing: Estimated via bootstrapping (typically 5,000 resamples), with significance determined by p-values and confidence intervals.

Coefficient of Determination ( $R^2$ ): Represents the model's explanatory power for each endogenous variable. Values of 0.75, 0.50, and 0.25 indicate substantial, moderate, and weak explanatory power, respectively (Cohen, 1988).

Effect Size ( $f^2$ ) Assesses the relative contribution of each predictor; values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively.

Predictive Relevance ( $Q^2$ ): Obtained via blindfolding; values greater than zero indicate predictive relevance.

Mediation Analysis: Indirect effects are evaluated using bias-corrected bootstrapping to determine whether mediating relationships are partial, complete, or complementary (Zhao et al., 2010).





## Results

### 1. Model fit

This research examines the constructs of GC, GEO, and US through the application of the consistent Partial Least Squares components (PLSc) algorithm. The model fit indices—Standardized Root Mean Square Residual (SRMR) = 0.060, d\_ ULS = 0.685, and d\_ G = 0.379—fall within acceptable ranges, thereby confirming the structural adequacy.

### 2. Measurement Model

Table 2: Measurement Model Evaluation, Panel A shows the reliability and validity of each latent construct using reflective indicators. The following criteria were used:

Indicator Reliability: All item loadings exceed 0.708, confirming reliable indicators. The items AB1–AB2 and ES1–ES2 exhibit strong loadings on the AB+ES construct, ranging from 0.818 to 0.852. In contrast, the GEI and IN items exhibit exceptionally high loadings, exceeding 0.90, indicating outstanding reliability.

Regarding Internal Consistency Reliability, all constructs reflect high levels of internal consistency, as evidenced by Cronbach's Alpha values that vary from 0.733 (EEF) to 0.884 (GEI). Composite Reliability (CR) values for all constructs are within the acceptable range of 0.70 to 0.95, confirming construct-level reliability (Dijkstra & Henseler, 2015).

Convergent Validity: The Average Variance Extracted (AVE) for each construct exceeds 0.50 (Fornell & Larcker, 1981), indicating substantial variance captured from the indicators. The AVE values range from 0.652 (EEF) to 0.868 (IN), demonstrating strong convergent validity.

Panel B assesses discriminant validity utilizing the Heterotrait–Monotrait (HTMT) ratio. All HTMT values are below 0.85, meeting the discriminant validity criterion established by. Key observations include that the HTMT value between EEF and SN is 0.843, which approaches the upper boundary but remains within acceptable limits.

This suggests a meaningful distinction between environmental entrepreneurship factors and perceived social norms, despite a strong empirical link. The constructs IN and GEI exhibit a high HTMT value of 0.846, indicating the anticipated theoretical link in SCCT-based motivational mediation, while remaining within acceptable limits. Other pairs, such as EEF–Perceived Behavioral Control + Opportunity Engagement (PBC+OE) = 0.821 and Attitude + Entrepreneurial Self-Efficacy–PBC+OE = 0.738, are distinguished, thereby supporting the validity of the measurement model. Table 2 confirms the model's adequacy, with indicators demonstrating satisfactory reliability, internal consistency, and convergent validity. HTMT analysis confirms discriminant validity, ensuring the distinctness of latent constructs. These findings establish a strong basis for evaluating the structural model.

**Table 2** Evaluation of the Measurement Model

| Panel A: Indicators' reliability and validity |                |                  |                       |       |
|-----------------------------------------------|----------------|------------------|-----------------------|-------|
| Construct                                     | Factor loading | Cronbach's Alpha | Composite Reliability | AVE   |
| AB+ES                                         |                | 0.856            | 0.902                 | 0.698 |
| AB1                                           | 0.849          |                  |                       |       |
| AB2                                           | 0.818          |                  |                       |       |
| ES1                                           | 0.823          |                  |                       |       |
| ES2                                           | 0.852          |                  |                       |       |
| EEF                                           |                | 0.733            | 0.849                 | 0.652 |
| US                                            | 0.788          |                  |                       |       |
| GC                                            | 0.849          |                  |                       |       |
| GEO                                           | 0.785          |                  |                       |       |
| GEI                                           |                | 0.884            | 0.928                 | 0.812 |
| GEI1                                          | 0.906          |                  |                       |       |
| GEI2                                          | 0.892          |                  |                       |       |
| GEI3                                          | 0.906          |                  |                       |       |
| IN                                            |                | 0.848            | 0.929                 | 0.868 |
| IN1                                           | 0.933          |                  |                       |       |
| IN2                                           | 0.93           |                  |                       |       |



| Panel A: Indicators' reliability and validity |       |       |       |       |        |    |
|-----------------------------------------------|-------|-------|-------|-------|--------|----|
| PBC+OE                                        |       | 0.868 | 0.91  |       | 0.716  |    |
| OE1                                           | 0.849 |       |       |       |        |    |
| OE2                                           | 0.862 |       |       |       |        |    |
| PBC1                                          | 0.831 |       |       |       |        |    |
| PBC2                                          | 0.842 |       |       |       |        |    |
| SN                                            |       | 0.827 | 0.897 |       | 0.743  |    |
| SN1                                           | 0.857 |       |       |       |        |    |
| SN2                                           | 0.913 |       |       |       |        |    |
| SN3                                           | 0.814 |       |       |       |        |    |
| Panel B: discriminant validity (HTMT)         |       |       |       |       |        |    |
| Construct                                     | AB+ES | EEF   | GEI   | IN    | PBC+OE | SN |
| AB+ES                                         |       |       |       |       |        |    |
| EEF                                           | 0.729 |       |       |       |        |    |
| GEI                                           | 0.524 | 0.467 |       |       |        |    |
| IN                                            | 0.552 | 0.488 | 0.846 |       |        |    |
| PBC+OE                                        | 0.738 | 0.821 | 0.498 | 0.528 |        |    |
| SN                                            | 0.643 | 0.843 | 0.479 | 0.518 | 0.815  |    |

### 3. Direct Effect Analysis

The structural model follows the measurement model to assess relationships between constructs. Table 3 shows the hypothesis testing outcomes for direct effects. Interest (IN) is the strongest direct predictor of GEI ( $\beta = 0.648$ ,  $p < 0.001$ ); however, AB+ES and PBC+OE did not reach statistical significance. This underscores the mediating role of motivators in entrepreneurial intention. EEF significantly impacts all cognitive factors (AB+ES, PBC+OE, SN) with path coefficients from 0.579 to 0.660 (both  $p < 0.001$ ).

**Table 3** Direct effect evaluation of the structural model

| Hypothesis | Path         | Coefficient ( $\beta$ ) | T-value | P-value | f <sup>2</sup> | VIF   | Result  | Effect Interpretation |
|------------|--------------|-------------------------|---------|---------|----------------|-------|---------|-----------------------|
| H1         | EEF → AB+ES  | 0.579                   | 14.089  | 0       | 0.503          | 1     | Support | Large                 |
| H2         | EEF → SN     | 0.66                    | 17.64   | 0       | 0.772          | 1     | Support | Large                 |
| H3         | EEF → PBC+OE | 0.659                   | 16.826  | 0       | 0.768          | 1     | Support | Large                 |
| H4         | AB+ES → IN   | 0.285                   | 5.144   | 0       | 0.064          | 1.766 | Support | Small                 |
| H5         | AB+ES → GEI  | 0.102                   | 1.678   | 0.093   | 0.013          | 1.846 | No      | Negligible            |
| H6         | SN → IN      | 0.177                   | 3.027   | 0.002   | 0.022          | 1.96  | Support | Small                 |
| H7         | PBC+OE → IN  | 0.15                    | 2.046   | 0.041   | 0.013          | 2.372 | Support | Negligible            |
| H8         | PBC+OE → GEI | 0.078                   | 1.299   | 0.194   | 0.008          | 1.798 | No      | Negligible            |
| H9         | IN → GEI     | 0.648                   | 14.346  | 0       | 0.694          | 1.361 | Support | Large                 |

Table 4 summarizes the  $R^2$  and adjusted  $R^2$  values for all constructs in the model, indicating the variance explained by each construct's predictors. The GEI has the highest explanatory power ( $R^2 = 0.556$ ), indicating that over 50% of its variance is attributed to interest, attitude, self-efficacy, and perceived control. The AB+ES, PBC+OE, SN, and IN constructs display moderate  $R^2$  values (0.281–0.436), indicating significant influence from the EEF. All  $R^2$  values surpass the 0.26 threshold for moderate strength, confirming the model's adequacy. This indicates that the TPB–SCCT model explains a significant portion of the variance in green entrepreneurial intention and its main antecedents.

**Table 4** Coefficient of Determination ( $R^2$ ) and Model Explanatory Power

| Construct | $R^2$ | Adjusted $R^2$ | Interpretation  |
|-----------|-------|----------------|-----------------|
| AB+ES     | 0.335 | 0.333          | Moderate        |
| PBC+OE    | 0.434 | 0.433          | Moderate        |
| SN        | 0.436 | 0.434          | Moderate        |
| IN        | 0.281 | 0.276          | Moderate        |
| GEI       | 0.556 | 0.552          | Moderately high |

#### 4. Mediation Effect Analysis

Table 5 presents results from a mediation analysis of indirect effects in the structural model using bias-corrected bootstrapping (5,000 resamples). This analysis evaluates whether Environmental Entrepreneurship Factors (EEF) and mediators (Subjective Norms, Perceived Behavioral Control, Other Experiences) influence GEI through constructs like Attitude Towards Behavior, Environmental Sustainability, and Interest (IN).

The table shows standardized indirect effect coefficients ( $\beta$ ), T-values, p-values, and statistical support for each mediation path at  $p < 0.05$ . The main results show that the path  $EEF \rightarrow AB+ES \rightarrow GEI$  is not significant ( $\beta = 0.059$ ,  $p = 0.096$ ), suggesting that the path of attitude and self-efficacy does not mediate the effect of EEF on GEI.  $EEF \rightarrow AB+ES \rightarrow IN$  is significant ( $\beta = 0.165$ ,  $p < 0.001$ ), indicating that interest mediates cognitive-affective inputs into intention. The paths  $EEF \rightarrow SN \rightarrow IN$  ( $\beta = 0.117$ ,  $p = 0.002$ ) and  $EEF \rightarrow PBC+OE \rightarrow IN$  ( $\beta = 0.099$ ,  $p = 0.043$ ) show that interest mediates normative and controlling influences. The mediation paths  $SN \rightarrow IN \rightarrow GEI$  and  $PBC+OE \rightarrow IN \rightarrow GEI$  are significant ( $\beta = 0.115$  and  $0.097$ , respectively), confirming that interest mediates the relationship between beliefs and behavioral intentions.

These results support a multilevel mediation structure consistent with the SCCT's focus on translating self-beliefs and outcome expectations into behavioral intentions through sustained interest. Even though some first-order cognitive constructs have no direct influence on GEI, their indirect influence through interest remains significant and robust.

**Table 5** Mediation analysis of indirect effects in the structural model

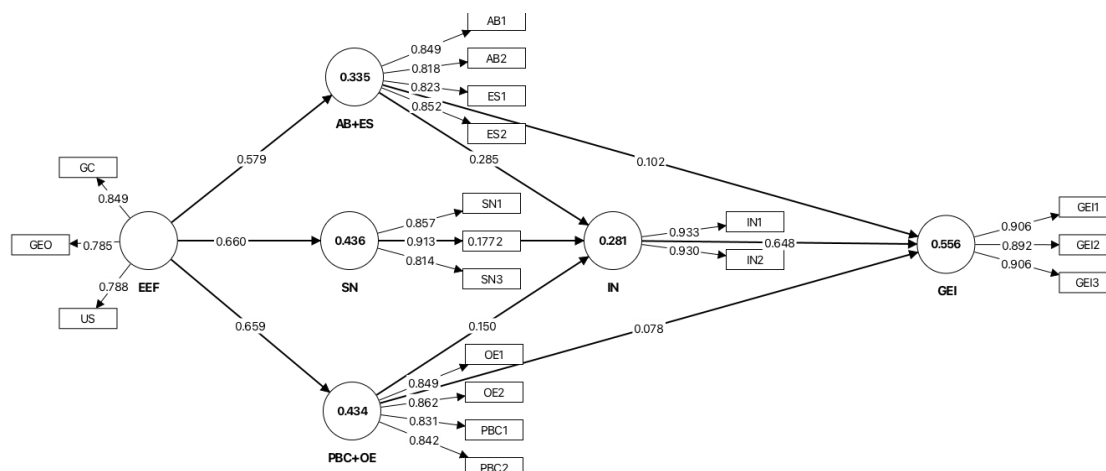
| Indirect Path                           | Indirect Effect ( $\beta$ ) | T-value | P-value | Supported |
|-----------------------------------------|-----------------------------|---------|---------|-----------|
| $EEF \rightarrow AB+ES \rightarrow GEI$ | 0.059                       | 1.666   | 0.096   | No        |
| $EEF \rightarrow AB+ES \rightarrow IN$  | 0.165                       | 4.911   | 0       | Yes       |
| $EEF \rightarrow SN \rightarrow IN$     | 0.117                       | 3.03    | 0.002   | Yes       |
| $EEF \rightarrow PBC+OE \rightarrow IN$ | 0.099                       | 2.023   | 0.043   | Yes       |
| $SN \rightarrow IN \rightarrow GEI$     | 0.115                       | 3.131   | 0.002   | Yes       |
| $PBC+OE \rightarrow IN \rightarrow GEI$ | 0.097                       | 2.061   | 0.039   | Yes       |

#### 5. Serial Mediation Effects

Table 6 presents the results of a serial mediation analysis on how Environmental Entrepreneurship Factors (EEF) affect Green Entrepreneurial Intention (GEI) through cognitive constructs (AB+ES, SN, PBC+OE) and the motivational construct Interest (IN). All three pathways are statistically significant, confirming that Interest (IN) mediates the transformation of cognitive and social beliefs into Green Entrepreneurial Intention. These findings support the proposed multi-layered mediation model, aligning with the TPB-SCCT integration.

**Table 6** Serial Mediation Effects

| Serial Path                                             | Indirect Effect ( $\beta$ ) | T-value | P-value | Supported |
|---------------------------------------------------------|-----------------------------|---------|---------|-----------|
| $EEF \rightarrow AB+ES \rightarrow IN \rightarrow GEI$  | 0.107                       | 4.795   | 0       | Yes       |
| $EEF \rightarrow SN \rightarrow IN \rightarrow GEI$     | 0.076                       | 3.112   | 0.002   | Yes       |
| $EEF \rightarrow PBC+OE \rightarrow IN \rightarrow GEI$ | 0.064                       | 2.028   | 0.043   | Yes       |



**Figure 3** Structural Model Results with Path Coefficients and R<sup>2</sup> Values

Figure 3 presents results from the PLS-SEM structural model analysis. The model comprises Environmental Entrepreneurship Factors (EEF)—a second-order construct of GEO, US, and GC—that predict cognitive, social, and motivational constructs. All factor loadings are above 0.70, which indicates high reliability. The R<sup>2</sup> values for the latent variables show moderate to considerable explanatory power (e.g., GEI: R<sup>2</sup> = 0.556, IN: R<sup>2</sup> = 0.281). The model depicts a multi-path, partially mediated structure in which the EEF influences the GEI both directly and indirectly through persuasion and motivation pathways. These results support the integration of the Theory of Planned Behavior (TPB) and the Social Cognitive Career Theory (SCCT) and underline the importance of interest (IN) in linking cognitive factors with behavioral intention.

## Discussion

### 1. Comparison with Prior Research

The study reinforces and extends existing research on Green Entrepreneurial Intention (GEI). Consistent with (Vuorio et al., 2018) and (Nuringsih & Mn, 2021), our findings indicate that cognitive predictors, such as Attitude toward Behavior (AB), Entrepreneurial Self-Efficacy (ES), Perceived Behavioral Control (PBC), and Outcome Expectations (OE), alone are insufficient to generate Generalized Expectancy of Interest (GEI). Instead, interest (IN) is a crucial psychological catalyst that transforms cognitive awareness into intention. This challenges the conventional theory of planned behavior (Ajzen, 1991), which assumes that these cognitive constructs directly predict intention. Instead, the results are consistent with more recent perspectives that emphasize motivational and affective mechanisms (Kautonen et al., 2015; Liñán & Fayolle, 2015).

Additionally, this research makes a significant contribution to the Social Cognitive Career Theory (Lent et al., 2002) by illustrating that environmental inputs stimulate self-beliefs and expectations, foster interest, and lead to intention. This emphasizes viewing interest as a functional link between cognition and behavior in the entrepreneurial process.

### 2. Theoretical Contributions

This study offers three primary theoretical advances:

The mediating role of interest: research empirically confirms that interest is the key motivational bridge linking environmental (EEF) and cognitive (AB, ES, PBC, OE) variables to GEI. This supports the call for the inclusion of interest in models of entrepreneurial intention (Krueger & Welp, 2014).

Development of EEF as a second-order construct: EEF, consisting of Green Entrepreneurial Orientation, University Support, and Green Consumption Commitment, is modeled as a reflexive second-order construct. This resolves previous inconsistencies in the conceptualization of environmental determinants by providing a unified and theoretically grounded structure (Galkina & Hultman, 2016).

Hierarchical cognitive-motivational model: The study introduces a multilevel pathway in which environmental factors indirectly influence entrepreneurial intentions by activating cognition and



stimulating interest. This hierarchical structure increases the explanatory power of both the TPB and the SCCT, especially in the context of sustainability and vocational training.

### 3. Practical Implications

The findings underscore the **importance of motivational activation**, particularly interest, in bridging the gap between ecological awareness and entrepreneurial action. For policymakers and educators, the results imply that. Green entrepreneurship education must move beyond rational instruction and incorporate emotional engagement strategies. Programs should include narrative-based learning, project initiation, and experiential activities to deepen interest. Institutional support should provide personalized advice, mentoring, and accessible incubators for green projects to reinforce perceived feasibility and benefits. A summarised matrix (Table 7) is used to translate the findings into specific actions for policy, practice, and curriculum.

**Table 7** Summary of Practical Recommendations by Stakeholder

| Stakeholder  | Recommendation                                                            |
|--------------|---------------------------------------------------------------------------|
| Educators    | Integrate project-based learning, storytelling, and mentorship programs.  |
| Institutions | Establish green incubators and provide targeted entrepreneurial training. |
| Policymakers | Design incentive structures, fund green competitions, and startup grants  |

These strategies are particularly crucial in emerging economies, where structural and perceptual barriers to entrepreneurship persist at high levels.

### 4. Study Limitations

This study offers insights into the cognitive and motivational mechanisms underlying green entrepreneurial intention (GEI) in vocational students; however, it also has several limitations. First, the cross-sectional design limits causal inferences between TPB, SCCT, and EEF variables; longitudinal or experimental designs are needed for future studies to clarify directionality. Second, the data from private vocational schools in Chongqing, China, limit the generalisability to other regions or countries. Replicating the study in a different location improves external validity. Thirdly, as self-report questionnaires were used for all variables, there is an increased risk of common method bias (CMB), despite the use of anonymity and item separation. Future studies should include other data sources or behavioral data for validation. Furthermore, although TPB and SCCT were integrated, personality traits (e.g., proactivity), environmental policy, and social capital were not considered. Future modeling could extend the predictive power. These limitations offer opportunities to refine the model in future research.

### Conclusion

This study integrates TPB and SCCT to explain the green entrepreneurial intention (GEI) of vocational students. The results highlight the key role of interest as a motivational mediator between cognitive and environmental factors, as well as between GEI, and provide a clearer understanding of how intention is formed.

Practical implications suggest that educators and policymakers should design interventions that foster students' interest through narrative learning, green project-based experiences, and institutional support, especially in emerging urban contexts such as Chongqing.

The study also makes a theoretical contribution by modeling Environmental Entrepreneurship Factors (EEF) as a second-order construct and by validating a second-order latent variable modeling approach in PLS-SEM. These innovations improve parsimony and explanatory power.

However, the study is limited by its geographical focus and cross-sectional design. Future research should apply the model in other regions, use longitudinal designs, and investigate additional variables such as ecological identity or digital skills.

To summarize, this study enhances our understanding of the relationship between motivation, ecological awareness, and green entrepreneurial intentions, providing actionable insights for theory, policy, and practice.



## Recommendations

Future research should focus on longitudinal studies of ecological cognition, theory of planned behavior (TPB), and social cognitive career theory (SCCT) in vocational students aspiring to become green entrepreneurs (Brown & Lent, 2019). These studies are critical to understanding how educational experiences shape GEI (Brown & Lent, 2019). They must investigate mediating variables in the intention-behavior gap (Potluri & Phani, 2020) by tracking students from the development of their green entrepreneurial intentions to the launch of green businesses. Incorporating social exchange theory into analysis presents an opportunity (Donald et al., 2024). Research needs to examine entrepreneurial behavior in green initiatives, especially in student-led sustainability projects and early-stage green innovations. There is a need to analyze how environmental awareness and SCCT factors influence these activities (Haldar, 2019). This also includes the study of green entrepreneurship, from corporate intrapreneurship to social entrepreneurship for environmental change. Testing intervention strategies is crucial. Programs based on the integrated TPB-SCCT model should focus on TPB elements, such as perceived behavioral control and subjective norms, together with SCCT elements, including green entrepreneurial self-efficacy and positive outcome expectations (Taylor & Walley, 2004). Narrative and experiential learning modules introduce VET students to green entrepreneurship through hands-on experiences. Comparative studies of VET systems, especially between China and other countries, help to understand how environmental policies and cultural attitudes influence green intentions and actions. Broader cross-context testing will improve the external validity and generalisability of the proposed framework (Nguyen et al., 2025).

Further work is needed to develop and validate measurement tools to assess the complex relationships between ecological cognition, theory of planned behavior (TPB), and social cognitive career theory (SCCT) in the context of professional green entrepreneurship. This development should include qualitative validation to ensure contextual sensitivity and support the refinement of mixed methods, thereby ensuring both psychometric robustness and practical applicability.

Finally, the inclusion of qualitative research, such as in-depth interviews and case studies, will provide rich insights into how students experience education in ecological cognition and how institutional factors (curriculum, support systems) enable or hinder green entrepreneurial pathways. These approaches will help to explain the mechanisms by which TPB and SCCT constructs influence intentions and actions, thus improving both the theoretical robustness and ecological validity of future studies in this area.

## Appendix A: Constructs, Dimensions, and Sources of Measurement Scales

| Construct                                                    | Item | Description                                                                                                           |
|--------------------------------------------------------------|------|-----------------------------------------------------------------------------------------------------------------------|
| Environmental Entrepreneurship Factors (EEF)                 | GEO1 | I am willing to develop green products or services with competitive advantages to meet market demand.                 |
|                                                              | GEO2 | Management makes forward-looking decisions based on market and competitive dynamics and develops matching strategies. |
|                                                              | US1  | My university offers courses and training related to green entrepreneurship.                                          |
|                                                              | US2  | My university/college provides the financial support or policy guidance needed to start a business.                   |
|                                                              | GC1  | I am willing to pay more for eco-friendly products than regular ones.                                                 |
|                                                              | GC2  | I actively promote the concept of green consumption in my daily life.                                                 |
| Attitude and Self-Efficacy in Green Entrepreneurship (AB+ES) | AB1  | I believe that green entrepreneurship can have a profoundly positive impact on both society and the environment.      |
|                                                              | AB2  | I believe that green businesses can strike a balance between economic interests and sustainable development goals.    |
|                                                              | ES1  | Green entrepreneurship can bring me stable economic returns.                                                          |



| Construct                                                                  | Item | Description                                                                                                                |
|----------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------------------|
| Subjective Norms (SN)                                                      | ES2  | Green entrepreneurship enables me to achieve my career goals and enhance my social impact.                                 |
|                                                                            | SN1  | My family supports me in starting a green business.                                                                        |
|                                                                            | SN2  | My friend thinks that green entrepreneurship is a business worth trying.                                                   |
|                                                                            | SN3  | More people are increasingly recognizing green companies and encouraging young people to get involved.                     |
| Perceived Control and Expected Outcomes in Green Entrepreneurship (PBC+OE) | PBC1 | Despite the difficulties, I remain confident that I will succeed in starting and running a green business.                 |
|                                                                            | PBC2 | With the right resources, I can start a green business.                                                                    |
|                                                                            | OE1  | I developed a business plan for a green startup, including market analysis, financial budgeting, and marketing strategies. |
|                                                                            | OE2  | I can identify and act on unmet opportunities for green entrepreneurship in the market.                                    |
| Interest (IN)                                                              | IN1  | I am curious about new technologies and business models for green entrepreneurship.                                        |
|                                                                            | IN2  | I enjoy studying the success stories of green entrepreneurship and considering its innovative approaches.                  |
|                                                                            | GEI1 | One of my career goals is to become a green entrepreneur.                                                                  |
| Green Entrepreneurial Intention (GEI)                                      | GEI2 | If given the opportunity, I would like to start a green business.                                                          |
|                                                                            | GEI3 | In the future, I will actively seek resources and support to promote my green entrepreneurship plan.                       |

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