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RECEIVED 07 February 2025

ACCEPTED 04 June 2025

PUBLISHED 10 July 2025

CITATION

Thao NTP, Truong DD, Lan BTH, Quang BH,
Tam DD and An ND (2025) Behavioral and
cognitive drivers of green entrepreneurship in
Net Zero context: an empirical analysis from
Vietnam. *Front. Clim.* 7:1572386.
doi: 10.3389/fclim.2025.1572386

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Behavioral and cognitive drivers of green entrepreneurship in Net Zero context: an empirical analysis from Vietnam

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Entrepreneurship plays a crucial role in socio-economic development, particularly in the context of green and sustainable business practices. This study explores the factors influencing and mediating green entrepreneurial intention (GEI) in Vietnam within the Net Zero context. The research integrates the theory of planned behavior (TPB) and social cognitive theory (SCT) to develop a comprehensive research model. Primary data were collected through a face-to-face survey with 400 business students. The data were analyzed using descriptive statistics, Cronbach's alpha analysis, exploratory factor analysis (EFA), and structural equation modeling (SEM). The results reveal that nine factors directly influence GEI, namely, self-efficacy (SE), attitude toward entrepreneurship, SN, perceived behavioral control, green industry awareness, entrepreneurship education, social persuasion, capital sources, and personality traits. In addition, the study highlights the mediating role of SE in linking the variables of TPB and SCT to GEI. The findings provide practical recommendations for policymakers and educational institutions to promote green entrepreneurship through targeted education, financial support, and enhanced social networks.

KEYWORDS

green entrepreneurship, entrepreneurial intention, theory of planned behavior, social cognitive theory, self-efficacy, Net Zero

1 Introduction

Globally, fostering startup activities is a crucial factor in the economic and social development of both developed and developing countries (Ahmad, 2011; Cetindamar et al., 2012; Anjum et al., 2020; Abdurrahman et al., 2024). Entrepreneurship drives technological innovation, creates employment opportunities, and opens new markets, thus facilitating economic growth and enhancing the welfare of nations (Gurbuz and Aykol, 2008a,b; Deveci et al., 2016; Ida Ketut, 2019). In recent years, governments have introduced various policies to encourage startups, particularly targeting youth and emerging industries that are expected to experience rapid growth in the near future. Student entrepreneurship has garnered significant attention due to its connection with employment and the alignment between educational institutions and the labor market (Isaac et al., 2007; Gerba, 2012; Arkorful and Hilton, 2021). Previous literature indicates that entrepreneurship is increasingly viewed by students worldwide as an appealing career

path upon graduation (Bird, 1998a,b; Hechavarria et al., 2012; Koe et al., 2022a,b; López-Núñez et al., 2022). Despite the numerous benefits entrepreneurship offers to various stakeholders, particularly young people, there remain significant challenges in promoting this activity. These challenges vary depending on the context, the industry, societal trends, and the level of support from governments. Factors such as administrative complexity, social networks, access to resources, cultural climate, and economic conditions can either foster or hinder entrepreneurial intention and actual entrepreneurial behavior (Gurbuz and Aykol, 2008a,b; Bullough et al., 2014; Karabulut, 2016a,b; Alshebami and Seraj, 2022a,b).

The entrepreneurial journey involves more than just starting a business; it is a complete process from intention to action (Nabi et al., 2010; Alshebami and Seraj, 2022a,b). Entrepreneurial activities are driven by intentions and plans (Koe et al., 2022a,b). Entrepreneurial intention marks the initial stage of entrepreneurial activity and is influenced by external factors (Liñán and Fayolle, 2015; Liñán et al., 2011; Naushad, 2018). It represents an individual's readiness to act and is a direct precursor to behavior. Manstead (2018) found that intentions predict about half of actual behavior. Understanding the factors that influence entrepreneurial intention is crucial for boosting national startup rates because "entrepreneurs are created, not born" (Mouselli and Khalifa, 2017). To foster entrepreneurial culture among students, improving their entrepreneurial intention is key (Suan et al., 2011a,b; Devece et al., 2016; Nisula and Olander, 2020a,b). Entrepreneurial intention not only influences individual entrepreneurship but also drives creativity, economic dynamism, and employment solutions (Bird, 1998a,b; Isaacs et al., 2007; Rasli et al., 2013). This is particularly important for students, who are well-trained and knowledgeable (Al-Awlaqi and Aamer, 2022; Suan et al., 2011a,b; Obschonka et al., 2010; Sabah, 2016).

Vietnam is one of the most dynamic and fast-growing economies in the Asia-Pacific region, with an annual growth rate of 7.12% from 2000 to 2020 (Dat and Truong, 2020; Bao et al., 2024). Entrepreneurship plays a crucial role in this economic development (Nga and Shamuganathan, 2020). According to the World Bank (2022), the increase in new businesses is a key driver of economic growth, poverty reduction, and job creation. However, business intentions in Vietnam have decreased, from 28% in 2018 to 18% in 2022 (Ministry of Education and Training, 2022). One significant obstacle is the lack of entrepreneurship content in general education and university programs, while in many countries, entrepreneurship is an official subject in universities (Nga and Shamuganathan, 2020). In addition, business support services, infrastructure, and financial resources are underdeveloped, particularly for small- and medium-sized enterprises (Le and Nguyen, 2019). These challenges have limited the participation of Vietnamese youth in entrepreneurship. Promoting the entrepreneurial spirit is essential for overcoming economic challenges (World Bank, 2022). Therefore, providing solutions to encourage entrepreneurship among students and the population is more urgent than ever to address employment issues (Dat and Truong, 2020).

In the context of Vietnam's Net Zero commitment and climate change adaptation, green industries are seen as a promising field

for business students to begin their careers (Le and Nguyen, 2019). The high market demand for green industries drives entrepreneurial intentions in these sectors (Ministry of Education and Training, 2022). As to Nga and Shamuganathan (2020), GE will significantly influence Vietnam's development over the next 20 years, especially as the country commits to a green and sustainable growth model, targeting Net Zero emissions by 2050. Recently, the government has introduced several policies to encourage entrepreneurship among young people. A notable initiative is Project 1665, "Supporting students to start a business until 2025," which was signed and enacted by the Prime Minister in 2017 (Government of Vietnam, 2017). This project aims to support and foster entrepreneurial activities among students, contributing to Vietnam's green transition.

Although GE has received considerable attention in global research, there are still many research gaps that need to be addressed, especially regarding the behavioral and cognitive factors that influence GE decisions in the context of net zero emissions targets, especially in emerging economies such as Vietnam. First, a key gap is the lack of in-depth studies on the behavioral and cognitive factors that influence GE, especially in the context of sustainable development and achieving net zero emissions targets. Current studies mainly focus on general entrepreneurial motivation without fully analyzing the specific psychological, cognitive, and behavioral factors of entrepreneurs when engaging in GE (Liñán and Chen, 2009; Hechavarria et al., 2012; Koe et al., 2022a,b). Second, although GE is a global concept, most studies focus on developed economies, while the cultural, social, and economic factors specific to developing countries such as Vietnam have not been fully explored (Gurbuz and Aykol, 2008a,b; Karabulut, 2016a,b). The lack of research in the Vietnamese context has limited the ability to apply research findings to local practices. Third, although global targets for net zero emissions are increasingly being focused on, there is still little research that clarifies how these targets influence the entrepreneurial behavior and decisions of green entrepreneurs, especially in developing countries such as Vietnam (Alshebami and Seraj, 2022a,b). This is a major gap in understanding the factors that promote or hinder GE in the context of sustainable development. Fourth, currently, Vietnam still lacks specific empirical studies on the behavioral and cognitive factors of entrepreneurs in GE, especially in rapidly growing green industries (Bird, 1998a,b; Isaac et al., 2007). Empirical studies in the Vietnamese context could provide insights into the specific factors influencing GE decisions and entrepreneurs' willingness to adopt sustainable technologies and practices. Finally, existing theories such as the TPB and SCT have not been fully integrated to explain the motivation of GE in the context of net zero emissions (Devece et al., 2016; Gurbuz and Aykol, 2008a,b). Therefore, a multi-theoretical approach is needed to elucidate the behavioral and cognitive factors that promote GE and to enable policymakers to provide appropriate support measures for green entrepreneurs.

The main research objective of this study is to analyze the behavioral and cognitive factors that influence the GE decision of entrepreneurs in Vietnam in the context of the zero net emissions target. Specifically, the study aims to (1). explore and clarify the relationship between psychological, cognitive,

and behavioral factors of entrepreneurs on GE decisions; (2). analyze specific factors in Vietnam, including cultural, social, and government policy factors, which influence GE decisions; and (3). propose solutions and policies to promote GE, helping to develop sustainable businesses in the current economic and social environment.

This study contributes a novel and valuable approach to analyzing the behavioral and cognitive factors of entrepreneurs in the context of GE in an emerging economy, especially in a zero net emission target environment. Specifically, the study will shed light on the relationship between entrepreneurs' psychological, cognitive, and behavioral factors on GE decisions, thereby providing insights into the motivations that promote or hinder the sustainable entrepreneurship process. The first contribution of the study is the application of behavioral and cognitive theories, such as the TPB and SCT, to the study of GE in the context of zero net emission in Vietnam, a developing country with an integrated and dynamic economy. Previous studies have mainly focused on developed economies, while few studies have clarified the factors affecting GE in developing countries. The second contribution of the study is the exploration and analysis of Vietnam-specific factors, including cultural, social, and government policy factors that influence GE decisions. This study will provide important information for policymakers, helping them to develop effective support policies for green entrepreneurs, while promoting the transition to a green and sustainable economy. Finally, the study will contribute to the expansion of GE theories by combining and integrating various theories to explain entrepreneurs' behavioral and cognitive motivations in the context of the net zero emission targets. This will provide a solid theoretical basis for further research on the factors that promote the development of sustainable businesses in the future. The novelty and contribution of this study is that it will consider not only the internal factors of entrepreneurs but also external factors such as policies, business environment, and social support, creating a comprehensive green startup model.

2 Theoretical framework and hypothesis development

2.1 Theoretical framework

This study extends and complements existing research models on GE by integrating two important theories: TPB and SCT. While TPB has been widely applied in entrepreneurship studies, especially in explaining the factors influencing entrepreneurial intentions and behaviors (Ajzen, 1991), SCT provides a complementary approach with an emphasis on the role of the interaction between individuals and the social environment in the development of entrepreneurial behaviors and decisions (Bandura, 1986).

Combining these two theories, the study not only clarifies individual factors, such as attitudes, social norms, and behavioral control (according to TPB), but also explores social and environmental factors, such as social learning models and self-perception, that influence GE behavior. An important contribution of the study is the inclusion of SCT in the context of GE, which has not been extensively studied before. SCT focuses on

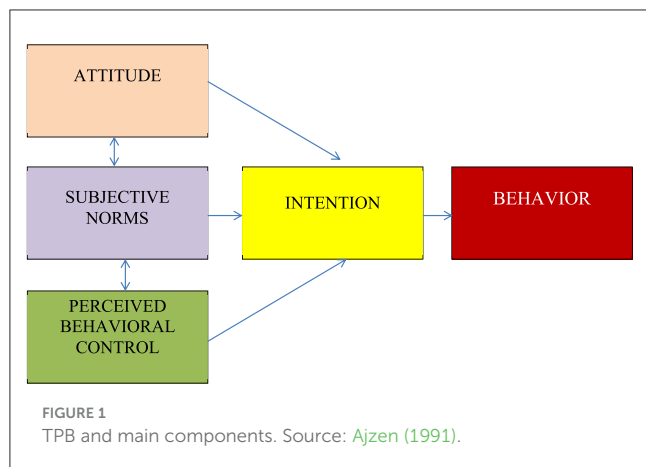
the interaction between individual and social factors in shaping behavior, which can better explain how social and environmental factors (such as community support, social media, and government commitment) influence entrepreneurs' GE decisions. This helps to extend the TPB, which has mainly focused on individual and attitudinal factors, to include environmental factors. In addition, the integration of both TPB and SCT also helps to challenge previous research models, which have used TPB or behavioral theories alone. By combining these two theories, the study can provide a more comprehensive view of the factors affecting GE behavior, from individual factors such as awareness and attitude to social and environmental factors such as community learning and social behavioral patterns. This also expands the applicability of the research model to developing economies, such as Vietnam, where social and environmental factors play an important role in promoting sustainable entrepreneurship.

2.1.1 Entrepreneurship and entrepreneurial intention

To date, the definition of entrepreneurship remains unclear due to varying perspectives on the concept (Nasip et al., 2017). Lihua (2021) defines entrepreneurship as the act of taking risks to start or open a business for the purpose of profit and enrichment. Al-Jubari (2019) views entrepreneurship as the process of creating something new and valuable, requiring time and effort to achieve financial independence, involving risks related to financial, mental, and social challenges. According to Nga and Shamuganathan (2020), entrepreneurship is the pursuit of economic opportunities through personal initiative or innovative ideas in an uncertain environment with limited resources. In this study, entrepreneurship is understood as the process of starting or establishing a new business through creative ideas, recognizing, and exploiting opportunities to achieve success in one's business activities (Gurbuz and Aykol, 2008a,b; Liguori et al., 2018). Alshebami and Seraj (2022a,b) conceptualized entrepreneurial intention as a mental state toward starting or creating a new business project. Entrepreneurial intention is also defined as an individual's plan to start a business (Akanbi and Ofoegbu, 2011; Hechavarria and Ingram, 2012; Uysal et al., 2022). Bullough et al. (2014) asserted that entrepreneurial intention arises from recognizing opportunities and seizing available resources and support to create a new business. Devece et al. (2016) argued that entrepreneurial intention is often linked to inner feelings, ambitions, and the desire for self-reliance. Research by Wang et al. (2022) introduced entrepreneurial intention as a mental state, ready to undertake self-employment, create a job, or establish a new business.

2.1.2 Theory of planned behavior

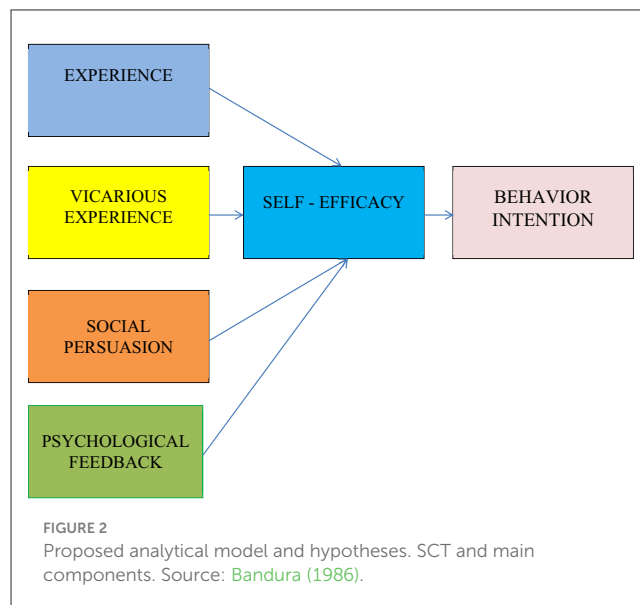
Ajzen's TPB (1991) is widely used to explain the behavioral intentions of individuals and organizations (Lihua, 2021). The theory identifies three key factors that influence behavioral intention: attitude toward the behavior, SN, and PBC (Amos and Alex, 2014). Attitude refers to how favorable



or unfavorable an individual judges a particular behavior. SNs reflect an individual's perception of social pressures to perform or not perform a behavior. PBC involves the perception of how easy or difficult it is to perform the behavior (Sabah, 2016). In essence, this factor relates to an individual's belief in their ability to control the behavior. TPB is frequently applied in studies examining individuals' entrepreneurial intentions (Turker and Selcuk, 2009; Suan et al., 2011a,b; Sesen, 2013; Zhang et al., 2014; Sabah, 2016) (Figure 1).

2.1.3 Self-efficacy and social cognitive theory

The concept of SE is central to psychologist Bandura's SCT, which emphasizes the role of observational learning, social experiences, and reciprocal determinism in personality development and decision-making (Bandura, 1986). According to SCT, SE is defined as "the belief in the ability to arrange and execute a series of actions necessary to control upcoming situations." In simpler terms, it is the belief that one will succeed in a particular situation. Bandura suggests that these beliefs significantly influence how individuals think, behave, and feel. SE became one of the most researched topics in psychology and has since been linked to economics and sociology. Studies have consistently shown that SE affects everything from psychological states to behavior and motivation, playing a pivotal role in individuals' decision-making. Subsequent research has identified four main sources of SE: (i) Experiences: the most effective way to develop strong SE is through repeated practice and mastery of tasks. Failure to handle challenges effectively can weaken SE. (ii) Vicarious experience: observing others succeed at tasks boosts confidence in one's own abilities. According to Bandura, seeing someone similar to ourselves succeed through their efforts increases our belief that we too can achieve success. (iii) Social persuasion: people can be persuaded to believe in their abilities through positive feedback, which encourages them to pursue and achieve their goals. (iv) Psychological feedback: our emotional responses to situations play a crucial role in shaping our belief in our capabilities. Factors such as mood, emotional state, physical reactions, and stress levels impact how individuals perceive their SE in specific circumstances (Figure 2).



2.2 Hypothesis development

2.2.1 Self-efficacy and green entrepreneurship

SE refers to an individual's belief in their ability to accomplish a specific outcome or goal. People with high SE tend to be more confident in their performance and are often willing to put in the effort to achieve their goals (Bandura, 1977). According to Ajzen (1991), SE beliefs may result from an individual's assessment of their power and control over a target behavior. The concept of SE, developed from Bandura's SCT, suggests that behavior is shaped by factors such as interpersonal interactions, personal involvement, and context. These factors influence SE and expectations about behavioral outcomes (Alvarez-Risco et al., 2021). The role of entrepreneurial SE has encouraged researchers to explore its relevance in entrepreneurship (De Carolis et al., 2009; Doanh and Bernat, 2019). Highlighted that entrepreneurial attitudes evolve through learning, experience, and personal interactions. Programs supporting entrepreneurship education aim to improve students' entrepreneurial attitudes, which argue are key factors influencing students' intentions and success in starting a business.

Hypothesis H1: SE has a positive impact on GEI.

2.2.2 Attitude toward entrepreneurship (AT)

Attitude is a key factor influencing human behavior. According to, attitude is a comprehensive evaluation made by an individual toward objects in their surroundings, serving as a fundamental psychological factor. A person's attitude toward an object mediates their response, potentially shaping their future reactions. Ajzen (1991) defines attitude as an individual's positive or negative evaluation of a behavior. In this study, attitude is applied according to Ajzen's definition. Byabashaija and Katono (2021) found that attitude significantly influences entrepreneurial intention, particularly among university

students in Uganda. Koe et al. (2022a,b) also highlighted that attitudes toward entrepreneurship positively impact students' entrepreneurial intentions in Spain. Suggest that attitudes toward entrepreneurial behavior can be measured in two aspects: (1) personal advantages of entrepreneurship and (2) benefits to society. In most studies, attitudes are assessed based on the individual's intention to start a business. Measured attitudes in their study on entrepreneurial intentions using four variables, while used three variables to assess attitudes toward entrepreneurship in the Netherlands.

Hypothesis H2: AT has a positive impact on GEI.

2.2.3 Subjective norms (SNs)

SN refers to the social pressures from family, friends, and significant others, which can influence an individual's decision to engage in entrepreneurial behavior (Naushad, 2018). These pressures can take the form of expectations, support, or observed behaviors, leading to either performing or refraining from that behavior (Ajzen, 1991; Lihua, 2021). Bird (1998a,b) argued that individuals may act in ways they believe society expects. Both Akanbi and Ofoegbu (2011) and Nasip et al. (2017) found that SN positively impacts entrepreneurial intentions, although the effect was not the strongest.

Hypothesis H3: SN has a positive impact on GEI.

2.2.4 Perceived behavioral control (PBC)

PBC refers to an individual's perception of the ease or difficulty of performing a behavior, influenced by past experiences and anticipated future obstacles (Ajzen, 1991). A meta-analysis by Çolakoglu and Gözükar (2016) concluded that PBC in the TPB effectively promotes both entrepreneurial intention and behavior. Amos and Alex (2014), studying Kenyan students, found that PBC significantly positively affected entrepreneurial intention. Similarly, Liñán et al. (2011) also demonstrated the positive impact of PBC on students' entrepreneurial intention.

Hypothesis H4: PBC has a positive impact on GEI.

2.2.5 Green industry awareness (GIA)

Career awareness is a process that involves perceiving, collecting, managing, and analyzing information about an individual's career (Dohse and Walter, 2012). It reflects the understanding of the value of a specific profession in society and the social requirements for it. Individuals recognize that their chosen profession aligns with their personal characteristics, such as demographics, strengths, knowledge, and skills (Alshebami and Seraj, 2022a,b). Most students select careers based on perceived benefits such as suitable skills, ease of finding a job, salary, and promotion opportunities. The influence of these factors varies depending on students' abilities, family circumstances, and social environments (Ambad and Damit, 2016). Bird's (1998a,b) study was one of the first to assess career awareness among students across different fields. In the green sector, Liñán and Chen (2009)

developed a scale to measure entrepreneurial intentions among university students, finding that training, academic support, and extracurricular activities influenced their perception of the green sector. Thus, increasing students' awareness of the green industry positively impacts their entrepreneurial intentions (Nabi et al., 2010).

Hypothesis H5a: GIA has a positive impact on green SE.

Hypothesis H5b: GIA has a positive impact on GEI.

Hypothesis H5c: SE mediates the relation between GIA and GEI.

2.2.6 Entrepreneurship education (EE)

EE focuses on enhancing knowledge, skills, attitudes, and personal characteristics related to entrepreneurship (Fayolle and Gailly, 2015). It helps individuals transform ideas into actionable plans, incorporating creativity, innovation, risk-taking, and project management to achieve goals (Isaacs et al., 2007). This form of education plays a crucial role in fostering entrepreneurial thinking and is widely recognized in society. It is viewed as a foundational tool to develop innovation skills necessary for entrepreneurship in a rapidly changing business environment. By equipping learners with entrepreneurial thinking, such education promotes the development of skills, understanding, attitudes, and motivations relevant to entrepreneurship. Fayolle and Gailly (2015) highlighted two main functions of EE: (1) fostering a culture and deep understanding of entrepreneurship and (2) encouraging experience accumulation to become an entrepreneur. Ndofirepi (2020) found that EE strengthens entrepreneurial intentions in universities, while Zhang et al. (2014) argued that adequate knowledge and inspiration significantly boost students' entrepreneurial intentions. Byabashaija and Katono (2021) also confirmed the positive impact of EE on entrepreneurial intentions.

Hypothesis H6a: EE has a positive impact on SE.

Hypothesis H6b: EE has a positive impact on GEI.

Hypothesis H6c: SE mediates the relation between EE and GEI.

2.2.7 Experience (EXP)

According to Palomino and Martínez (2021), entrepreneurship experience is understood as students' employment experiences, such as part-time or contract work, related to business. Gerba (2012) expanded this definition to include leadership positions held by students, such as class leaders or roles in university organizations and clubs. Sabah (2016) found that business and sales experience positively influences entrepreneurial intention. Similarly, Suan et al. (2011a,b) in Malaysia concluded that student experience positively affects entrepreneurial intention. Turker and Selcuk (2009) also found that experience has a positive impact on entrepreneurial intention.

Hypothesis H7a: EXP has a positive impact on SE.

Hypothesis H7b: EXP has a positive impact on GEI.

Hypothesis H7c: SE mediates the relation between EXP and GEI.

2.2.8 Social persuasion (SP)

The term “social persuasion” refers to the influence of society on an individual’s thoughts and behaviors (Wang et al., 2022). Specifically, it describes how a person or group can affect the opinions, attitudes, thoughts, emotions, and behaviors of another. SP can manifest in various forms, such as persuading others to comply or becoming a role model for others to follow. While empirical studies may yield contradictory results, most research supports the role of SP in encouraging green behaviors. For instance, Doanh and Bernat (2019) found that SP influences low-income consumers’ acceptance of green vehicles. Other studies also show a significant impact of SP on green product purchases and individual green consumption behaviors. Social trends have been proven to influence entrepreneurial intention, particularly among Malaysian students. Recent studies in developing countries also support the relationship between SP and entrepreneurship (Doanh and Bernat, 2019; Ma et al., 2019; Wang et al., 2022).

Hypothesis H8a: SP has a positive impact on SE.

Hypothesis H8b: SP has a positive impact on GEI.

Hypothesis H8c: SE mediates the relation between SP and GEI.

2.2.9 Capital sources (CAP)

According to Ma et al. (2019), resources play a crucial role in promoting entrepreneurial behavior, with capital being a key factor. In this study, capital refers to money used for entrepreneurial activities, which can come from family support, loans, personal savings, or other sources. Regardless of the country’s development level, entrepreneurship requires a certain investment, and the ability to meet resource needs strengthens the intention to start a business. Zain et al. (2010) and Edelman et al. (2016) found that available capital, as part of the economic environment, positively impacts entrepreneurial intentions. Koe et al. (2022a,b) also developed a model that showed capital positively influences students’ entrepreneurial intentions.

Hypothesis H8a: CAP has a positive impact on SE.

Hypothesis H8b: CAP has a positive impact on GEI.

Hypothesis H8c: SE mediates the relation between CAP and GEI.

2.2.10 Personality traits (PTs)

As to Nga and Shamuganathan (2020), PT is defined as enduring patterns of behavior, thinking, or emotions. They are fixed characteristics that cause differences in behavior in similar situations. When studying PT, Çolakoglu and Gözükar (2016) measured this factor using observational variables related to facing and overcoming obstacles, the ability to recognize opportunities, and the preference for challenging the status quo. This topic measures PT that tend to be proactive based on the perspective of Alshebami and Seraj (2022a,b). Studies by Sesen (2013) and Karabulut (2016a,b) confirmed that PTs have a strong positive influence on entrepreneurial intentions. Nisula and Olander (2020a,b) also showed a positive relationship between individual PT and entrepreneurial intentions.

Hypothesis H8a: PT has a positive impact on SE.

Hypothesis H8b: PT has a positive impact on GEI.

Hypothesis H8c: SE mediates the relation between PT and GEI.

2.3 Methodology

2.3.1 Model and scale development

From the established hypotheses, the research model was proposed as in Figure 3.

In the research design, we inherited some previous studies such as Doanh and Bernat (2019), Byabashaija and Katono (2021), Alvarez-Risco et al. (2021), and Wang et al. (2022) to build scales for observed variables and at the same time adjust and supplement the scales to suit the conditions in Vietnam. The scales were based on calculating scores from statements to measure observed variables. The study used Likert scales with scores from 1 to 5 depending on the level of agreement of respondents with the statements (1 = strongly disagree, 5 = strongly agree) (Table 1).

2.3.2 Sampling, data collection, and analysis

The research collected primary data through a direct survey. Initially, a focus group discussion (FGD) was conducted, which included six final-year business administration students at the National Economics University, four business administration and environmental management lecturers, and three former business administration students who had started their own businesses. The objective of the FGD was to gather insights on the factors affecting students’ intention to pursue GE. During the discussion, the participants’ opinions were recorded to refine the model and scale of factors influencing green entrepreneurial intention. The FGD results revealed a consensus among participants on 10 factors that might influence students’ intention to start a green business. In addition, delegates agreed on key aspects of SE that should be incorporated into the model, particularly those relevant to the Vietnamese context, such as GIA, entrepreneurial education, experience, PT, SP, and CAP. Regarding the scales, FGD participants recommended adjustments to some of the measuring statements and suggested using a 5-point Likert scale for the observed variables. This process ensured that the factors and scales were appropriately aligned with the context of the study.

The study population was students studying business administration at universities in Vietnam. As to there are currently 35 universities offering business administration training. The study focused on investigating final year business administration students at universities to collect data. The reason for choosing final year business administration students was because this is a group of students who have studied at universities for a long time, having had access to specialized start up knowledge as well as an understanding of market demand and social trends. In addition, this group of students is in the stage of choosing a career or starting to think about future career directions.

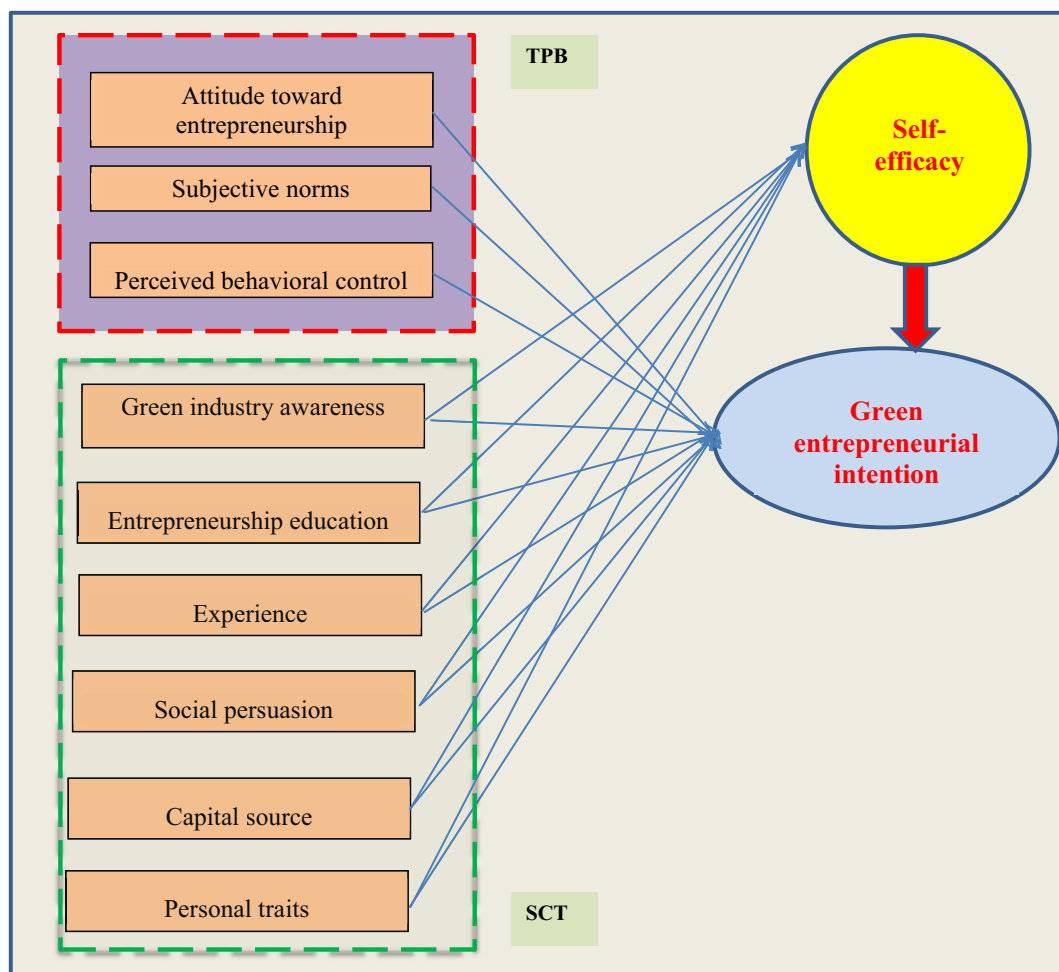


FIGURE 3
Study model.

We employed the below formula to calculate the sample size (Hair, 2013):

$$n = Z^2 \frac{p^*(1-p)}{e^2} \quad (1)$$

in which n is sample size, z is z-score, e is margin of error, and p is standard of deviation. Supposed with a 90% confidence level, 50% standard of deviation, and a 5% margin of error, the sample size to ensure reliability was 389. In fact, the study collected 400 questionnaires from students through face-to-face interviews. For sample selection, we used random sampling method with a quota sampling technique, in which the research team selected eight universities in the North region of Vietnam that offer business administration training for the survey. At each university, 50 questionnaires were collected (Table 2).

At universities, the research team collected a list of business administration students from student management departments. From these lists, we randomly drew 50 students to interview. Selected students were contacted in advance to inform them of the interview, and if they agree, the team would approach them

directly to conduct the interview. Students were approached in the study session break approximately 30 min for interviews. Before asking the questions, students were clearly told about the interview goal; at the same time, they were questioned whether to agree be ready to participate in the survey. All students agreed to attend the survey and signed consent forms with name and date of survey. The official questionnaire had four main sections: (1) objective of research and interview, (2) student information, (3) respondents' perception about green start up, and (4) green entrepreneurial impact factor evaluation. The survey was conducted in March and April 2024.

After collection, the data were coded and imported into AMOS 23.0 software. First, we estimated the descriptive statistics, means, frequencies, and correlation of the observed variables. Then, Cronbach's alpha analysis was done to check the reliability and validity of observation variables' scale. After that, EFA was conducted to evaluate the convergence of constructs into separate testing factors. From there, SEM was performed to explore the relationships between variables and mediating effects.

TABLE 1 Constructs and observed variables.

Code	Observed variables	Literature sources
Entrepreneurial self-efficacy		
SE1	I feel that GE is within your capabilities	Doanh and Bernat (2019); Alvarez-Risco et al. (2021); Wang et al. (2022),
SE2	I think having enough knowledge and experience to start a green business	
SE3	I think having sufficient resources and support to start a green business	
SE4	I think to start a GE is in line with the needs, trends and models of society regarding business start up and sustainability	
SE5	I think that I can control the risks when starting a green business	
Attitude toward entrepreneurship		
AT1	Becoming a business owner is my dream	Byabashaija and Katono (2021)
AT2	Starting a business is very attractive to me	
AT3	I will be satisfied when starting and owning a business	
AT4	Among the various job options, I prefer starting a business	
Subjective norms		
SN1	My family wants me to start a green business	Akanbi and Ofoegbu (2011); Lihua (2021)
SN2	Starting a green business is a trend among young people today	
SN3	I want to start a green business to follow the general trend of people studying business	
SN4	I admire and want to follow in the footsteps of successful entrepreneurs	
SN5	My friends and relatives wanted me to start a green business	
Perceived behavioral control		
PBC1	I find starting a business favorable	Liñán et al. (2011)
PBC2	I think I have enough capacity and conditions to start a business	
PBC3	I have a clear picture of the way and path to start a business	
PBC4	I feel like I will be fully supported when I start my business	
Green industry awareness		
GIA1	Green industries are becoming an inevitable trend in the development of countries	Alshebami and Seraj (2022a,b)
GIA2	I see that green industries have many potential opportunities for development and entrepreneurship	
GIA3	GE will bring me long-term and sustainable business opportunities	
GIA4	Green startups will be supported by stakeholders	
Entrepreneurial education		
EE1	I was provided with the necessary knowledge and skills about business at university	Fayolle and Gailly (2015); Wang et al. (2022)

(Continued)

TABLE 1 (Continued)

Code	Observed variables	Literature sources
EE2	I was encouraged by the university to start a business	
EE3	I have been educated and equipped with knowledge about green and sustainable fields	
EE4	I have participated in other courses and trainings on entrepreneurship to gain more knowledge and entrepreneurship skills	
Experience		
EXP1	I have participated in business activitie	Turker and Selcuk (2009); Doanh and Bernat (2019)
EXP2	I have participated in business clubs and associations	
EXP3	I have visited and researched green business models of businesses	
EXP4	I have participated in sharing sessions about starting a green business	
Social persuasion		
SP1	I have participated in business activitie	Ma et al. (2019); Wang et al. (2022)
SP2	I have participated in business clubs and associations	
SP3	I have visited and researched green business models of businesses	
SP4	I have participated in sharing sessions about starting a green business	
Capital sources		
CAP1	I have my own capital to start a green business	Edelman et al. (2016); Alvarez-Risco et al. (2021)
CAP2	I received capital support from my family and relatives to start my business	
CAP3	I can borrow money from banks and credit institutions to start a business	
CAP4	When starting a business in the green field, I will receive capital support from the state and locality	
Personality traits		
PT1	I am someone who dares to face and overcome challenges	Nga and Shamuganathan (2020); Çolakoglu and Gözükara (2016)
PT2	I know how to research and analyze business opportunities	
PT3	I am someone who dares to take risks when doing business	
PT4	I am a decisive person and will pursue my goals when doing business	
Green entrepreneurial intention		
GEI1	I will start a green business after graduation	Alvarez-Risco et al. (2021); Wang et al. (2022)
GEI2	I have serious intentions and am looking to start a business in green industries	
GEI3	If I receive support and accumulate enough experience, I will start a business in green industries	

TABLE 2 Distribution of questionnaire by universities.

No	Survey university	Number of questionnaire
1	National Economics	50
2	Foreign Trade	50
3	Commerce	50
4	National University	50
5	Financial Academy	50
6	Business and Technology	50
7	Forestry	50
8	Natural Resources and Environment	50

Source: research design (2024).

4 Results

4.1 Reliability and validity analysis

Table 3 presents the descriptive statistics for the observed variables used in the study, including their factor loadings (FL), Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). These values are critical for evaluating the reliability and validity of the measurement model (Hair, 2013).

The FL for all observed variables ranged from 0.723 to 0.832, which are above the acceptable threshold of 0.7, indicating that the items strongly contribute to their respective latent factors. The Cronbach's alpha values for the scales were well above the threshold of 0.7, ranging from 0.732 to 0.871. These results confirm the internal consistency and reliability of the measures used in this study. The CR values for all constructs were above the recommended threshold of 0.7, suggesting good internal consistency. These results indicate that the constructs are reliably measured and that the items within each scale are cohesive. The AVE for all constructs exceeded the 0.5 threshold, indicating that the observed variables explain a substantial amount of the variance in their respective latent variables. These values suggest that the constructs exhibit good convergent validity (Hair, 2013). In addition, the variance inflation factor (VIF) of the constructs in the research model ranged from 1.29 to 1.89, indicating that there was no serious multicollinearity among the independent variables. In theory, VIF values above 10 may indicate a multicollinearity problem, while values below 5 were not strongly correlated with each other, which helps ensure the independence and reliability of the model estimates. This indicated that there was no significant confounding due to multicollinearity, and the model results can be trusted and accurately interpreted. Overall, Table 3 demonstrated that the observed variables were both reliable and valid, with the scales performing well in terms of internal consistency and construct validity (Table 3).

To test for multivariate normality, we conducted several diagnostic checks, including assessing skewness and kurtosis of the variables involved in the SEM. We found that the majority of the variables exhibited acceptable levels of skewness and kurtosis, suggesting that multivariate normality was not violated. Regarding outliers, we employed Mahalanobis distance to detect

TABLE 3 Statistics of observed variables.

Code	FL	Cronbach's alpha	CR	AVE	VIF
Self-efficacy					
SE1	0.794	0.776	0.805	0.758	1.45
SE2	0.743				
SE3	0.773				
SE4	0.782				
SE5	0.746				
Attitude toward entrepreneurship					
AT1	0.817	0.795	0.745	0.711	1.74
AT2	0.811				
AT3	0.793				
AT4	0.749				
Subjective norms					
SN1	0.799	0.765	0.793	0.723	1.86
SN2	0.784				
SN3	0.739				
SN4	0.769				
Perceived behavioral control					
PBC1	0.794	0.768	0.724	0.707	1.63
PBC2	0.812				
PBC3	0.748				
PBC4	0.793				
Green industry awareness					
GIA1	0.805	0.810	0.776	0.742	1.47
GIA2	0.822				
GIA3	0.813				
GIA4	0.799				
Entrepreneurial education					
EE1	0.784	0.786	0.743	0.769	1.89
EE2	0.723				
EE3	0.743				
EE4	0.748				
EE5	0.793				
Experience					
EXP1	0.738	0.763	0.864	0.731	1.31
EXP2	0.754				
EXP3	0.738				
EXP4	0.758				
Social persuasion					
SP1	0.812	0.791	0.744	0.753	1.70
SP2	0.786				
SP3	0.799				
SP4	0.774				

(Continued)

TABLE 3 (Continued)

Code	FL	Cronbach's alpha	CR	AVE	VIF
Capital sources					
CAP1	0.773	0.798	0.763	0.734	1.53
CAP2	0.819				
CAP3	0.785				
CAP4	0.768				
Personality traits					
PC1	0.737	0.732	0.811	0.696	1.29
PC2	0.814				
PC3	0.773				
PC4	0.785				
PC5	0.774				
Green entrepreneurial intention					
GEI1	0.832	0.812	0.871	0.782	1.33
GEI2	0.794				
GEI3	0.825				

any potential outliers, and none were identified as influential points that could adversely affect the SEM results. Therefore, the study proceeded with the analysis without excluding any data points. We acknowledge the potential concern of common method bias (CMB) as all data were collected via self-reported questionnaires. To address this, we performed Harman's single-factor test to check for CMB. The results showed that the first factor did not account for the majority of the variance in the data, suggesting that CMB was not a significant concern in our study.

4.2 Exploratory factor analysis

The results of the EFA for the independent variables indicated that the Kaiser-Meyer-Olkin (KMO) coefficient was 0.715, which is greater than the threshold of 0.5. In addition, the Bartlett's test yielded a significance value (Sig) of less than 0.05, suggesting that the correlation among the observed variables is statistically significant. The Eigenvalue for the first factor was 1.216, which is greater than 1, indicating that the factor is valid. The total variance explained by the extracted factors was 67.163%, which exceeds the 50% threshold, confirming that the factors derived from the analysis accounted for a substantial proportion of the variance in the dataset. Thus, the independent variables demonstrated high convergence to the individual factors, which together explained 67.16% of the variation in the dataset (Table 4).

For the dependent variable (GEI), the KMO coefficient was 0.732, which is also above 0.5, and the Bartlett's test showed a significance value (Sig) less than 0.05, confirming the inter-correlation of the observed variables. The Eigenvalue for the first factor was 3.112, which is greater than 1, indicating that the analysis converged at the first factor. The total variance extracted by this factor was 72.11%, surpassing the 50% threshold. These results

TABLE 4 Rotated matrix of independent variables.

Variables	Factors								
	1	2	3	4	5	6	7	8	9
AT2	0.905								
AT4	0.892								
AT1	0.876								
AT3	0.821								
SN1		0.881							
SN3		0.871							
SN4		0.856							
SN2		0.798							
PBC2			0.878						
PBC4			0.866						
PBC3			0.843						
PBC1			0.824						
GIA3				0.898					
GIA1				0.885					
GIA2				0.834					
GIA4				0.813					
EE1					0.856				
EE2					0.829				
EE4					0.812				
EE5					0.783				
EE3					0.777				
EXP1						0.898			
EXP4						0.877			
EXP3						0.841			
EXP2						0.833			
SP1							0.821		
SP3							0.811		
SP4							0.782		
SP2							0.765		
CAP2								0.888	
CAP1								0.867	
CAP3								0.832	
CAP4								0.815	
PT1									0.878
PT3									0.855
PT2									0.838
PT4									0.812
PT5									0.798

suggest that only one factor was extracted from the three observed variables on the GEI scale, and this factor accounted for 72.11%

TABLE 5 Pearson's correlation coefficient matrix.

Factors	SE	AT	SN	PBC	GIA	EE	EXP	SP	CAP	PC
SE	1.000									
AT	0.093	1.000								
SN	0.088	0.011**	1.000							
PBC	0.124**	0.059**	0.111	1.000						
GIA	0.165**	0.111	0.132	0.084	1.000					
EE	0.101**	0.115**	0.176**	0.214	0.028	1.000				
EXP	0.112**	0.120**	0.124**	0.187	0.025	0.151*	1.000			
SP	0.143	0.132	0.153	0.138	0.174	0.185	0.164	1.000		
CAP	0.253	0.224	0.191	0.168	0.115	0.024	0.013	0.024	1.000	
PC	0.192	0.187	0.078	0.123	0.099	0.035	0.096	0.101	0.105	1.000

* $p < 0.1$. ** $p < 0.05$.

of the variation in the dataset. Based on these findings, both the independent and dependent variables were deemed appropriate for inclusion in the SEM path model, which examines the factors influencing GEI.

4.3 Direct relationships

The results of Pearson's correlation indicated that independent variables correlated with each other but correlations were fairly low; thus, multicollinearity was not detected (Table 5).

The SEM analysis revealed significant findings, indicating a strong fit for the proposed model. The model achieved a p -value of less than 0.001, with a chi-square to degrees of freedom ratio (χ^2/df) of 2.013, which is within the acceptable threshold for model fit. In addition, the goodness-of-fit indices demonstrated a satisfactory model fit: the Goodness of Fit Index (GFI) was 0.915, the Adjusted Goodness of Fit Index (AGFI) was 0.898, and the Comparative Fit Index (CFI) was 0.905. These values exceed commonly accepted thresholds, indicating that the model fits the data well. Furthermore, the Normed Fit Index (NFI) was 0.924, and the Root Mean Square Error of Approximation (RMSEA) was 0.051, which is below the widely accepted cutoff of 0.06, suggesting a good approximation of the model to the data. These indices collectively provide strong support for the adequacy of the model, confirming its robustness and suitability for further analysis (Hair, 2013).

The path analysis results, displayed in Table 6, further illustrate the relationships and pathways between the variables, reinforcing the model's explanatory power. Accordingly, SE was the factor that had the strongest impact on GEI, with $\beta = 0.364$ and p -value < 0.01 . When students feel confident in their ability to cope with challenges and opportunities in the process of starting a business, they tend to have stronger entrepreneurial intentions.

The results also showed that factors of TPB had a strong impact on GEI. Specifically, AT had a positive effect ($\beta = 0.213$, p -value = 0.013), although this effect was weaker than that of SE. SN also had a significant effect ($\beta = 0.182$, p -value < 0.01), indicating that expectations and social support promote students' entrepreneurial

TABLE 6 Direct relationships.

Relationships	Estimate (β)	t-value	p-value	Results
H1: SE \rightarrow GEI	0.364	3.743	0.000***	Accepted
H2: AT \rightarrow GEI	0.213	2.835	0.013**	Accepted
H3: SN \rightarrow GEI	0.182	3.734	0.000***	Accepted
H4: PBC \rightarrow GEI	0.165	3.312	0.000***	Accepted
H5a: GIA \rightarrow SE	0.134	4.199	0.000***	Accepted
H6a: EE \rightarrow SE	0.146	3.646	0.000***	Accepted
H7a: EXP \rightarrow SE	0.165	1.734	0.067	Rejected
H8a: SP \rightarrow SE	0.132	3.123	0.000***	Accepted
H9a: CAP \rightarrow SE	0.113	4.646	0.000***	Accepted
H10a: PT \rightarrow SE	0.116	2.734	0.017**	Accepted
H5b: GIA \rightarrow GEI	0.169	2.623	0.029**	Accepted
H6b: EE \rightarrow GEI	0.195	2.733	0.034**	Accepted
H7b: EXP \rightarrow GEI	0.145	1.156	0.154	Rejected
H8b: SP \rightarrow GEI	0.164	2.622	0.023**	Accepted
H9b: CAP \rightarrow GEI	0.126	2.734	0.031**	Accepted
H10b: PT \rightarrow GEI	0.174	4.252	0.000***	Accepted

** $p < 0.05$.

*** $p < 0.01$.

intentions. Finally, PBC had a positive and significant effect ($\beta = 0.165$, p -value < 0.01), proving that students who have the ability to control their entrepreneurial actions will have stronger entrepreneurial intentions.

However, EXP had no significant impact on SE ($\beta = 0.165$, p -value = 0.067) and GEI ($\beta = 0.145$, p -value = 0.154). This indicates that, although experience may be important in some cases, for students in this study, factors such as education, industry awareness, and social factors had a greater impact on entrepreneurial intention. This result suggested that other factors, such as financial support and further education,

TABLE 7 Mediating relationships.

Relationships	Estimate (β)	t-value	p-value	Result
H5c: GIA \rightarrow SE \rightarrow GEI	0.111	4.663	0.000***	Approved
H6c: EE \rightarrow SE \rightarrow GEI	0.132	3.172	0.035**	Approved
H7c: EXP \rightarrow SE \rightarrow GEI	0.108	1.466	0.144	Rejected
H8c: SP \rightarrow SE \rightarrow GEI	0.116	2.786	0.028**	Approved
H9c: CAP \rightarrow SE \rightarrow GEI	0.094	4.993	0.000***	Approved
H10c: PT \rightarrow SE \rightarrow GEI	0.115	5.753	0.000***	Approved

** $p < 0.05$.*** $p < 0.01$.

are needed to promote stronger entrepreneurial intention (Table 6).

4.4 Mediating effects

The results from Table 7 showed the important mediating role of SE in the relationship between independent factors and GEI. Specifically, factors such as GIA, EE, SP, CAP, and PT all had a significant influence on GEI through their impact on SE. These results demonstrated that SE was not only a decisive factor for entrepreneurial intention but also an important mediating factor that helps transform external factors such as education and society into entrepreneurial action. Specifically, GIA had a significant effect through SE, with $\beta = 0.111$ and p -value < 0.01 , indicating that when students are more aware of the green industry, they would increase their confidence in their entrepreneurial ability, thereby promoting GEI. Similarly, EE also had a positive effect through SE, increasing students' entrepreneurial ability ($\beta = 0.132$, p -value = 0.035). In particular, SP and CAP also played an important role in promoting SE and GEI. SP had $\beta = 0.116$ and p -value = 0.028, showing that encouragement from the community and society has a strong effect in strengthening the belief in entrepreneurial ability and promoting entrepreneurial action. CAP also had a significant impact through SE, with $\beta = 0.094$, t -value = 2.993, and p -value < 0.01 , showing that when students feel they have enough financial resources, they would be more confident in starting a business. Finally, PT also had a significant effect on SE ($\beta = 0.115$, p -value < 0.01). Individuals with entrepreneurial-friendly personalities (e.g., risk-taking and proactive) might have higher confidence in their ability to carry out entrepreneurial plans. However, the results from EXP did not show a clear mediating effect between experience and GEI, with p -value = 0.144, suggesting that personal experience is not strong enough to mediate this relationship.

These results emphasized the importance of psychological factors such as SE in promoting GE, while also indicating that external factors such as SP, CAP, and PT play an important role in enhancing students' entrepreneurial intentions and confidence in starting a business (Table 7).

5 Discussion

First, the results of the study showed that SE had the strongest impact on GE, reflecting the importance of self-efficacy in promoting entrepreneurial action, especially in the context of GE. SE helps students feel confident in their ability to overcome challenges and take advantage of opportunities in the green industry, thereby increasing GEI. This result is consistent with Bandura's (1986) SCT and Ajzen's (1991) TP, in which SE is an important factor promoting entrepreneurial behavior. Previous studies, such as Liñán and Chen (2009), also showed that SE strongly influences entrepreneurial intentions, especially in new fields. This is consistent with the research results of Fayolle and Gailly (2015), when affirming that entrepreneurship education helps students enhance SE, thereby promoting entrepreneurial intentions. Compared with previous studies, this research results expand the understanding of GE, indicating that educational and social factors have a strong influence in forming GEI, especially in the Net Zero context.

The results also showed that the factors of TPB, including AT, SN, and PBC, all had significant effects on GEI. These results not only reaffirm the validity of TPB in the context of entrepreneurship research but also emphasize the importance of psychological and social factors in promoting green entrepreneurial behavior. First of all, AT has a positive impact on GEI, with students with positive attitudes toward green entrepreneurship tending to have higher entrepreneurial intentions. This result reflects the TPB theory, according to which attitude is an important factor in forming entrepreneurial intentions. Previous studies by Liñán et al. (2011) and Suan et al. (2011a,b) also showed that individual attitudes toward entrepreneurial behavior have a great influence on entrepreneurial decisions, especially in educational settings. In the context of GE, positive attitudes toward environmental protection and sustainable development can strongly promote green entrepreneurial intentions. SN also showed a significant impact on GEI. This research result is consistent with the TPB model, in which SN is considered a social factor that influences an individual's behavioral decisions. Social factors such as expectations from family, friends, and community can promote or hinder an individual's entrepreneurial intention. This is also confirmed in the studies of Bird (1998a,b) and Hechavarria et al. (2012), which showed that social support and expectations have a strong influence on entrepreneurial decisions, especially in new and innovative fields such as green entrepreneurship. In addition, PBC is the next factor that has a significant impact on GEI. The research results show that students with a high sense of control over their entrepreneurial behavior will have a stronger entrepreneurial intention. Perceptions of behavioral control may include factors such as SE, resource readiness, and willingness to face difficulties. Manstead (2018) show that PBC can predict a large part of an individual's actual behavior, including entrepreneurial behavior.

The research results indicated that factors belonging to SCT, including GIA, EE, SP, CAP, and PT, all have a significant influence on GEI. This is consistent with Bandura's (1986) SCT theory, which emphasizes the role of the social environment, external factors, and interpersonal interactions in shaping entrepreneurial behavior and decisions. First of all, GIA is considered an important factor promoting SE and GEI. According to SCT, understanding

the industry and the opportunities in that field helps individuals feel more confident in starting a business. Previous studies, such as Liñán and Chen (2009), have also shown that awareness of opportunities in new industries such as green industries can increase confidence and willingness to start a business. GIA helps potential entrepreneurs perceive opportunities and the possibility of success, thereby increasing their determination to take entrepreneurial action. Next, EE is an important element in SCT, where learning environments and educational programs provide the knowledge and skills necessary for entrepreneurship. Bandura (1986) argued that social learning models have a strong influence on individual behavior, and education is a means to help individuals develop their abilities and self-perceptions of their capabilities. Fayolle and Gailly (2015) asserted that EE not only equips students with knowledge but also helps them build confidence in starting a business. In the context of green entrepreneurship, education plays an even more important role in helping students become more aware of sustainable opportunities and the specific requirements of the green industry.

In addition, SP in SCT is also confirmed as an important factor, acting as a driving force for belief in entrepreneurial ability. Bandura (1986) pointed out that social encouragement and support enhance SE and promote entrepreneurial behavior. Research results show that social factors such as encouragement from family, friends, and community have a great influence on students' green entrepreneurship decisions. This is also the result confirmed in the studies of Suan et al. (2011a,b) and Koe et al. (2022a,b), showing that social support has a strong impact on entrepreneurial intention, especially in fields that require high creativity and commitment such as green entrepreneurship. In addition, CAP, according to SCT theory, plays an important role in the formation of SE and GEI, when finance is a key factor that helps individuals implement entrepreneurial ideas. Studies by Alshebami and Seraj (2022a,b) and Sesen (2013) show that having sufficient capital increases self-confidence and willingness to start a business. This result is consistent with SCT theory when it asserts that the surrounding environment, including financial resources, has a strong influence on individual entrepreneurial behavior. Finally, PTs, especially traits such as proactiveness, risk-taking, and persistence, are also considered by SCT to be important factors in promoting GEI. Bandura (1986) argued that personal characteristics influence the ability to perceive and process social and environmental situations, thereby shaping behavior. Nisula and Olander (2020a,b) and Karabulut (2016a,b) also pointed out that people with positive, proactive, and challenge-taking personalities tend to be more confident and have a higher likelihood of success in starting a business.

Regarding the mediating effect, the research results confirm the importance of SE in connecting the elements of SCT and GEI and indicate that factors such as GIA, education, SP, and finance need to be integrated to create a favorable environment for green entrepreneurship. These results are consistent with Bandura's (1986) SCT theory, in which SE plays a mediating role in transforming external factors such as industry awareness, education, and society into entrepreneurial action. This result is also similar to the studies of Liñán and Chen (2009), Fayolle and Gailly (2015), Suan et al. (2011a,b), Alshebami and Seraj (2022a,b), and Nisula and Olander (2020a,b) on the mediating role of SE in

connecting factors related to student entrepreneurship. Compared to previous studies, the results of this study further clarify the role of SE in the context of green entrepreneurship and especially in the social and educational environment in Vietnam, where cultural and social factors play a very important role in promoting entrepreneurial intentions.

Notably, the results showed that EXP did not have a significant impact on SE and GEI. This may be explained by some factors specific to the research context in Vietnam. Although experience may be influential in developed entrepreneurial environments or in economies where entrepreneurship has become an important part of the ecosystem, in Vietnam, factors such as EE, GIA, and social support may play a more important role in promoting entrepreneurial intentions. Furthermore, for students, experience may not be enough to make a big difference in entrepreneurial intentions, especially in the green industry context, where technical knowledge and sustainability awareness may be more important. This reflects the need for improved EE and support from social learning models rather than relying solely on personal experience (Fayolle and Gailly, 2015).

6 Recommendations

Based on the findings, the following recommendations are proposed to promote GEI among students, particularly in the context of Vietnam and other developing nations: In general, fostering GE among students requires a multi-faceted approach that includes enhancing education, building strong social support networks, increasing financial accessibility, and promoting GIA. By considering the following recommendations, both educational institutions and governments can create an environment conducive to the growth of green businesses, contributing to the broader goal of sustainable economic development and addressing environmental challenges.

Enhance Entrepreneurial Education: One of the key strategies for fostering GE is to enhance entrepreneurial education at universities. Educational institutions should integrate specialized courses and programs focusing on GE, providing students with knowledge about sustainable business practices, environmental policies, and green technologies. These courses should combine theory with practical applications, encouraging students to develop innovative green business solutions. Furthermore, offering more hands-on learning opportunities, such as internships, business incubators, and mentorship programs focusing on green sectors, will allow students to gain real-world experience. This approach will not only build their entrepreneurial skills but also increase their SE, making them more confident in their ability to start and run green businesses.

Strengthen social support and networking: Social support plays a crucial role in shaping students' entrepreneurial intentions, particularly in the context of GE. Establishing strong social networks is vital for aspiring entrepreneurs as these connections provide mentorship, advice, and resources. Educational institutions, governments, and private sectors should work together to create platforms where students can interact with established green entrepreneurs, environmental experts, and business leaders. By participating in these networks, students

can learn from experienced professionals, increasing their confidence and knowledge about green business opportunities. In addition, creating a supportive community that encourages collaboration will help students gain a broader understanding of the green industry and its challenges, fostering a more robust entrepreneurial spirit.

Foster green industry awareness: To successfully promote GE, raising awareness of green industries among students is essential. Public awareness campaigns, led by governments and non-governmental organizations, can help inform students about the potential of green businesses and their role in sustainable development. By educating students on the economic and environmental benefits of green businesses, such campaigns can inspire them to consider entrepreneurship in this sector. Furthermore, integrating industry-specific knowledge into academic programs will give students a better understanding of the challenges and opportunities within the green sector. This awareness not only strengthens their entrepreneurial intentions but also helps them identify innovative solutions for pressing environmental issues, positioning them as future leaders in green business.

Facilitate access to financial resources: access to financial resources is often a significant barrier to starting any business, particularly in emerging sectors such as GE. To address this, governments, educational institutions, and financial organizations should collaborate to create specialized funding programs for green startups. These could include grants, subsidies, or micro-financing options that provide initial capital to students who wish to start their green ventures. Moreover, governments could offer tax incentives or financial support specifically targeted at businesses focused on sustainability and innovation. By reducing the financial risks and making capital more accessible, these measures would encourage students to take the entrepreneurial leap into the green sector, knowing they have the resources needed to bring their ideas to life.

Promote entrepreneurial mindset and risk-taking: Developing an entrepreneurial mindset is essential for students who aspire to start their own green businesses. Educational programs should emphasize risk-taking, innovation, and problem-solving skills. Encouraging students to take calculated risks, experiment with new business ideas, and embrace failures as part of the learning process will foster an entrepreneurial spirit. Universities can organize competitions, pitch events, and workshops that challenge students to come up with innovative solutions to environmental problems. Sharing success stories and offering mentorship from established green entrepreneurs will also help students see that entrepreneurial ventures in the green sector can be successful. This approach will help students develop the resilience and confidence needed to overcome challenges and achieve long-term success in the GE space.

7 Limitations and future research

Although this study makes a significant contribution to understanding the behavioral and cognitive factors of entrepreneurs in the context of GE in Vietnam, the study still has some limitations that may affect the generalizability and

accuracy of the results. First, a limitation of the study is the use of self-report methods to collect data. Research participants may experience self-report bias, in which they tend to report behaviors and attitudes that they consider socially acceptable or expected, rather than accurately reflecting actual behavior. This may reduce the reliability and accuracy of the research results, especially when the questions are related to sensitive or non-observable factors. Second, the study sample only included final-year business students from universities in Northern Vietnam. Limiting the study sample to this specific group of subjects reduces the ability to generalize the results to the entire population of entrepreneurs in Vietnam, especially those entrepreneurs who are actually active in industries other than green startups or in other regions of the country. Third, this study uses a cross-sectional research method, collecting data at only one point in time, which does not allow for studying changes in participants' behaviors and perceptions over time. This method also cannot determine the causal relationship between factors in the research model. Furthermore, another important issue is the possibility of omitted variables in the model. Factors that may not have been included in the study, such as cultural factors, public policies, or external environmental factors, may play an important role in the decision to start a green startup but are not mentioned in the model. This may lead to bias in the results and a failure to fully account for the factors that influence GE behavior. Finally, another limitation is the potential lack of objectivity in assessing external factors, such as community or government support, which participants may feel are influenced by surrounding social factors.

Future studies could overcome these limitations by using a multi-method approach, combining self-reports with direct observation or in-depth interviews. Expanding the sample to include different target groups, including actual entrepreneurs operating in different industries, would help improve the generalizability and reliability of the results. In addition, future studies can use longitudinal studies to track changes in behavioral and cognitive factors over time, thereby determining the causal relationships between factors in the model. Adding important variables not covered in this study, such as cultural factors, social environment, and public policies, will help to improve the model and provide a more comprehensive view of factors affecting GE.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

This study was approved by the Scientific and Training Council of the National Economics University, Vietnam. The study was conducted in accordance with Declaration of Helsinki, and local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s)

for the publication of any potentially identifiable images or data included in this article.

Author contributions

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Funding

The author(s) declare that financial support was received for the research and/or publication of this article. This study was funded by the National Economics University, Vietnam.

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