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Does Entrepreneur Moral Reflectiveness Matter? Pursing Low-Carbon Emission Behavior among SMEs through the Relationship between Environmental Factors, Entrepreneur Personal Concept, and Outcome Expectations

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Abstract: The intensity and severe impact of carbon emissions on the environment has been witnessed globally. This study aims to unravel how environmental factors, personal factors, and entrepreneur outcome expectations affect entrepreneur low-carbon emission behavior (LCB) through the lens of social cognitive theory (SCT). To achieve the aims of this study, we gathered data from 1015 entrepreneurs and small, medium-sized enterprises (SMEs) in the Jiangsu province of China to analyze the predictors of entrepreneur low-carbon behavior. The proposed relationships were tested using the partial least square structural equation modelling (PLS-SEM) technique. The findings from the study indicate that environmental factors (i.e., climate change (CC), public media (PM), and corporate social responsibility (CSR) have a significant and positive relationship with entrepreneur LCB. Moreover, entrepreneur green production self-efficacy (GPS) is positively associated with entrepreneur LCB. The findings further revealed that entrepreneur personal concepts such as entrepreneur self-monitoring (SM), entrepreneur self-esteem (SE), and entrepreneur self-Preference (SP) significantly and completely affect entrepreneur GPS. Likewise, entrepreneur moral reflectiveness (EMR) substantially moderates the relationship between entrepreneur green production outcome expectation and LCB. This study concludes with recommendations for researchers interested in enhancing knowledge in this field. In summation, this study shows that a behavioral science viewpoint is critical for improving knowledge of low-carbon environment, CC drivers, mitigation strategies, and sustainable transition to our complex environment.

Keywords: low-carbon emission behavior; entrepreneur moral reflectiveness; climate change; green production self-efficacy; SMEs; entrepreneur

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1. Introduction

The competitive business environment in transition economies, such as China, has made it difficult for entrepreneurial-based high-tech small and medium enterprises (SMEs) to survive and grow. Organizations that want to succeed in such a tumultuous environment must rethink their priorities to align their business models with technological advancements and climate change (CC) issues [1]. Along with this challenge, growing public awareness of environmental problems has compelled businesses to invest in environmentally friendly practices to improve their green innovation performance, as predicted by a set of green activities [2]. Global warming has resulted from rising average atmospheric temperatures, which has caused a series of changes in the earth's weather and climate mechanisms. As society and businesses continue to emit heat-trapping greenhouse gases (GHG) into

the atmosphere, these rapid changes occur [3]. Carbon dioxide (CO_2) is the most crucial greenhouse gas due to its abundance and ability to remain in the atmosphere for thousands of years. W. Yang et al. [4] reported that the focus of a low-carbon environment (LCE) is to mitigate the effect of CC and GHG emissions in the environment. Global temperatures, carbon emissions, and CC rise rapidly [5]. Su and Pan [6] observed that several of these environmental issues that appeared on the scene emerged recently. Therefore, various governments are looking for initiatives, laws, and strategies to curb the adverse effect of environmental impacts on socio-economic activities. Protecting the environment by reducing CO2 emissions has become a worldwide concern of every society. Gifford et al. [7] indicated that the primary cause of CC and GHG is human behavior. Notwithstanding this, Gifford et al. [7] also believe that human behavior is the least predictable dimension of the CC system. Grottera et al. [8] added that the Intergovernmental Panel on Climate Change (IPCC) acknowledged in its fifth assessment report that the influence of behavior, lifestyle, and culture on energy use and associated emissions has considerable mitigation potential, particularly when combined with technology and structural change.

Dean and McMullen [9] suggested that environmental entrepreneurs address ecological failures by identifying, evaluating, and exploiting possibilities resulting from market failure. The fundamental objective of green entrepreneurship (GE) is to realize human society's long-term economic development [10]. GE entails combining several behaviors: green vision, green innovation, green opportunity identification, risk-taking, resource management, decision-making and problem-solving, and strategic growth planning [10]. Ye et al. [11] posited that the industrial communities of which entrepreneurs are part had been recognized as key contributors to the environmental problems faced by humans. Therefore, there is a need for innovative action from the business community to find creative ways to address these environmental issues.

This research is a contemporary analysis of how environmental factors such as climate change (CC), public media (PM), and corporate social responsibility (CSR) affect entrepreneur behavior of low-carbon emission (LCB). In their research W. Yang et al. [4] found that low-carbon cognition and intention significantly impacted consumer LCB. Their study further reported that consumer awareness of global warming influenced their understanding of low-carbon behavior.

This study investigates how entrepreneur personality concepts such as self-efficacy (SE), self-monitoring (SM), self-esteem (SE), and self-preference (SP) can affect entrepreneur green production self-efficacy (GPS). Eliyana et al. [12] researched the role of entrepreneur self-efficacy (ESE) on self-esteem and entrepreneur achievement. Their study uses the PLS-SEM, and based on their findings it was established that there is a link between ESE and entrepreneur success. The present study also delves into entrepreneur outcome expectations (EOEs) and their relationship with LCB. Moreover, our research investigates the moderating effect of entrepreneur moral reflectiveness (EMR) between expected outcome expectation and their LCB. Therefore, the primary goal of this article is to provide an empirical analysis of the determinants of entrepreneur behavior of low-carbon emission. Thus, the study provides an empirical investigation on entrepreneurs and their behavior toward carbon emission and climate change through theoretical and methodological approaches.

Our study contributes to knowledge in the exiting literature. First, various empirical studies have researched the low-carbon behavior of consumers [8,13–16], but not much literature exists for the low-carbon behavior of businesses. or entrepreneurs or of SMEs. This research aims to fill this gap. Secondly, there is growing research on low-carbon emission and climate change in emerging economies such as China. Various governments have implemented many policies intended to achieve LCE. However, these policies are at the macro level and leave the micro behavioral domain unexplored. Most importantly, entrepreneurship behavior is a significant aspect that needs to be investigated to achieve a more robust low-carbon environment. Lastly, the study explored the moderating effect of EMR on the relationship between entrepreneur outcome expectations and their commitment

to LCE behavior. EMR promotes green production outcome expectation, which eventually can help entrepreneurs exhibit LCB.

This study concludes with recommendations for researchers interested in enhancing knowledge in this field. We demonstrate the usefulness of behavioral science insights in discussing the behavior of low-carbon environments and climate change. In summation, this study shows that a behavioral science viewpoint is critical for improving knowledge of low-carbon environment, CC drivers, mitigation strategies, and sustainable transition to our complex environment.

The rest of the paper is structured as follows. Section 1 focuses on the research background, objectives, and contributions to entrepreneurship. Section 2 focuses on the theoretical framework and hypothesis development of the study. Section 3 focuses on the materials and methods of the current study. Section 4 expounds the findings of the partial least square (Smart PLS 3.0) analysis. Section 5 presents our interpretation of the findings, leading to practical and theoretical consequences. Section 6 provides the conclusion and future research.

2. Theoretical Framework and Hypothesis Development of the Study

2.1. Social Cognitive Theory (SCT)

Bandura [17,18] states that while the environment influences behavior, behavior also affects the environment. This is what Bandura refers to as reciprocal determinism, in which the world and people's actions are mutually caused. Bandura argues that human behavior is described by mutual cognitive, behavioral, and environmental factors [19,20]. Behavior can be described as a function of individuals and their environment. This behavior is also viewed as socially visible behavior driven by individual cognitive, choice, and intention processes [21]. In this research, entrepreneur behavior can be described as individual actions that affect the environment in which the entrepreneur operates his or her business. The SCT rightly emphasizes the link between personal perception and social identity. Individuals' learning is aided by the social setting, which allows them to observe and engage with other group members to mimic their behavior. As a result, individual behavior may be influenced by one's impression of the behavior of others in one's social group [22].

SCT posited that human behavior is developed in connection to the person's environment, as presented in Figure 1. A person's behaviors can impact her environment, and her environment can influence her behavior, such as how she chooses to change the setting and how those changes affect her reactions. In this way, an individual's environment, including external circumstances, can form self-efficacy, making judgments while engaging with the environment based on expectations [23]. SCT uses a more extensive, context-aware definition of cognition that considers contextual elements. SCT has been used to investigate aspects of business such as corporate decision-making, employee behavior, and technology innovation in a variety of fields [24]. Scholars maintain that because SCT describes the intricacies of human behavior from a broader viewpoint than other theories, SCT is a valuable framework for understanding human decision-making and behavior in a quickly changing world [24].

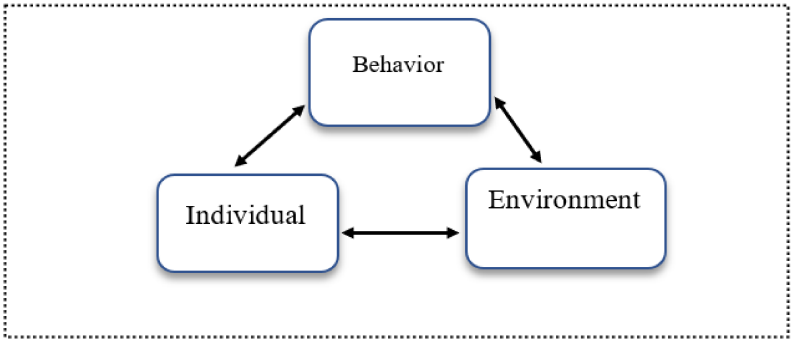

Figure 1. Behavior as a function of individual and environment; Source: (Williams Middleton [21]).

2.2. Environmental Influence and Entrepreneur Low-Carbon Behavior

The surrounding environment significantly impacts strategy, structure, and processes, including entrepreneurial enterprises. Due to the direct and significant impact of the environment on business operations, entrepreneurial activity should logically begin by examining the external environment [25]. Current developments in emerging countries' environmental conditions have legitimized entrepreneurial behavior, encouraging the emergence of new firms [25]. For instance, Miranda et al. [26] argued that firms' environmental obligations, which include waste reduction, energy and water efficiency, recycling, monitoring, reusing by-products, and efforts to protect natural resources, aim to decrease the negative repercussions of a company's operations.

2.2.1. Climate Change Influence and Entrepreneur LCB

The Paris Agreement on CC urged all countries to commit to addressing climate-change issues. The report further stated that countries responsible for 97% of the total globe emission had pledged their Nationally, Determined Contributions (NDCs) to address climate-change issues [27]. All countries must report on GHG inventories and projections as part of the Paris Agreement, subject to technical expert examination and a multilateral investigation. Governments are to continue to offer climate funds to assist the world's most vulnerable populations in adapting to CC and establishing LCE. While the Paris Agreement does not in fact "solve" CC, it does pave the way for the next wave of global climate action, setting in motion a virtuous cycle that will lead to even more strong effort in the decades ahead [27]. The Intergovernmental Panel on Climate Change [28] report indicates that CC will exceed 1.5 °C in the coming decades. Therefore, immediate and robust measures should be put in place by various governments to reduce GHS emissions by 2030.

A recent agreement on CC organized by the UNFCCC is the Conference of the Parties (COP26) at Glasgow in October 2021. On the reduction of CC, the continuous emissions gap has been highlighted. Various countries have decided to work together to close it and guarantee that the world continues to progress throughout the current decade, with the average temperature rise confined to 1.5 degrees Celsius. Countries are urged to increase their carbon reductions and link their national climate action commitments with the Paris Agreement [29,30]. In light of this report, GE is on the increase as governments, stakeholders, and researchers around the globe seek to identify a solution to reduce the effect of CC on the environment. The study's initial hypothesis is proposed as:

Hypothesis 1 (H1). *CC positively and significantly affects entrepreneur LCB.*

2.2.2. Public Media Influence and Entrepreneur LCB

Bandura [17,18] also maintained that public media (PM) could influence thinking processes, likes and dislikes, and behavior through two mechanisms: the first involves the utilization of media platforms to bring individuals together on media platforms, providing natural incentive schemes and ongoing individually tailored advice to help them achieve their goals, while the second uses the media to encourage change in persons through knowledge sharing and interaction [31]. Recently, public media, especially social media, have had much impact on the life of people and businesses and on government activities. In this environment, social media has emerged as an electronic communication platform for sharing information, ideas, and material created by individuals via networking and blogging [32]. Moreover, Yang et al. [33] found that low-carbon intention and LCB are significantly correlated with the public media of consumers. The above literature has helped us deduce that public media influence the entrepreneurial behavior of low-carbon entrepreneurs. Hence, we propose the second hypothesis that:

Hypothesis 2 (H2). *PM positively and significantly affects entrepreneur LCB.*

2.2.3. Corporate Social Responsibility Influence and Entrepreneur LCB

The utilization of CSR strategies among SMEs in the research reported by Caitlyn Loeffler [34] shows that if companies continue to enhance their CSR initiatives simultaneously, this can lead to energy efficiency and LCE. Shu et al. [35] argued that CSR has a positive impact on the rate of the recycling activities of firms. Their study proposes that CSR investment provide a new perspective for managerial decisions in enhancing their environmental activities. Sampene et al. [36] suggested that entrepreneurs can contribute to education and to job creation, improve the environment, contribute to social and economic progress, and meet other basic human needs. The importance of sustainability and the critical role of entrepreneurs in solving social and environmental problems has increased the relevance of CSR significantly over the last three decades [37]. Entrepreneurs are supported in conducting a voluntary campaign and exhibiting behavior that supports CSR to help maintain the environment in which they operate. Thus, the researchers propose the third hypothesis of this study:

Hypothesis 3 (H3). *CSR positively and significantly affects entrepreneur LCB.*

2.3. Entrepreneur Personal Self-Concepts and Low-Carbon Behavior

Entrepreneurial characteristics are responsible for environmental adaptation and individual performance [38]. According to recent literature on entrepreneurship, self-identity perception, or the personal features and self-elements that an individual identifies with to give meaning to context and behavior, has recently been introduced as a factor potentially affecting entrepreneurs' alternatives from the start of their business [39,40]. There are numerous models of appropriate roles and actions in today's culture. For those who desire to learn and emulate observed activities, role models, for example, are vital points of reference. On the other hand, individuals may have multiple identities that they act out depending on the situation [40]. Proactive personality refers to individuals' generalized perception that they can excel in challenging conditions and effectively engage with the environment [41].

2.3.1. Entrepreneur Green Production Self-Efficacy and LCB

ESE is universally considered to have a substantial impact in determining whether people pursue entrepreneurial careers and engage in entrepreneurial conduct. It refers to individuals' belief in their capacity to accomplish activities and adopt the roles needed to achieve entrepreneurial goals [42]. ESE is the level of self-assurance that entrepreneurs have to execute various entrepreneurial activities using their entrepreneurial talents, indicating that entrepreneurs can change their surroundings and succeed by appropriate actions [43]. Entrepreneurs can improve their ability to manage negative emotions and stress by being constantly exposed to an entrepreneurial environment influenced by environmental and human factors [44]. The application of self-efficacy in entrepreneurship research is known as ESE, and it refers to the extent of entrepreneurs' confidence in their ability to complete various tasks and projects. [43]. The concept of entrepreneur green production self-efficacy (GPS) has been deemed helpful in describing the establishment of entrepreneurial intention and the subsequent decision-making process as a kind of belief in achieving a given goal or activity. Based on preceding work in the literature, in this study we define GPS as an entrepreneur's belief in his or her capabilities to venture into green product production and control his or her behavior in order to characterize how firms face obstacles in green output. This study hypothesizes that:

Hypothesis 4 (H4). *GPS is positively related to entrepreneur low-carbon behavior.*

2.3.2. Entrepreneur Self-Monitoring and GPS

According to SCT, people who have high levels of self-monitoring are more able to perceive environmental cues and make judgments based on that knowledge than people who have low levels of self-monitoring; this phenomenon is known as self-reaction [18]. Bandura [17,18] view SM from the perspective of an individuals' efforts toward internal agency either to sustain or to change their behavior. Karoly and Kanfer [45] believe that environmental factors significantly impact human behavior. SM pertains to the endeavor to use humans as agents to control their behavior and break the cycle of ecological control over them.

Entrepreneurs with high dispositional positive affect are more willing to adjust to environmental changes. On the other hand, positive emotions might have negative consequences by lowering current tasks and monitoring actions [46]. This study argues that when entrepreneurs monitor their activities and impact on the environment, producing more green products can lead to LCB. The fifth hypothesis of the research is as follows:

Hypothesis 5 (H5). *Entrepreneur self-monitoring is positively related to their green production self-efficacy.*

2.3.3. Entrepreneur Self-Esteem and GPS

Entrepreneurs with high dispositional positive affect are more willing to adjust to the environment. Eliyana et al. [12] observed that strategic efforts to improve entrepreneurial behavior could be taken through an educational approach that prioritizes competencies and skills. ESE and self-esteem (SE) are two attributes that people must have to grow their entrepreneurial activity. An entrepreneur with high ESE and SE is more confident and able to self-actualize, which will lead to more entrepreneur accomplishment in behavior. People who have a higher sense of SE believe that their actions will be successful. They establish high goals for themselves, develop action plans, devote significant effort to goal-oriented activity, and continue in their efforts to achieve their dreams despite setbacks. Individuals who believe they can engage in the actions required to achieve their goals are more likely to succeed [41]. Hernandez et al. [47] argued for the importance of SE components in self-evaluation to assist people in having a more favorable opinion of themselves, which may be used as capital in achieving business success.

Furthermore, Pautina et al. [48] emphasized that SE allows people to recognize and accept their weaknesses and strengths, optimizing their strengths and achieving success. SE can also help with a person's traits and with more effective efforts. An essential thing to remember is that self-esteem can influence one's ability to attain life goals and respond positively to challenges. Possessing self-efficacy, such as demonstrating positive attitudes and talents, can encourage others and show that obstacles can be conquered. High ESE can help people achieve better psychological well-being results, boosting SE and lowering the risk of adverse psychological consequences such as depression [41]. Individuals have strong self-esteem, according to the findings. The sixth hypothesis is therefore that:

Hypothesis 6 (H6). *Entrepreneurs' self-esteem is positively related to their green production self-efficacy.*

2.3.4. Entrepreneur Self-Esteem and GPS

In describing self-preference (SP), Elazar [49] revealed that when people transcend innate self-preference to act justly, they perceive themselves as "but one of the many". Veljkovic et al. [50] conclude that personal preferences more significantly impact entrepreneurship than other professions. A recent study conducted by Wei et al. [51] on waste-sorting behavior concluded that individuals should improve their SM and minimize their SP. According to this study, for administrators to achieve better waste-sorting behavior, the focus should be on environmental protection rather than on the self-preference of individuals. Our study maintains that a lower demand among entrepreneurs for SP will

lead to a higher level of GPS. Brandstatter [52] found that SP plays a more integral role in entrepreneurial activities than in those of other professionals. This is because of the nature of entrepreneurial activities and strategies, which offer a comprehensive way of selecting and dealing with the environment in which entrepreneurs operate. Hence, we propose Hypothesis 7 as:

Hypothesis 7 (H7). *Entrepreneurs with a lower demand for self-preference have a higher level of GPS.*

2.4. Entrepreneur Outcome Expectations and Entrepreneur LCB

Luc [53] indicated that one of the essential characteristics that drive entrepreneurial intent and social entrepreneurial orientation, in particular, is outcome expectations (OEs). Martin and Guerrero [23] argue that based on SCT, outcome expectation is defined as an individual's consequence after engaging in a given action. Individuals will engage in various behaviors if they believe the results will benefit them. The SCT assumes that when the results are more favorable, the individual wishes and intends to take action, but does not plan to do so when the OEs are unfavorable [54].

Individuals who are confident in their abilities to perform specific jobs, in particular, will have positive OEs [31]. This type of expectation reflects one's ideas about the implications of a particular course of action. As a result, OEs are the behavioral incentives that influence whether or not a person will engage in a specific task [22]. Entrepreneurs are expected to engage differently depending on their ideas and views about environmental preservation. The SCT appropriately emphasizes the connection between social identity and personal perception. Entrepreneurs' individual outcome expectations (POE) impact their involvement in producing green products, leading to LCE. Santos et al. [55] emphasized that the degree to which one develops entrepreneurial OEs is likely related to one's self-efficacy. Moreover, the study proposes that entrepreneurs with higher levels of green production self-efficacy outcome (EGO) may be more optimistic about the OEs of their efforts because they are confident in their abilities to complete the work successfully. Hence, we hypothesize that:

Hypothesis 8 (H8). *POE is positively associated with entrepreneur LCB.*

Hypothesis 9 (H9). *EGO is positively associated with entrepreneur LCB.*

2.5. The Moderating Effect of Moral Reflectiveness (EMR)

Moral reflection improves a person's concern for morality. Individual variances are defined as disparities in the extent to which individuals participate in ethically directed reflection about their daily experiences and consider moral dilemmas in their daily lives [10]. Ahmad et al. [56] discovered that environmentally conscious behavior is directly affected by moral reflection. In their study, moral reflectiveness mitigated the link between employee pro-environmental activity and perceived CSR. People can be inspired to evaluate themselves and their actions by intrinsic or integrated extrinsic incentives. An individual natural desire to engage in pleasant activities to feel fulfilled is the foundation of intrinsic motivation. Intrinsic motivation can be seen in moral reflectiveness [10]. A person will undertake ethically and morally sound actions to experience a feeling of purpose even if there is no benefit or pressure. On the other hand, extrinsic motivation is a desire to engage in activities that result in a specific outcome, such as a reward, social approval, or the avoidance of punishment [10,56]. This study presents the following hypothesis based on these arguments:

Hypothesis 10 (H10). *EMR positively moderates the relationship between entrepreneur personal outcome expectation and entrepreneur behavior of LCB.*

Hypothesis 11 (H11). *EMR positively moderates the relationship between entrepreneur green production outcome expectation and entrepreneur behavior of LCB.*

2.6. Conceptual Framework

Figure 2 illustrates the conceptual model for the study based on Social Cognitive Theory.

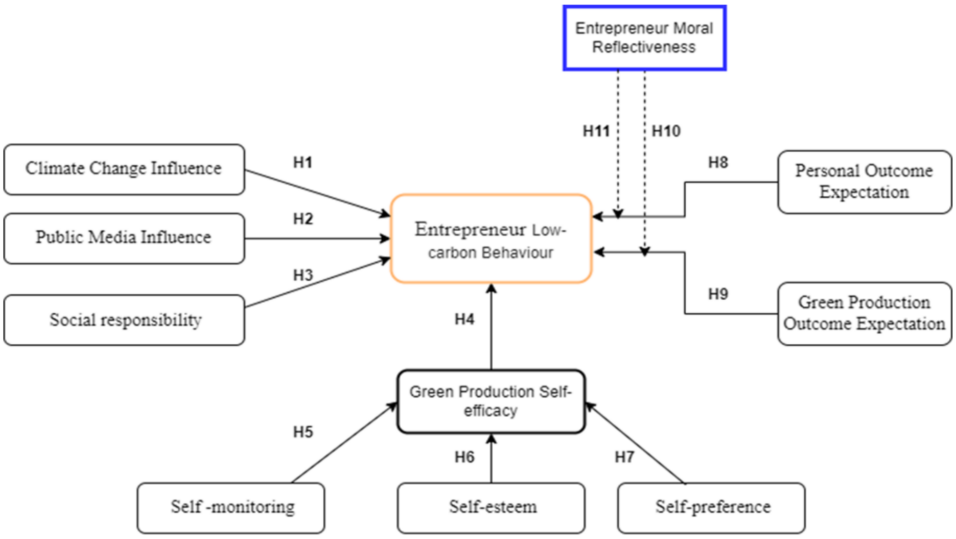

Figure 2. The conceptual model for the study.

3. Materials and Methods

3.1. Data Collection and Procedures

China has committed to lowering carbon emissions and has implemented several interventions, plans, and programs to achieve LCE. Jiangsu Province has shown significant commitment over the years in its quest to foster green innovation and sustainability. It has promoted using high-tech enterprises, moving toward emission and resource-efficient consumption, reshaping the greener of environmental protection regions, and improving regulatory oversight, cooperation, and analysis of future green developments [57]. Jiangsu Province was selected for the present study because China's social and environmental resilience concerns have been expressed. Coordinating the interaction of the environment and economy and minimizing global warming impact is crucial to international sustainable development for all countries [58,59]. Figure 3 shows the geographical location of Jiangsu Province. The research data were gathered from SMEs and entrepreneurs in clean energy, green innovation, service, manufacturing, and construction; the assumption is that these entrepreneurs and SMEs have more knowledge about low-carbon emissions [10]. Furthermore, the information of SMEs and entrepreneurs regarding environmental sustainability was gathered and authenticated from each company's website. This strategy assisted the researchers in obtaining accurate information about the SMEs and entrepreneurs selected for this study. Additionally, our questions were meant to be filled in by only those SMEs involved in enhancing environmental performance, such as low-carbon emission efforts.

The researchers used three months (July 2021 to September 2021) to gather the responses from the respondents. The questionnaire was first structured in the English language. After that, experts and professionals were hired to translate the survey questionnaire from English to Standard Chinese. At the initial phase of our data collection process, the researchers contacted 1250 entrepreneurs and SMEs through email and Wechat platforms. A month later, a reminder about the messages was also sent to the respondents. The researchers visited some of the entrepreneurs in-person to help facilitate answering the questionnaires. The researchers used simple random sampling to select the respondents of the research. In a simple random sample, all respondents are given an equal probability

of being selected. The researchers directly administered the questionnaires; hence there was no need to train any persons during this research. The present research received an 81% response rate (N = 1015) at the end of the survey, showing a high response to the study's questionnaire.

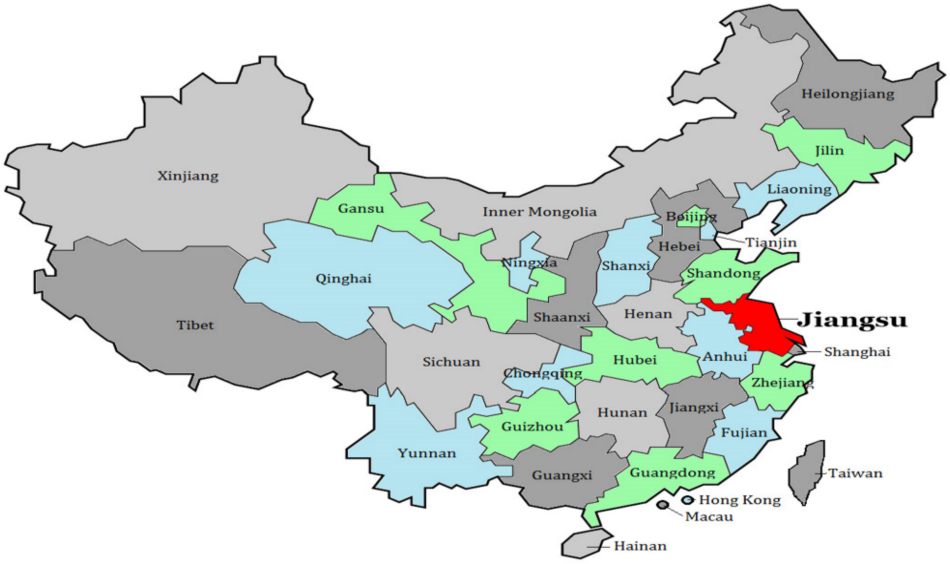

Figure 3. Location of the study area.

3.2. Construct Operationalization

A structured questionnaire was gathered to ensure the efficient and accurate content of the research model. The first section of the questionnaire was primarily concerned with the profile information of the respondent. The second section consisted of a 5-point Likert scale with closed-ended questions organized into six parts, lettered B–F. Section B focused on environmental influence, and the questions in Section C also analyzed the entrepreneur's concept. Section D included green production self-efficacy and entrepreneur personal outcome expectation. Entrepreneur low-carbon behavior constituted Section E. Section F comprised entrepreneur moral reflectiveness on the questionnaire. Items that were not significant were deleted to make the model strong for better prediction or interpretations. A list of variables for the study is shown in Table 1. The study's measuring constructs were all based on a 5-point Likert scale (1, strongly disagree; 2, disagree; 3, neither agree nor disagree; 4, agree; and 5, strongly agree). The following is a breakdown of how each construct was quantified.

3.2.1. Environmental Influence

CC was measured with 5 items (e.g., "I believe that business's wasteful production patterns have a negative impact on the environment"). Public media influence (PM) consisted of 5 items (e.g., "I believe that hearing about environmental issues in the news raises my awareness of green production practices."). Corporate social responsibility (CSR) was also measured with 5 items (e.g., "My firm is aware of local and international environmental requirements and standards for the protection of the environment"). The researchers selected the variables based on the research of [13,60].

3.2.2. Entrepreneur Personal-Concept

Self-monitoring (SM) was measured with 6 items (e.g., "I regularly remind myself to keep my company's waste creation to a minimum." Self-esteem (SE) was also measured with 6 items (e.g., "In terms of green production behavior, everyone thinks that I am an Earth-lover"). Self-preference (SP) was measured with 5 items (e.g., "I do not abandon the practice of green production behavior in my business activities simply to save time"). The researchers selected the variables based on the research of [15,21]. Green production

self-efficacy (GPS) was measured with 5 items, and the variables were selected [61,62]. The researchers utilized items such as "Everyone thinks I am a visionary who seeks out new green knowledge for my company regarding green production behavior."

Table 1. Demographic Information of SMEs (*N* = 1015).

Background Information	Characteristics	Frequency	Percentage
Gender	Male	685	67%
	Female	330	33%
Age of SMEs	<1 Year	95	9%
	1–5 Years	257	25%
	6–10 Years	360	35%
	11–15 Years	273	27%
	>15 Years	30	3%
Industrial Sector	High-Tech	32	3%
	Green technology Enterprise	65	6%
	Services	110	11%
	Manufacturing	553	54%
	Construction	221	22%
	Others	34	3%
Number of Employees	5–30 Workers	115	11%
	31–50 Workers	240	24%
	51–100 Workers	422	42%
	More than 100 Workers	238	23%

3.2.3. Entrepreneur Personal-Concept

Entrepreneur personal outcome expectation (POE) was measured with 5 items (e.g., "I am optimistic that the practice of green production behavior in my enterprise enhances my level of self-satisfaction"). Entrepreneur green production outcome expectation (EGO) was also measured with 5 items (e.g., "I think that practicing green production behavior is conducive to sustainable development"). The researchers selected the variables based on the research [15,22].

3.2.4. Entrepreneur Moral Reflectiveness

Entrepreneur moral reflectiveness was measured with 5 items (e.g., "I have good morals regarding environmental safety"). The researchers selected the variables based on studies by [10,56].

3.2.5. Entrepreneur Low-Carbon Behavior

Entrepreneur low-carbon behavior (ELB) was measured with 6 items, and the variables were selected from [15,19]. The researchers utilized items such as "I am committed in terms of my green production behavior," "I am actively committed to and inclined towards my green production behavior," and "I am pragmatic and firm in terms of my green production behavior."

3.3. Method of Data Analysis

The partial least square structural equation model (PLS-SEM) was utilized to analyze entrepreneurs' behavior towards low-carbon emission in this study. Hair et al. [63] indicate that the partial least square model is currently the most generally recognized and accepted new methodology for analysis. PLS-SEM is a multivariate technique for developing latent variables or factor models. These variables are determined to optimize the covariance between independent (X) and dependent (Y) scores. The main argument for selecting PLS-SEM as an effective strategy for this research is that it offers the best assessment, according to Cheng et al. [64], resulting in detailed analysis. PLS-SEM may also be used to examine linear relationships between latent and manifest variables. PLS-SEM is used as both reflective and formative variables in causal predictive analysis. Since this approach is

non-parametric, no assumptions about the data distribution are needed. The PLS-SEM is a multivariate statistical analysis tool for estimating structural equation models currently explored in research work. According to Joe F Hair et al. [65], a parameter of 150 is appropriate for assessing variables. Many studies have used Cronbach's alpha (CA) as a measurement tool to analyze the reliability between various variables in a construct [64,66].

4. Results

4.1. Profile of Participants

The participants' demographic information in this study includes: 685 males (67%) and 330 (33%) females. The age range of the participants was from 25 to 40+ years (M = 3.26, SD = 1.30). The age of the firm indicated that 9% ($n = 95$) had operated <1 year, while 25% ($n = 257$) between 1–5 years, 35% ($n = 360$) falls between, 35% ($n = 360$) had been in operation 6–10 Years, while 27% ($n = 273$) and 3% ($n = 30$) had been in operation for 11–15 years and >15 years, respectively. The survey further indicated that 3% of the entrepreneurs and SMEs were from the high-tech industry, 6% from green technology enterprises, 11% from the service industry, 54% from the manufacturing sector, 22% from construction, and 3% from other entrepreneurs and SMEs. The respondents from the survey also revealed that the average number of entrepreneurs and SMEs was 11%, 24%, 42%, and 23% in the range of 5–30, 31–5, 51–100, and more than 100 workers, respectively, as indicated in Table 1.

4.2. Validity and Reliability Assessment of the Model

PLS-SEM includes a two-stage procedure to evaluate the external model and assess the internal structural model [63]. Coherence assessments are based on observed individual reliability tests and concurrent validity and discriminatory validity evaluations. When conducting a PLS study, it is essential to analyze its validity and reliability. Internal quality in construction reliability was examined using Cronbach's alpha (CA) and composite reliability (CR). Many studies have used Cronbach's alpha CA as a measurement technique for determining the consistency of various factors in a construct [64,65]. Hair et al. [65,66] suggested that the value for CA should be retained between 0.40 and 0.70, while Chin [67] recommended that CA should exceed 0.5. Table 2 shows that all the constructs were sufficiently satisfied and met the standard values noted in the range of 0.795 and 0.899. The implication is that all the values exceed the 0.7 thresholds. This study, therefore, meets the reliability standard for all the individual items selected for the research. Per Fornell and Larcker, [68] rule of thumb, the CR value should be equal to or higher than 0.7. Table 2 shows the five constructs' CR coefficient values, ranging from 0.798 to 0.906, showing that these measurements are reliable.

Each latent structure of the average extracted variance (AVE) must be determined to verify the factors' internal consistency [68]. AVE should be greater than 0.5 for all constructs. Table 3 shows that all AVE and Rho_A values were more significant than 0.5, indicating that the model was correct for convergence. This study proved that the measurement model has converged and has strong internal reliability.

4.3. Heterotrait–Monotrait Ratio (HTMT)

Another relevant approach for assessing the model's validity and multicollinearity is the HTM. HTMT is the ratio that measures the trait of correlation within the model; according to [68,69], if the HTMT value is more than 0.9, the research suggests that the discrimination will not apply. The HTMT ratio should not be higher than 0.9 [70]. The results established in Table 3 comply with all the standard rules set by the previous researchers. The results, therefore, show an acceptance of the HTMT discriminant level in this study.

Table 2. Convergent validity results.

Variables/Indicators	Items	Outer Loadings	CA ($\alpha > 0.7$)	Rho_A (>0.7)	CR (ρc) (>0.7)	AVE (>0.5)
Climate Change Influence (CC)	CC1	0.770	0.880	0.934	0.911	0.680
	CC2	0.851				
	CC3	0.939				
	CC4	0.914				
	CC5	0.895				
Public Media Influence (PM)	PM1	0.810	0.906	0.912	0.930	0.726
	PM2	0.860				
	PM3	0.846				
	PM4	0.853				
	PM5	0.889				
Social Responsibility (SR)	SR1	0.761	0.898	0.899	0.925	0.713
	SR2	0.832				
	SR3	0.875				
	SR4	0.873				
	SR5	0.874				
Entrepreneur Self-Monitor (SM)	SM1	0.737	0.838	0.851	0.880	0.559
	SM2	0.841				
	SM3	0.877				
	SM4	0.851				
	SM5	0.833				
	SM6	0.852				
Entrepreneur Self-Pref. (SP)	SP1	0.822	0.798	0.820	0.864	0.566
	SP2	0.857				
	SP3	0.856				
	SP4	0.825				
	SP5	0.804				
Entrepreneur Self-Esteem (SE)	SE1	0.821	0.889	0.906	0.916	0.645
	SE2	0.854				
	SE3	0.864				
	SE4	0.858				
	SE5	0.715				
	SE6	0.861				
Green Prod. Self-efficacy (GPS)	GPS1	0.738	0.815	0.835	0.868	0.530
	GPS2	0.855				
	GPS3	0.762				
	GPS4	0.819				
	GPS5	0.825				
	GPS6	0.808				
Personal Outcome Exp. (POE)	POE1	0.717	0.896	0.896	0.921	0.660
	POE2	0.768				
	POE3	0.815				
	POE4	0.863				
	POE5	0.845				
	POE6	0.856				
Green Prod. Out. Exp. (EGO)	EGO1	0.884	0.838	0.940	0.862	0.515
	EGO2	0.814				
	EGO3	0.822				
	EGO4	0.789				
	EGO5	0.781				
	EGO6	0.870				
Low-Carbon Behavior (LCB)	LCB1	0.836	0.889	0.891	0.916	0.644
	LCB2	0.842				
	LCB3	0.806				
	LCB4	0.757				
	LCB5	0.772				
	LCB6	0.799				

4.4. Bias

This paper utilized three statistical techniques to analyze common method bias (CMB). The researchers first employed Harman [71] single-factor analysis. Harman indicated that single factor analysis describes only 34.5% of the variance, lower than the 50% threshold [72].

Second, the researchers employed a collinearity test to see a considerable overlap between the variables selected for the survey. The variance inflation factor (VIF) coefficient was used to analyze collinearity among variables in this research. The authors of [65,73] indicated that the VIF coefficient value should be lower than 5.00. This study's results suggest that the VIF values range from 1.616 and 3.446 (<5.00). The results show that the construct has no collinearity and that all of the construct's variables are valid in this study. Thirdly, extant works in the literature suggest that CMB can be proven if the variable's correlation in a construct is more significant than 0.9 [74]. From Table 3, all our constructs were less than the threshold of 0.9.

Table 3. Heterotrait–Monotrait Ratio (HTMT).

	CC	EGO	GPS	LCB	PM	POE	SE	SM	SP	SR
CC										
EGO	0.877									
GPS	0.577	0.816								
LCB	0.299	0.545	0.862							
PM	0.290	0.621	0.936	0.708						
POE	0.317	0.528	0.762	0.943	0.785					
SE	0.296	0.575	0.912	0.972	0.969	0.877				
SM	0.942	0.986	0.754	0.471	0.524	0.464	0.492			
SP	0.647	0.721	0.745	0.765	0.627	0.866	0.690	0.709		
SR	0.310	0.480	0.693	0.895	0.689	0.984	0.805	0.427	0.880	

Abbreviations: Climate Change Influence (CC), Green Prod. Outcome Expectation (EGO), Low-Carbon Behavior (LCB), Public Media Influence (PM), Personal Outcome Expectation (POE), Entrepreneur Self-Esteem (SE), Entrepreneur Self-Monitoring (SM), Entrepreneur Self-Preference (SP), Social Responsibility (SR).

4.5. Assessment of the Structural Equation Model

Henseler et al. [75] suggested that to measure the model fitness of PLS-SEM, the standardized root means square (SRMR) should be <0.08. The results from our study show an adequate level of model fitness with (SRMR) of 0.042, as shown in Table 4. Furthermore, the (R^2) test determines whether or not an endogenous latent variable has an explanatory value in the model. In summary, the R^2 statistic indicates the accuracy of the forecast [65]. Regarding the R^2 rule, values of 0.67, 0.33, and 0.19 suggest that the model is robust, moderate, and weak, respectively [76]. The results of the R^2 in this research show entrepreneurs' LCB as 0.975 and 0.958 for entrepreneur green production self-efficacy. Thus, from the R^2 co-efficient determination, the structural model explained 97.5% variance in entrepreneur low-carbon behavior and 96% entrepreneur green production self-efficacy, as indicated in Table 4.

Table 4. Structural model fit summary.

Construct	R^2	Adj R^2	VIF	Q^2	F^2	SRMR
LCB	0.975	0.975	1.846	0.413	0.037	0.042
GPS	0.958	0.958	1.424	0.402		

Abbreviations: VIF: variance inflation factor; $R^{2:}$ co-efficient determination; SRMR: standardized root mean square; Q^2: predictive relevance.

The relevant prediction test seeks to ascertain the degree to which the model's observed value and parameter estimates are accurate. A score of Q^2 greater than 0 (zero) indicates that the model has a high predictive relevance value. The study results from Table 4 illustrate that the Q^2 value of each variable is more than zero (0), showing that the present study model possesses a significant predictive score. The size effect test (f^2) seeks to assess the strength of the connection between the latent predictor variable (exogenous latent variable) and the structural model. As a result, there are three main criteria: 0.02 (small), 0.15 (average), and 0.35 (large). This study shows a significant (f^2) value of 0.037, which indicates a large effect size.

4.6. Structural Equation Modelling-Path Analysis

The goal of path coefficients is to assess structural models. A resampling bootstrap methodology was utilized to obtain the T-value in PLS-SEM analysis. PLS-SEM testing accuracy and reliability are determined using the bootstrapping approach, which is a non-parametric strategy. This study used 500 bootstrapped samples to process the data. The eleven hypotheses' path coefficient (p-value) is between 0.000 and 0.05, as indicated in Figure 4 and Table 5.

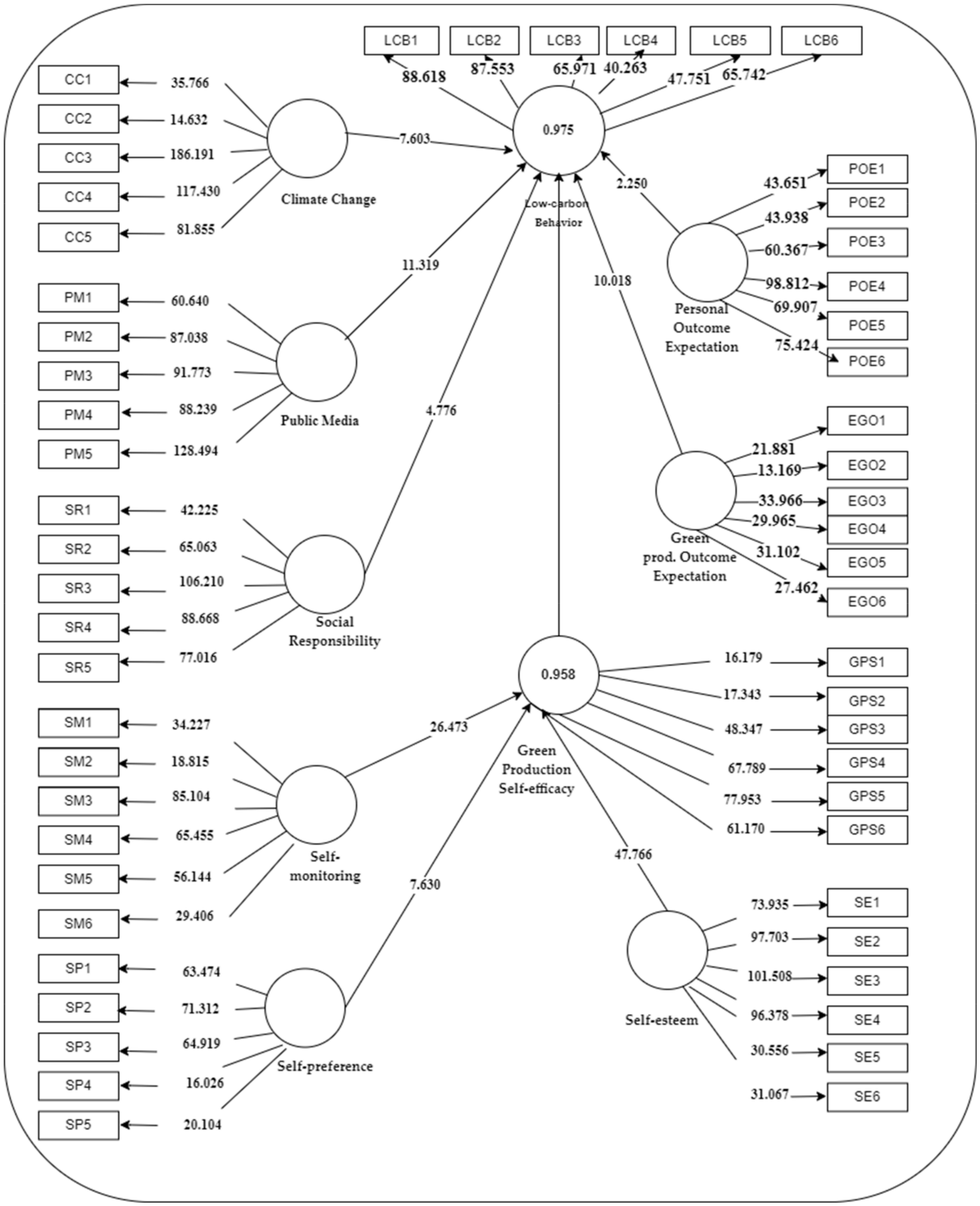

Figure 4. Results of the structural equation research model.

Table 5. Results of hypothesis testing.

	Hypothesis Path	(β)	T Statistics	P-Stats	Decision
	Direct Relationship				
H1	Climate Change Influence-> Entrepreneur LCB	0.661	10.436	0.000	Supported
H2	Public Media Influence -> Entrepreneur LCB	1.795	12.956	0.000	Supported
H3	Entrepreneur Social Responsibility-> LCB	1.807	13.375	0.000	Supported
H4	Green Production Self-efficacy -> Entrepreneur LCB	0.362	11.525	0.000	Supported
H5	Entrepreneur Self-monitoring-> Green Production Self-efficacy	0.367	17.639	0.000	Supported
H6	Entrepreneur Self-esteem -> Green Production Self-efficacy	0.817	50.238	0.000	Supported
H7	Entrepreneur Self-preference-> Green Production Self-efficacy	−0.103	7.584	0.000	Supported
H8	Personal Outcome Expectation-> Entrepreneur LCB	−1.061	7.843	0.000	Supported
H9	Green prod. Outcome Expectation-> Entrepreneur LCB	−0.315	9.409	0.000	Supported
	Indirect/Moderating Path				
H10	EMR*EGO -> LCB	0.673	10.521	0.000	Supported
H11	EMR*POE -> LCB	0.601	10.340	0.000	Supported

Abbreviations: EMR: Entrepreneur Moral Reflectiveness; EGO: Entrepreneur Green Production Outcome Expectation; POE: Entrepreneur Personal Outcome Expectation; LCB: Entrepreneur Low-Carbon Behavior; *p*-value < 0.05.

The results from the study indicate that environmental factors such as climate change influence ((H1. β) = 0.661; t-statistics = 10.436; $p = 0.000$), public media influence ((H2. β) = 1.795; t-statistics = 12.956; $p = 0.000$) and corporate social responsibility influence ((H3. β) = 1.807; t-statistics = 13.375; $p = 0.000$) have a significant positive relation to entrepreneur low-carbon behavior. Our first three hypotheses in the study were therefore supported.

Interestingly, the present study results also show that entrepreneur green production self-efficacy (GPS) ((H4. β) = 0.362; t-statistics = 11.525; $p = 0.000$) has a significant relation to entrepreneur low-carbon behavior. Our study hypothesis is therefore supported. The outcome of the research shows that entrepreneur personal concept such as entrepreneur self-monitoring ((H5. β) = 0.367; t-statistics = 17.639; $p = 0.000$), entrepreneur self-esteem ((H6. β) = 0.817; t-statistics = 50.238; $p = 0.000$) and entrepreneur self-preference ((H7. β) = −0.103; t-statistics = 7.584; $p = 0.000$) positively and significantly influences entrepreneur green production self-efficacy.

The present study's Hypothesis 8 stated that personal outcome expectation positively influences entrepreneur low-carbon emission with ((H8. β) =−1.061; t-statistics = 7.843; $p = 0.000$). Therefore, H9 was supported. The effect of green production outcome expectation ((H9. β) = −0.315; t-statistics = 9.409; $p = 0.000$) has a significant positive influence on entrepreneur low-carbon emission. Thus Hypothesis 9 was supported.

The research investigated entrepreneur moral reflectiveness (EMR) as a moderate predictor of entrepreneur green production outcome expectation and entrepreneur low-carbon emission in Hypothesis 10. The results of the study (Table 5) indicated that entrepreneur moral reflectiveness ((H9. β) = 0.673; t-statistics = 10.521; $p = 0.000$) has a positive effect on and significantly moderates the relationship with entrepreneur low-carbon emission.

The study also examined entrepreneur moral reflectiveness (EMR) as a moderator to predict entrepreneur personal outcome expectation and entrepreneur low-carbon emission in Hypothesis 11. Our study results shows that entrepreneur moral reflectiveness (H11. β) = 0.101; t-statistics = 6.340; $p = 0.000$) has a positive effect on and significantly moderates the relationship with entrepreneur green production outcome expectation and entrepreneur low-carbon emission. Furthermore, Figure 5 indicates the interaction diagram of EMR between EGO and LCB. Figure 6 also shows the interaction diagram of EMR between POE and LCB. The lines on the graph show that if entrepreneurs' moral reflectiveness increases, their green production outcome expectation and personal outcome expectation practices will also increase, leading to low-carbon emission behavior among entrepreneurs in Jiangsu Province.

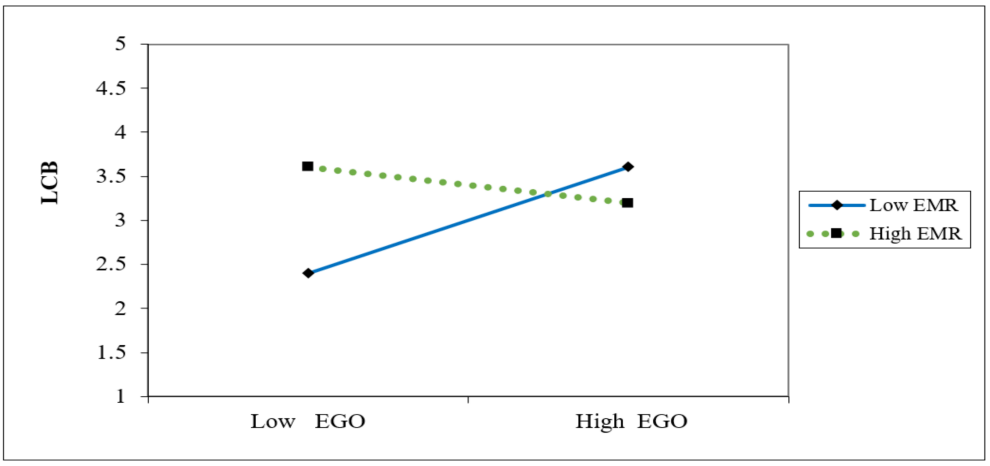

Figure 5. Interaction diagram of EMR between EGO and LCB.

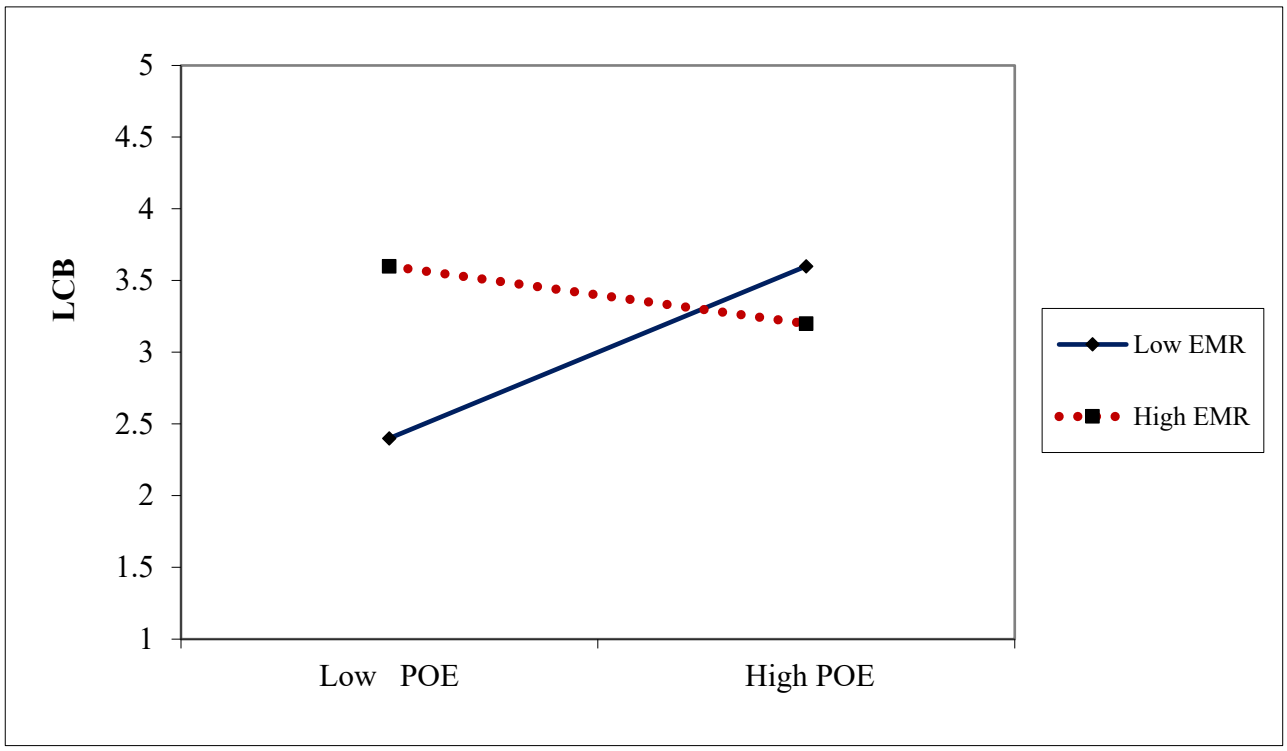

Figure 6. Interaction diagram of EMR between POE and LCB.

5. Discussion

An expanding variety of research studies explores the potential contribution of behavioral changes to emissions reduction [8]. Transition to LCE has become a contentious topic of discussion among government, stakeholders, and policymakers. There is a call for more extensive research on green entrepreneurship, identified as a critical variable to promote LCE [77]. The study's analysis was based on an investigation of entrepreneur LCB of 1015 SMEs in the Jiangsu province of China. This study used a questionnaire survey to conduct an empirical test based on previous work and theories in the literature to examine determinants that influence the LCB behavior of entrepreneurs and SMEs. The following conclusions can be drawn.

First, the present study's results indicate that environmental factors (i.e., climate change, public media, and corporate social responsibility) have a significant association with entrepreneur behavior of low-carbon emission, confirming H1–H3. These results

imply that entrepreneurs' understanding of climate-change issues has a higher impact on their behavior LCB. Moreover, public and social media are very influential in their behavior towards LCB. Another key finding from the study is that entrepreneurs who appreciate their role in society through CSR have a high behavioral attitude towards environmental sustainability. Xu and Ou [78] indicated that awareness of the environment is vital for low-carbon behavior. Recent research conducted by Liao et al. [79] supported this result; their study finding revealed that environmental factors such as CC influenced individual willingness to control air pollution in society. Deepening organizational CSR and implementing green initiatives and practices have emerged as critical strategic mechanisms affecting the globe and individual livelihoods [80]. Citizens' energy-saving behaviors were significantly related to their sense of social responsibility, awareness of global warming, and access to adequate media coverage in the studies conducted by [33].

Second, the study hypothesis indicated that entrepreneurs' GPS is significantly associated with their LCB, confirming H4. Thus, the implication of these results shows that to entrepreneurs, LBC can be enhanced through their GPS. The study, therefore, recommends the need for entrepreneurs and businesses to channel more resources into green production. The study of Liao et al. [81] supports this result. Their research indicated that GPS has a positive impact on the pro-environmental behavior of individuals. Guo et al. [82] believe that GPS can enhance people's attitudes and beliefs towards the environment, affecting their LCB.

Third, the study's results further indicated that entrepreneur personal concepts (SM, SE, and SP) significantly and completely affect entrepreneur GPS, confirming Hypotheses 5, 6 and 7. The studies by Luu [82] revealed a positive relationship between green entrepreneurial orientation and green creative behavior, mainly through the dual mediation paths of green creative self-efficacy and cohesive environmental ambition. Gifford et al. [7] found that self-efficacy was the best predictor of individual behavioral action to mitigate the impact of CC.

Fourth, the study results revealed that entrepreneur POE and EGO are significantly related to entrepreneur LCB, confirming H8 and H9. Our study results indicate that entrepreneurs with a high level of POE and EGO are associated considerably with LCB. This finding from the study shows that entrepreneurs with a high level of expected outcome for GPS have a more vital willingness to exhibit behaviors of low-carbon emission. The result of this study is similar to that from Santos et al. [55]; their study emphasized that the degree to which one develops entrepreneurial outcome expectations is likely related to one's self-efficacy.

Finally, the moderating effect in this study was confirmed. Thus, results from the survey illustrate that EMR moderates the relationship between entrepreneur POE and entrepreneur LCB, confirming H11. The study results also show that EMR significantly mediates the relationship between EGO and entrepreneur LCB, confirming H12. This outcome indicates that moral reflectiveness (individual personal values) can moderate the impact of their understanding of green production and entrepreneur behavior towards LCE. Our finding is in line with previous research conducted by [10]. Their study results suggest that moral reflectiveness can act as an intrinsic motivator for people to change their attitudes towards green production initiatives.

6. Conclusions, Research Implication, and Future Direction

6.1. Conclusions

This research, through empirical analysis, examined the determinants that influence the LCB behavior of entrepreneurs and SMEs. The study also examined the mediation role of entrepreneur core competencies on the link between astute entrepreneur skills and entrepreneur success. The study also focused on the moderating effect of EMR on the relationship between entrepreneur outcome expectation and entrepreneur LCB.

Based on the concept of SCT and empirical findings, this research draws the following conclusion: (1) environmental factors (i.e., climate change, public media, and corporate

social responsibility) have a significant and positive relationship with entrepreneur LCB; (2) entrepreneur green production self-efficacy is positively associated with entrepreneur LCB; (3) entrepreneur personal concepts such as entrepreneur self-monitoring, entrepreneur self-esteem, and entrepreneur self-preference (SP) significantly and completely affect entrepreneur GPS; (4) likewise, entrepreneur moral reflectiveness (EMR) substantially moderates the relationship between entrepreneur green production outcome expectation and LCB.

6.2. Theoretical Implications

This study contributes to the literature on low-carbon behavior in five significant ways. Firstly, SCT was extended to entrepreneur behavior of low-carbon emission. The research adopted this theory and demonstrated how entrepreneurs' perception of environmental factors such as CC, PM, and CSR affect their behavior towards LCE. The main goal is to unravel entrepreneurs' psychological mechanisms towards LCB.

Secondly, the present study expounded on entrepreneur green production and self-efficacy theory in green entrepreneurship. The theory outcome demonstrated that self-efficacy can help predict entrepreneurs' behavior towards LCE. This is the first study to analyze entrepreneur green production self-efficacy and its effect on low-carbon behavior, especially among entrepreneurs and SMEs. The study demonstrated that entrepreneurs' concepts, such as self-monitoring, self-preference, and self-esteem, are predictors of their behavior towards GPS and LCE. The implication is that when entrepreneurs encounter a counterintuitive environment that can hinder their pro-environmental behaviors, their SM, SP, and SE will be activated. Thus, the entrepreneurs will be alerted to find an alternative solution within their ability and capabilities to accomplish their desired behavior.

Thirdly, several studies have been conducted on the low-carbon behavior of consumers [8,13–15], but not much literature exists for the low-carbon behavior of businesses or entrepreneurs. The researchers are optimistic that this is the first study to be conducted on the behavior of entrepreneurs in a low-carbon environment.

Fourth, the empirical research analysis was conducted to enhance further knowledge of how POE and EGO can impact entrepreneur LCB. The paper advances the conceptual understanding of the relationship between outcome expectations and LCB. The present study analysis indicted that entrepreneur outcome expectation has a significant and positive association with their behavior of low-carbon emission.

Lastly, the current study was carried out to add to the limited works in the literature on the moderating effect of EMR on entrepreneur outcome expectation and entrepreneur LCB. The study's findings revealed that EMR has a positive moderating effect between entrepreneur POE and entrepreneur LCB. Moreover, the study outcome further illustrated that EMR moderates the relationship between EGO and entrepreneur LCB. The paper explains that EMR enhances entrepreneurs' personal outcome expectations, leading to LCB. Moreover, EMR also promotes EGO, which eventually can help them exhibit LCB.

6.3. Practical Implications

Regarding entrepreneur behavior of low-carbon emission, the present research findings contribute to the literature by proving some contribution to the theory on individual behavior and low-carbon environments. For starters, in the past many businesses ignored green initiatives as an extraneous investment or were deluded into thinking that such expenditure would obstruct their advancement. Nevertheless, with the pattern of stringent operational environmental legislation (e.g., the Paris Agreement and the COP26 Agreement) and the rise of consumer environmentalism, an important role has emerged for CSR [81].

The research revealed that environmental factors such as CC, PM, and CSR are statistically significant with respect to entrepreneur behavior of low-carbon emission. In other words, these environmental factors influence the behavior of entrepreneurs towards a low-carbon environment. The present research provides entrepreneurs and SMEs with a pathway to enhance their low-carbon behavior, leading to low-carbon emissions. Entrepreneurs and SMEs should understand their roles and responsibility toward LCE. Thus,

entrepreneurs should build strategic plans that can help reduce climate change. Through CSR, entrepreneurs and SMEs can build eco-initiatives and strategies to fulfill their commitment to promoting LCE. To ensure the transition to LCE, entrepreneurs should make an effort to measure and analyze their greenhouse gas emissions periodically. Thus, if entrepreneurs measure and find out the level of GHG emission, it can help them consider a solution to mitigate it. Another way for a business to reduce its carbon footprint is for it to reduce the amount of waste it generates [83]. Liao et al. [81] argued that entrepreneurs and SMEs also facilitate the achievement of environmental targets by incorporating CSR into their core business strategy, management systems, and procedures.

This research also recommends an intervening variable in the relation between GPS and LCB. The indicators of the impact of ESE on various levels of LCB have given rise to potential self-monitoring initiatives, which play a role in managing the relationship between individual attitude and behavior. The study maintains that a variety of carbon emission intensity initiatives and control measures could be implemented in Jiangsu Province to achieve LCE. Entrepreneurs should also work with scientific research agencies to investigate low-carbon innovations for use in their businesses.

Finally, the study recommends that the provincial government play an important role by sponsoring environmental campaign initiatives through print media, advertising, social media, educational centers (for instance, universities, high schools), and various newspapers. The content of the message can be used to advocate for environmental protection and climate-change reduction by businesses and individuals living in the society. Such activities can also affect their behavior towards LCE. This study also proposes that policymakers and government formulate regional and province emission caps for SMEs and entrepreneurs to help mitigate carbon emissions in Jiangsu Province in China.

6.4. Limitation and Future Work

This section of the study focuses on some limitations and future research directions. The present research gathered data from entrepreneurs, clean energy production, green technology, and green infrastructure building in China's Jiangsu Province. Therefore, the results may limit the generalizability of our study. Future studies can extend this study to five or six provinces in China. The study scope can be enlarged by increasing the sample size in future studies. More mediators and moderators could also be introduced to examine the causal relationships among the variables in future studies. Such research can also be extended to analyzing the behavior of low-carbon emissions among startups.

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References

1. Iqbal, S.; Akhtar, S.; Anwar, F.; Kayani, A.J.; Sohu, J.M.; Khan, A.S. Linking green innovation performance and green innovative human resource practices in SMEs; a moderation and mediation analysis using PLS-SEM. *Curr. Psychol.* **2021**, *1*, 1–18. [CrossRef]
2. Li, C.; Ur, H.M.R.; Asim, S. Impact of Entrepreneurial Leadership on Innovative Work Behavior: Examining Mediation and Moderation Mechanisms. *Psychol. Res. Behav. Manag.* **2020**, *13*, 105. [CrossRef]
3. Ali, K.A.; Ahmad, M.I.; Yusup, Y. Issues, impacts, and mitigations of carbon dioxide emissions in the building sector. *Sustainability* **2020**, *12*, 7427. [CrossRef]
4. Yang, W.; Zhao, R.; Chuai, X.; Xiao, L.; Cao, L.; Zhang, Z.; Yang, Q.; Yao, L. China's pathway to a low carbon economy. *Carbon Balance Manag.* **2019**, *14*, 14. [CrossRef] [PubMed]
5. Kirton, J. BRICS Climate Governance in 2020. 2020. Available online: http://www.brics.utoronto.ca/biblio/Kirton_BRICS_Climate_Governance_2020.html (accessed on 15 November 2021).
6. Su, J.; Pan, Y. Impact of Stakeholder Behavior on the Carbon Emission Reduction in Supply Chain. In Proceedings of the 2019 International Conference on Advanced Education, Management and Humanities (AEMH 2019), Wuhan, China, 19–21 July 2019; Volume 352, pp. 201–207. [CrossRef]
7. Gifford, R.; Kormos, C.; Mcintyre, A. Behavioral dimensions of climate change: Drivers, responses, barriers, and interventions. *WIREs Clim. Chang.* **2011**, *2*, 801–827. [CrossRef]
8. Grottera, C.; La Rovere, E.L.; Wills, W.; Pereira, A.O. The role of lifestyle changes in low-emissions development strategies: An economy-wide assessment for Brazil. *Clim. Policy* **2020**, *20*, 217–233. [CrossRef]
9. Dean, T.J.; McMullen, J.S. Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action. *J. Bus. Ventur.* **2007**, *22*, 50–76. [CrossRef]
10. Chu, F.; Zhang, W.; Jiang, Y. How Does Policy Perception Affect Green Entrepreneurship Behavior? An Empirical Analysis from China. *Discret. Dyn. Nat. Soc.* **2021**, *2021*, 1–9. [CrossRef]
11. Ye, Q.; Zhou, R.; Anwar, M.A.; Siddiquei, A.N.; Asmi, F. Entrepreneurs and environmental sustainability in the digital era: Regional and institutional perspectives. *Int. J. Environ. Res. Public Health* **2020**, *17*, 1355. [CrossRef]
12. Eliyana, A.; Musta'in, A.R.S.; Sridadi, A.R.; Widiyana, E.U. The role of self-efficacy on self-esteem and entrepreneurs achievement. *Syst. Rev. Pharm.* **2020**, *11*, 314–319. [CrossRef]
13. Fraj, E.; Martinez, E. Environmental values and lifestyles as determining factors of ecological consumer behaviour: An empirical analysis. *J. Consum. Mark.* **2006**, *23*, 133–144. [CrossRef]
14. Gilg, A.; Barr, S.; Ford, N. Green consumption or sustainable lifestyles? Identifying the sustainable consumer. *Futures* **2005**, *37*, 481–504. [CrossRef]
15. Lin, H.Y.; Hsu, M.H. Using Social Cognitive Theory to Investigate Green Consumer Behavior. *Bus. Strateg. Environ.* **2015**, *24*, 326–343. [CrossRef]
16. Niamir, L.; Filatova, T.; Voinov, A.; Bressers, H. Transition to low-carbon economy: Assessing cumulative impacts of individual behavioral changes. *Energy Policy* **2018**, *118*, 325–345. [CrossRef]
17. Bandura, A. Cultivate Self-efficacy for Personal and Organizational Effectiveness. In *The Blackwell Handbook of Principles of Organizational Behaviour*; Blackwell Publishing Ltd.: Hoboken, NJ, USA, 2017; pp. 125–141. [CrossRef]
18. Bandura, A. Social cognitive theory of self-regulation. *Organ. Behav. Hum. Decis. Process.* **1991**, *50*, 248–287. [CrossRef]
19. England Bayrón, C. Social Cognitive Theory, Entrepreneurial Self-Efficacy and Entrepreneurial Intentions: Tools to Maximize the Effectiveness of Formal Entrepreneurship Education and Address the Decline in Entrepreneurial Activity. *Rev. Griot (Etapa IV-Colección Complet.* **2013**, *6*, 66–77.
20. O'Shea, D.; Buckley, F.; Halbesleben, J.; Gibbs, D.; O'Neill, K.; Wei, C.F.; Yu, J.; Huang, T.L.; Brando-Garrido, C.; Montes-Hidalgo, J.; et al. Self-regulation in entrepreneurs: Integrating action, cognition, motivation, and emotions. *Emerg. Econ. Transform. Int. Bus. Brazil, Russ. India China* **2020**, *10*, 533–544. [CrossRef]
21. Williams Middleton, K. *Developing Entrepreneurial Behavior: Facilitating Nascent Entrepreneurship at the University*; Chalmers University of Technology: Gothenburg, Sweden, 2010.
22. Ojo, A.O.; Alias, M. Conceptualising Social Media Entrepreneurial Engagement from the Socio-Cognitive Theory. *J. Entrep. Res. Pract.* **2021**, *2021*, 846138. [CrossRef]
23. Martin, J.J.; Guerrero, M.D. Social cognitive theory. In *Routledge Handbook of Adapted Physical Education*; Routledge: London, UK, 2020; Volume 6, pp. 280–295. [CrossRef]
24. Park, J.Y.; Sung, C.S. Does social media use influence entrepreneurial opportunity? A review of its moderating role. *Sustainability* **2017**, *9*, 1593. [CrossRef]
25. Luthans, F.; Stajkovic, A.D.; Ibrayeva, E. Environmental and psychological challenges facing entrepreneurial development in transitional economies. *J. World Bus.* **2000**, *35*, 95–110. [CrossRef]
26. Miranda, I.T.P.; Moletta, J.; Pedroso, B.; Pilatti, L.A.; Picinin, C.T. A Review on Green Technology Practices at BRICS Countries: Brazil, Russia, India, China, and South Africa. *SAGE Open* **2021**, *11*, 21582440211013780. [CrossRef]
27. United Nations The Paris Agreement | United Nations. 2015. Available online: https://www.un.org/en/climatechange/paris-agreement (accessed on 10 November 2021).
28. IPCC Global Warming of 1.5 °C. Available online: https://www.ipcc.ch/sr15/ (accessed on 1 January 2022).

29. United Nations Climate Reports | United Nations. 2020. Available online: https://www.un.org/en/climatechange/reports (accessed on 10 November 2021).
30. United Nation Climate Change COP26 Reaches Consensus on Key Actions to Address Climate Change | UNFCCC. Available online: https://unfccc.int/news/cop26-reaches-consensus-on-key-actions-to-address-climate-change (accessed on 27 November 2021).
31. Bandura, A. Social Cognitive Theory: An Agentic Perspective. *Annu. Rev. Psychol.* **2001**, *52*, 1–26. [CrossRef]
32. Jain, V.K.; Gupta, A.; Tyagi, V.; Verma, H. Social media and green consumption behavior of millennials. *J. Content Community Commun.* **2020**, *10*, 221–230. [CrossRef]
33. Yang, Y.; Guo, Y.; Luo, S. Consumers' intention and cognition for low-carbon behavior: A case study of Hangzhou in China. *Energies* **2020**, *13*, 5830. [CrossRef]
34. Caitlyn Loeffler, B. *What Are the Effects of Corporate Social Responsibility Initiatives on*; Georgetown University: Washington, DC, USA, 2020.
35. Shu, T.; Liu, Q.; Chen, S.; Wang, S.; Lai, K.K. Pricing decisions of CSR closed-loop supply chains with carbon emission constraints. *Sustainability* **2018**, *10*, 4430. [CrossRef]
36. Sampene, A.K.; Li, C.; Agyeman, F.O.; Robert, B.; Moses, S.; Salomon, A.A. A Critical assessment of the role of Entrepreneurship. *Eur. J. Bus. Innov. Res.* **2021**, *9*, 1–26.
37. Buendía-Martínez, I.; Monteagudo, I.C. The role of CSR on social entrepreneurship: An international analysis. *Sustainability* **2020**, *12*, 6976. [CrossRef]
38. Byrne, O.; Shepherd, D.A. Different Strokes for Different Folks: Entrepreneurial Narratives of Emotion, Cognition, and Making Sense of Business Failure. *Entrep. Theory Pract.* **2015**, *39*, 375–405. [CrossRef]
39. Ceresia, F.; Mendola, C. Am I an Entrepreneur? Entrepreneurial Self-Identity as an Antecedent of Entrepreneurial Intention. *Adm. Sci.* **2020**, *10*, 46. [CrossRef]
40. Newbery, R.; Lean, J.; Moizer, J.; Haddoud, M. Entrepreneurial identity formation during the initial entrepreneurial experience: The influence of simulation feedback and existing identity. *J. Bus. Res.* **2018**, *85*, 51–59. [CrossRef]
41. Brando-Garrido, C.; Montes-Hidalgo, J.; Limonero, J.T.; Gómez-Romero, M.J.; Tomás-Sábado, J. Relationship of academic procrastination with perceived competence, coping, self-esteem and self-efficacy in Nursing students. *Enfermería Clínica (Engl. Ed.)* **2020**, *30*, 398–403. [CrossRef]
42. Newman, A.; Obschonka, M.; Schwarz, S.; Cohen, M.; Nielsen, I. Entrepreneurial self-efficacy: A systematic review of the literature on its theoretical foundations, measurement, antecedents, and outcomes, and an agenda for future research. *J. Vocat. Behav.* **2019**, *110*, 403–419. [CrossRef]
43. Wei, J.; Chen, Y.; Zhang, Y.; Zhang, J. How Does Entrepreneurial Self-Efficacy Influence Innovation Behavior? Exploring the Mechanism of Job Satisfaction and Zhongyong Thinking. *Front. Psychol.* **2020**, *11*, 1–15. [CrossRef] [PubMed]
44. Liu, X.; Lin, C.; Zhao, G.; Zhao, D. Research on the effects of entrepreneurial education and entrepreneurial self-efficacy on college students' entrepreneurial intention. *Front. Psychol.* **2019**, *10*, 1–9. [CrossRef]
45. Karoly, P.; Kanfer, F.H. Self-control: A behavioristic excursion into the lion's den. *Behav. Ther.* **1972**, *3*, 398–416.
46. O'Shea, D.; Buckley, F.; Halbesleben, J. Self-regulation in entrepreneurs: Integrating action, cognition, motivation, and emotions. *Organ. Psychol. Rev.* **2017**, *7*, 250–278. [CrossRef]
47. Hernández, Y.C.U.; Cueto, O.F.A.; Shardin-Flores, N.; Luy-Montejo, C.A. Academic procrastination, self-esteem and self-efficacy in university students: Comparative study in two peruvian cities. *Int. J. Criminol. Sociol.* **2020**, *9*, 2474–2480. [CrossRef]
48. Pautina, M.R.; Puluhulawa, M.; Djibran, M.R. The Correlation Between Interest In Entrepreneurship And Students' Self-Esteem. *J. Bus. Behav. Entrep.* **2018**, *2*, 62–67. [CrossRef]
49. Elazar, Y. Adam Smith on impartial patriotism. *Rev. Polit.* **2021**, *83*, 329–350. [CrossRef]
50. Veljkovic, S.M.; Maric, M.; Subotic, M.; Dudic, B. Family Entrepreneurship and Personal Career Preferences as the Factors of Di ff erences in the Development of Entrepreneurial Potential of Students. *Sustainability* **2019**, *11*, 5693. [CrossRef]
51. Wei, C.F.; Yu, J.; Huang, T.L. Exploring the drivers of conscious waste-sorting behavior based on sor model: Evidence from Shanghai, China. In Proceedings of the 2020 Management Science Informatization and Economic Innovation Development Conference (MSIEID), Guangzhou, China, 18–20 December 2020; pp. 21–24. [CrossRef]
52. Brandstätter, H. Personality aspects of entrepreneurship: A look at five meta-analyses. *Pers. Individ. Dif.* **2011**, *51*, 222–230. [CrossRef]
53. Luc, P.T. Outcome expectations and social entrepreneurial intention: Integration of planned behavior and social cognitive career theory. *J. Asian Financ. Econ. Bus.* **2020**, *7*, 399–407. [CrossRef]
54. Liguori, E.W.; Bendickson, J.S.; McDowell, W.C. Revisiting entrepreneurial intentions: A social cognitive career theory approach. *Int. Entrep. Manag. J.* **2018**, *14*, 67–78. [CrossRef]
55. Santos, S.C.; Unidos, E.; Liguori, E.W.; Unidos, E. How and when is self-efficacy related to entrepreneurial intentions: Exploring the role of entrepreneurial outcome expectations and subjective norms. *Revista de Estudios Empresariales. Segunda Época* **2019**, *1*, 6–21. [CrossRef]
56. Ahmad, N.; Ullah, Z.; Mahmood, A.; Ariza-Montes, A.; Vega-Muñoz, A.; Han, H.; Scholz, M. Corporate social responsibility at the micro-level as a "new organizational value" for sustainability: Are females more aligned towards it? *Int. J. Environ. Res. Public Health* **2021**, *18*, 2165. [CrossRef]

57. PAGE Partnership for Action on Green Economy (PAGE) Jiangsu Province, China (2015-2020)—Greenjobs AP. Available online: https://apgreenjobs.ilo.org/project/copy2_of_greener-business-asia/partnership-for-action-on-green-economy-page-jiangsu-province-china-2015-2020 (accessed on 16 November 2021).
58. Dong, K.; Sun, R.; Hochman, G. Do natural gas and renewable energy consumption lead to less CO2 emission? Empirical evidence from a panel of BRICS countries. *Energy* **2017**, *141*, 1466–1478. [CrossRef]
59. Wang, Y.; Li, L.; Kubota, J.; Han, R.; Zhu, X.; Lu, G. Does urbanization lead to more carbon emission? Evidence from a panel of BRICS countries. *Appl. Energy* **2016**, *168*, 375–380. [CrossRef]
60. Bandura, A. Impeding ecological sustainability through selective moral disengagement. *Int. J. Innov. Sustain.Dev.* **2007**, *2*, 8–35. [CrossRef]
61. Enuoh, R.; Pepple, G.J.; Cross, C.; State, R.; Etim, G.S.; Bassey, A. Green entrepreneurship and business performance in Nigeria: A conceptual review. *Solid State Technol.* **2021**, *63*, 15767–15775.
62. Alwakid, W.; Aparicio, S.; Urbano, D. The influence of green entrepreneurship on sustainable development in Saudi Arabia: The role of formal institutions. *Int. J. Environ. Res. Public Health* **2021**, *18*, 5433. [CrossRef]
63. Hair, J.F.; Risher, J.J.; Sarstedt, M.; Ringle, C.M. When to use and how to report the results of PLS-SEM. *Eur. Bus. Rev.* **2019**, *31*, 2–24. [CrossRef]
64. Cheng, L.; Nsiah, T.K.; Charles, O.; Ayisi, A.L. Credit risk, operational risk, liquidity risk on profitability. A study on South Africa commercial Banks. A PLS-SEM Analysis. *Rev. Argentina Clínica Psicológica* **2020**, *XXIX*, 5–18. [CrossRef]
65. Hair, J.F.; Sarstedt, M.; Ringle, C.M.; Mena, J.A. An assessment of the use of partial least squares structural equation modeling in marketing research. *J. Acad. Mark. Sci.* **2012**, *40*, 414–433. [CrossRef]
66. Hussain, S.; Fangwei, Z.; Siddiqi, A.F.; Ali, Z.; Shabbir, M.S. Structural Equation Model for evaluating factors affecting quality of social infrastructure projects. *Sustainability* **2018**, *10*, 1415. [CrossRef]
67. Chin, W.W. The partial least squares approach to structural equation modeling. *Mod. Methods Bus. Res.* **1998**, *295*, 295–336.
68. Fornell, C.; Larcker, D.F. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *J. Mark. Res.* **1981**, *18*, 39. [CrossRef]
69. Rashed, M.; Polas, H. The effects of individual characteristics on women intention to become social entrepreneurs? *J. Public Aff.* **2020**, *21*, e2204. [CrossRef]
70. Henseler, J.; Ringle, C.M.; Sarstedt, M. Using Partial Least Squares Path Modeling in International Advertising Research: Basic Concepts and Recent Issues. Available online: https://www.researchgate.net/publication/233408729_Using_Partial_Least_Squares_Path_Modeling_in_International_Advertising_Research_Basic_Concepts_and_Recent_Issues (accessed on 26 April 2021).
71. Harman, H.H. *Modern Factor Analysis*; University of Chicago Press: Chicago IL, USA, 1976; ISBN 0226316521.
72. Podsakoff, P.M.; MacKenzie, S.B.; Lee, J.-Y.; Podsakoff, N.P. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *J. Appl. Psychol.* **2003**, *88*, 879. [CrossRef]
73. Handayati, P.; Wulandari, D.; Eko, B.; Wibowo, A. Heliyon Does entrepreneurship education promote vocational students ' entrepreneurial mindset? *Heliyon* **2020**, *6*, e05426. [CrossRef] [PubMed]
74. Bagozzi, R.P.; Yi, Y.; Singh, S. On the use of structural equation models in experimental designs: Two extensions. *Int. J. Res. Mark.* **1991**, *8*, 125–140. [CrossRef]
75. Henseler, J.; Hubona, G.; Ray, P.A. Using PLS Path Modeling in New Technology Research: Updated Guidelines. 2016. Available online: https://www.emerald.com/insight/content/doi/10.1108/IMDS-09-2015-0382/full/pdf (accessed on 12 November 2021).
76. Marcoulides, G.A.; Chin, W.W.; Saunders, C. A critical look at partial least squares modeling. *MIS Q.* **2009**, *33*, 171–175. [CrossRef]
77. Jiang, H.; Wang, S.; Wang, L.; Li, G. Golden apples or green apples? The effect of entrepreneurial creativity on green entrepreneurship: A dual pathway model. *Sustainability* **2020**, *12*, 6285. [CrossRef]
78. Xu, X.M.; Ou, S.J. Research on low-carbon behavioural identity with the New Environmental Paradigm Scale. *IOP Conf. Ser. Earth Environ. Sci.* **2019**, *267*, 022014. [CrossRef]
79. Liao, Y.W.; Su, Z.Y.; Huang, C.W.; Shadiev, R. The influence of environmental, social, and personal factors on the usage of the app "Environment Info Push". *Sustainability* **2019**, *11*, 6059. [CrossRef]
80. Guo, L.; Xu, Y.; Liu, G.; Wang, T.; Du, C. Understanding Firm Performance on Green Sustainable Practices through Managers' Ascribed Responsibility and Waste Management: Green Self-Efficacy as Moderator. *Sustainability* **2019**, *11*, 4976. [CrossRef]
81. Liao, H.-Y.; Hsu, C.-T.; Chiang, H.-C. How does green intellectual capital influence employee pro-environmental behavior? The mediating role of corporate social responsibility. *Int. J. Manag. Stud.* **2021**, *2*, 27–47. [CrossRef]
82. Luu, T.T. Green creative behavior in the tourism industry: The role of green entrepreneurial orientation and a dual-mediation mechanism. *J. Sustain. Tour.* **2020**, *29*, 1290–1318. [CrossRef]
83. Fournier, C. 10 Actions That Companies Can Put in Place to Fight Climate Change. Available online: https://youmatter.world/en/actions-companies-climate-change-environment-sustainability/ (accessed on 19 November 2021).