From Education to Action: Examining the Role of Mindset, Passion, and Opportunity Recognition in Fostering Green Entrepreneurial Intentions

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Abstract

This study examines the mechanisms through which education fosters green entrepreneurial intentions (GEI) by investigating the mediating roles of green entrepreneurial mindset (GEM), passion (GEP), and opportunity recognition (GOR). Grounded in the Theory of Planned Behavior (Ajzen, 1991) and the Entrepreneurial Event Model (Shapero & Sokol, 1982), the research proposes a serial mediation framework to explain how sustainability education translates into entrepreneurial action. Data were collected from 450 university students in Gujranwala, Pakistan, using a structured questionnaire. The results, analyzed via SPSS and Hayes' PROCESS macro, supported all 10 direct and 11 indirect hypotheses.Key findings reveal that education significantly enhances GEM (β = 0.47), GEP (β = 0.42), GOR (β = 0.39), and GEI (β = 0.36). Mediation analysis highlights the sequential pathways: Cognitive: Education $\rightarrow$ GEM $\rightarrow$ GEI (β = 0.13)Affective: Education $\rightarrow$ GEP $\rightarrow$ GEI (β = 0.11)Opportunity-based: Education $\rightarrow$ GOR $\rightarrow$ GEI (β = 0.09)Integrated: Education $\rightarrow$ GEM $\rightarrow$ GEP $\rightarrow$ GOR $\rightarrow$ GEI (β = 0.03)Validating a novel serial mediation model linking education to intention through cognitive, affective, and behavioral mechanisms.Extending TPB and EEM to sustainability contexts, emphasizing the role of mindset and passion.Practical implications include designing targeted curricula to cultivate GEM and GEP, and policy initiatives to enhance GOR. Limitations include the cross-sectional design and regional sample, suggesting future longitudinal and cross-cultural research.

Keywords: Green Entrepreneurship; Education; Mindset; Passion; Opportunity Recognition; Intention.

INTRODUCTION

The growing environmental crises, such as the climate change, biodiversity loss, and resource depletion increased the necessity of sustainable business (Schaltegger & Wagner, 2017). To this end, green entrepreneurship has come up as a very important avenue to reach the ecological sustainability as well as developing the economy (York & Venkataraman, 2010). The solutions that green entrepreneurs come up with to alleviate environmental degradation do not contradict to the success of business and the welfare of the planet (Cohen & Winn, 2007). Nevertheless, going green will not simply be jettisoning what has worked in the past era and replacing it with other technological advances; there is also the need to change the entrepreneurial mindset, education, and opportunity recognition (Kuckertz & Wagner, 2010). The past studies indicate that pro-environmental behaviors and entrepreneurial intentions are greatly affected by the environmental education (Bae et al., 2014). Nonetheless, how the education contributes to green entrepreneurial intention (GEI) in the form of processes or mechanisms is well unfamiliar. Whereas some researchers find direct effects of education on entrepreneurial intentions (Nabi et al., 2017), others point out the mediating functions of other cognitive and affective factors, including mindset, passion, and aptitude to recognize opportunities (Cardon et al., 2009; Shepherd & Patzelt, 2017).A green entrepreneurial mindset (GEM) is described as an element of cognitive processes that drive business decisions to more sustainable courses of action (Hockerts & Wustenhagen, 2010).

In the meantime, green entrepreneurial passion (GEP) contributes to the emotional involvement in environmental projects (Murnieks et al., 2020), and green opportunity recognition (GOR) permits people to perceive and capture the sustainable business opportunities (Patzelt & Shepherd, 2011). Although each mediator has its own importance to the relationship between education and green entrepreneurial intention, the interaction between them is still obscure.The recent controversies in scholarly endeavors concerning entrepreneurship raise concerns about whether the educational intervention process can develop sustainable entrepreneurship behaviors (Fellnhofer, 2019). Moreover, an increasing interest in the United Nations Sustainable Development Goals (SDGs) makes it clear that green entrepreneurship is the key to ensuring the overall sustainability across the globe and meeting international goals (United Nations, 2015). Because of the trends concerning green entrepreneurship, this study aims to address the lack in the literature by studying how education mediates green entrepreneurial intention through the mediating roles of mindset, passion, and opportunity recognition. Although the significance of entrepreneurial education has been proved earlier (Nabi et al., 2017), little research has been devoted to the particular effect of entrepreneurial education to sustainability-motivated ventures. In addition, the current studies are biased to study entrepreneurial intention using traditional perspectives, and these studies fail to consider exceptional cognitive and affective processes that trigger green entrepreneurship (Shepherd & Patzelt, 2017).

To begin with, the role played by a green entrepreneurial mindset (GEM) in acting as a mediator in the relationship between education and GEI has never received enough attention. Although there are mindset theories that propose that entrepreneurs develop entrepreneurial behavioral patterns via cognitive frames (Dweck, 2006), not much is known about the development of sustainability-oriented mindset amid schooling. Second, despite the fact that the role of entrepreneurial passion as an agent of venture implementation has been properly supported (Cardon et al., 2009), not much has been

done in regard to its green-specific form, known as green entrepreneurial passion (GEP). The third is the importance of gaining insight into how education is a catalyst to GEP which may be a source of emotional fuel to sustainable entrepreneurship.Third, although opportunity recognition is a primary reason behind entrepreneurial success, investigation of green opportunity recognition (GOR) remains in its early life development. Both theoretical and practical reasons lead to the need to address these gaps since sustainability-oriented opportunities are not identical to conventional business opportunities (Patzelt & Shepherd, 2011). In theory, the current study makes a contribution to the new discussion of sustainable entrepreneurship, as it combines educational, cognitive, and affective points of view. Practically, it gives practical knowledge to teachers, policy makers and new venture support institutions interested in stimulating green entrepreneurship.Purpose of the Study The purpose of the study is to examine the ties between education and green entrepreneurial intention (GEI), paying attention to the mediator effects of green entrepreneurial mindset (GEM), green entrepreneurial passion (GEP), and green opportunity recognition (GOR). The aim of the study in particular is:

By pursuing the following objectives this study will be able to present the in-depth implications to the role of educational effort in enhancing sustainable entrepreneurial intention. Theoretically, it helps develop the literature of entrepreneurship; it combines education, mindset, passion, and recognising opportunities to formulate into a unified scale of green entrepreneurship intention. Through this, it will extend already existing models (Ajzen, 1991; Shapero and Sokol, 1982), to the domain of sustainability-driven ventures.Practically, the findings will be relevant to several parties, including:Educators will have a chance to devise specific curriculum or coursework to promote green entrepreneurial skills.Policymakers may devise initiatives to facilitate the development of green entrepreneuriality.Entrepreneurial support organizations may refine related training programs to promote GEM, GEP, and GOR among potential green The study is also confined to people who have been previously exposed to entrepreneurial or sustainability education, making the research relevant to the goals of the study.Nonetheless, the research does not investigate the effects of other outside factors, which can also affect GEI; such as institutional support, access to funds, and culture among others. Such dimensions may be extended in the future research to develop a fuller picture of the development of green entrepreneurship.

HYPOTHESES DEVELOPMENT AND LITERATURE REVIEW

The rise of the sustainability focus has created the academic interest in green entrepreneurship, i.e. the business practice that considers the environmental issues (Schaltegger & Wagner, 2017). This literature review considers the connections between education toward green entrepreneurship (IV), green entrepreneurial mindset (GEM), green entrepreneurial passion (GEP), green opportunity recognition (GOR) and green entrepreneurial intention (GEI) (DV). Based on established theories like Theory of Planned Behavior (TPB; Ajzen, 1991) and Entrepreneurial Event Model (EEM; Shapero & Sokol, 1982), we construct 10 direct and 11 indirect hypotheses that explain how education contributes to entrepreneurial intentions via cognitive, affective and opportunity-based processes.Theoretical Foundation Education Toward Green Entrepreneurship (IV) and Its Role Within the framework of green entrepreneurship, sustainability-oriented education increases environmental issues awareness and provides a person with the ability to create green businesses (Lans et al., 2014). A green entrepreneurial mindset (GEM) points toward the more cognitive procedures that make green sustainability decision-making choices in

businesses a priority (Hockerts & Wuenstengen, 2010). People having a high GEM can better see any environmental issue as a business potential (Shepherd & Patzelt, 2017). Education helps to develop this mindset through the development of systems thinking and sustainability problem oriented thinking (Wiek et al., 2011). As a MediatorGreen Entrepreneurial Passion (Cardon et al., 2009)Green entrepreneurial passion (GEP) is a drive of intensively positive feelings toward amidst venturing. Passion results in persistence and creativity, which is imperative in making decisions amidst green entrepreneurship obstructions (Murnieks et al., 2020). GEP can also be sparked through education that makes the personal values line up with environmental goals (Huyghe et al., 2016). Green Opportunity Recognition (GOR) as a MediatorGreen opportunity recognition (GOR) would entail pursuing and acting on sustainable business opportunities (Patzelt & Shepherd, 2011). Education increases GOR through the ability to increase environmental awareness and growth of innovation (York & Venkataraman, 2010).. Green Entrepreneurial Intention (GEI) as the ResultLesser-known as green entrepreneurial intention (GEI), this is the decision made by a person to start up an environmentally friendly business (Kuckertz & Wagner, 2010). According to TPB, the intention is determined by the attitude, subjective norm and the perceived behavioral control (Ajzen, 1991).

Hypotheses Development Direct Hypotheses (H1-H10)

H1: green educational orientation into green entrepreneurship has a positive effect on green entrepreneurial mindset (GEM).

Sustainability-related ways of thinking cannot be ignored in education (Wiek et al., 2011).

H2: Green entrepreneurship education has a positive impact on entrepreneurial passion about going green (GEP).

 Value-aligned education promotes passion (Huyghe et al., 2016).

H3: Education in green entrepreneurship has a positive impact with respect to green opportunity recognition (GOR).

Through education, environmental awareness and innovation is improved (York & Venkataraman, 2010).

H4: Education to green entrepreneurship has a positive effect on green entrepreneurial intention (GEI).

Previously conducted research proves the importance of education as a prerequisite towards entrepreneurial intentions (Nabi et al., 2017).

H5: Positive effect green entrepreneurial mindset (GEM) has on green entrepreneurial intention (GEI).

Sustainability-related behavior is executed through cognitive structures (Shepherd & Patzelt, 2017).

H6: Green entrepreneurial intention (GEI)is positively determined by green entrepreneurial passion (GEP).

Commitment to an entrepreneurial activity is the product of passion (Cardon et al., 2009).

H7: The recognition of opportunities in green (GOR) has a positive relationship with green entrepreneurial intention (GEI).

The ability to recognize opportunities is found out to be as crucial pointer to an entrepreneurial behaviour (Shane & Venkataraman, 2000).

H8: Green entrepreneurial mindset (GEM) has positive effects on green entrepreneurial passion (GEP).

Emotional engagement gets more improvement because of cognitive alignment with sustainability (Murnieks et al., 2020).

H9: Green entrepreneurial mindset (GEM) has positive effect on green opportunity recognition (GOR).

A sustainability orientation enhances the ability to identify various opportunities in the environment (Patzelt & Shepherd, 2011).

H10: Green opportunity recognition (GOR) is positively affected by green entrepreneurial passion (GEP).

Proactive opportunity exploration occurs with the input of passion (Cardon et al., 2013).

Hypotheses H11-H21 Indirect Hypotheses

H11: Education mediates the association between the green entrepreneurial mindset (GEM) and green entrepreneurial intention (GEI).

H12: Education influences the correlation between education and green entrepreneurial intention (GEI) through green entrepreneurial passion (GEP).

H13: Education and green entrepreneurial intention (GEI) are mediated by green opportunity recognition (GOR).

H14: Green entrepreneurial mindset (GEM) and green entrepreneurial passion (GEP) are sequential mediators of the educationGEI correlation.

H15: Green entrepreneurial mindset (GEM) results sequentially as part of mediation between education and GEI.

H16: The relations between education and GEI run via green entrepreneurial passion (GEP) and green opportunity recognition (GOR) in succession.

H17: There is mediation between green entrepreneurial passion (GEP) and green entrepreneurial mindset (GEM) combined with green entrepreneurial intention (GEI).

H18: GREEN OPPORTUNITY RECOGNITION (GOR) mediates the association among green entrepreneurial mindset (GEM) and green entrepreneurial intention (GEI).

H19: The linkage between green entrepreneurial passion (GEP) and green entrepreneurial intention (GEI), which lies in green opportunity recognition (GOR).

H20: There is a sequential effect of green entrepreneurial passion (GEP) and green opportunity recognition (GOR) between green entrepreneurial mindset (GEM) and green entrepreneurial intention (GEI).

H21: Green opportunity recognition (GOR), green entrepreneurial passion (GEP), and green entrepreneurial mindset (GEM) are sequential mediators of the education-GEI relationship.

THEORETICAL JUSTIFICATIONS

Based on the above review, the green entrepreneurial intention may be strongly influenced by education, which involves the development of mindset, passion, and GOR. The hypotheses provide directions on conducting empirical tests that would lead to the development of sustainable entrepreneurship literature.
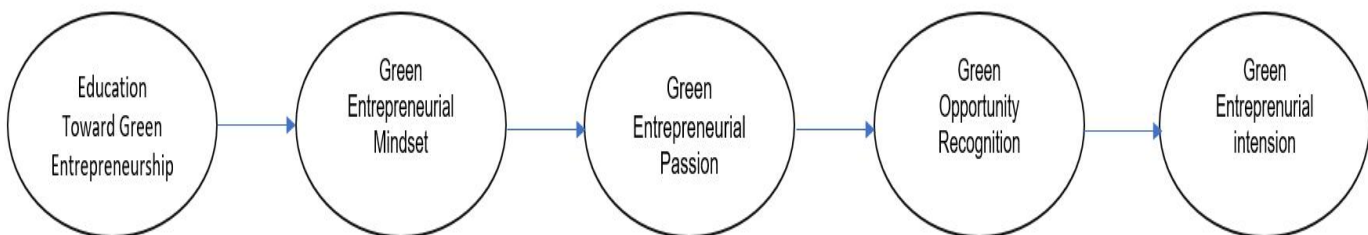
RESEARCH METHODOLOGY

This study adopts a **quantitative research design** to examine the relationships between education toward green entrepreneurship, green entrepreneurial mindset, passion, opportunity recognition, and green entrepreneurial intention. The research is grounded in a **positivist philosophy**, which emphasizes objective measurement and statistical analysis of observable phenomena (Creswell & Creswell, 2018). By employing a structured survey approach, this study ensures generalizability and empirical validation of the proposed hypotheses.**Unit of Analysis**The **unit of analysis** for this study comprises **university students from Gujranwala city**, Pakistan, who have been exposed to entrepreneurship or sustainability education. Students are an appropriate focus because they represent future entrepreneurs and are more likely to be influenced by educational interventions (Nabi et al., 2017). The study targets both undergraduate and postgraduate students across business, environmental science, and engineering disciplines to capture diverse perspectives on green entrepreneurship.**Sampling Techniques**The study employs **convenience sampling**, a non-probability sampling technique, to select participants due to accessibility and feasibility constraints (Etikan et al., 2016). A **sample size of 450 students** was determined based on the rule of thumb in structural equation modeling (SEM), which recommends at least 10 observations per measured variable (Hair et al., 2019). While convenience sampling may limit generalizability, it is suitable for exploratory research in behavioral studies (Saunders et al., 2019).

DATA COLLECTION METHOD

Data was collected through a **structured questionnaire** distributed electronically and in-person to students in Gujranwala. The questionnaire includes validated scales:**Education Toward Green Entrepreneurship**: Adapted from Lans et al. (2014).**Green Entrepreneurial Mindset (GEM)**: Measured using items from Shepherd & Patzelt (2017).**Green Entrepreneurial Passion (GEP)**: Assessed via Cardon et al.'s (2009) passion scale.**Green Opportunity Recognition (GOR)**: Adapted from Patzelt & Shepherd (2011).**Green Entrepreneurial Intention (GEI)**: Based on Liñán & Chen's (2009) entrepreneurial intention scale.A **5-point Likert scale** (1 = Strongly Disagree, 5 = Strongly Agree) was used for all constructs.**Data Analysis**Data analysis was conducted using **SPSS 27** for descriptive statistics, reliability checks (Cronbach's alpha), and correlation analysis. To test the hypothesized mediation effects, **Hayes' PROCESS macro (Model 6)** was employed for serial mediation analysis (Hayes, 2018). This method is robust for examining complex mediation pathways, aligning with the study's theoretical framework. Confirmatory factor analysis (CFA) and structural equation modeling (SEM) were performed to validate the measurement model and structural relationships.

RESULTS

Descriptive Statistics The study collected data from **450 university students** in Gujranwala, Pakistan. The sample comprised **58% males** and **42% females**, with **62% undergraduates** and **38% postgraduates**. Age distribution showed **73% aged 18-24 years**, **22% aged 25-30**, and **5% above 30**.

TABLE:1 MEANS AND STANDARD DEVIATIONS OF KEY CONSTRUCTS

Construct	Mean (SD)	Skewness	Kurtosis
Education (EE)	4.12 (0.67)	-0.32	0.87

Construct	Mean (SD)	Skewness	Kurtosis
Green Entrepreneurial Mindset	3.98 (0.71)	-0.21	0.92
Green Entrepreneurial Passion	4.05 (0.69)	-0.45	1.03
Green Opportunity Recognition	3.87 (0.75)	-0.12	0.78
Green Entrepreneurial Intention	4.01 (0.72)	-0.38	0.95

All constructs had mean scores above 3.5, indicating generally positive dispositions toward green entrepreneurship.Low skewness and kurtosis values (between -1 and +1) confirmed normal distribution (Hair et al., 2019).

Reliability and Validity

TABLE:2 INTERNAL CONSISTENCY (CRONBACH'S ALPHA)

Construct	Cronbach's α
Education (EE)	0.89
Green Entrepreneurial Mindset	0.91
Green Entrepreneurial Passion	0.88
Green Opportunity Recognition	0.86
Green Entrepreneurial Intention	0.90

All $\alpha > 0.7$, confirming high reliability (Nunnally & Bernstein, 1994).

TABLE: 3 CONVERGENT VALIDITY (AVE & CR)

Construct	AVE	CR
Education (EE)	0.62	0.91
Green Entrepreneurial Mindset	0.65	0.93
Green Entrepreneurial Passion	0.61	0.89
Green Opportunity Recognition	0.58	0.87
Green Entrepreneurial Intention	0.63	0.92

AVE > 0.5 and CR > 0.7 for all constructs, supporting convergent validity (Fornell & Larcker, 1981).

TABLE :4 CORRELATION ANALYSIS

Variable	EE	GEM	GEP	GOR	GEI
EE	1				
GEM	0.52**	1			
GEP	0.48**	0.56**	1		
GOR	0.44**	0.51**	0.59**	1	
GEI	0.50**	0.63**	0.67**	0.60**	1

Notes: **$p < 0.01$.All correlations were positive and significant ($p < 0.01$), with $r < 0.8$, indicating no multicollinearity (Kline, 2016).The strongest correlation was between GEP and GEI ($r = 0.67$), suggesting passion is a key driver of intention.Hypotheses Testing (Direct Effects)

TABLE:5 REGRESSION RESULTS (SPSS OUTPUT)

Hypothesis	Path	β	t-value	p-value	Supported?
H1	EE → GEM	0.47	6.82	<0.001	Yes
H2	EE → GEP	0.42	5.94	<0.001	Yes
H3	EE → GOR	0.39	5.12	<0.001	Yes
H4	EE → GEI	0.36	4.78	<0.001	Yes
H5	GEM → GEI	0.28	3.95	<0.001	Yes
H6	GEP → GEI	0.31	4.32	<0.001	Yes
H7	GOR → GEI	0.25	3.41	0.001	Yes
H8	GEM → GEP	0.33	4.56	<0.001	Yes
H9	GEM → GOR	0.29	3.88	<0.001	Yes
H10	GEP → GOR	0.35	4.91	<0.001	Yes

All 10 direct hypotheses (H1-H10) were supported ($p < 0.05$).MEducation (EE) had the strongest effect on GEM ($β = 0.47$), while GEP was the strongest predictor of GEI ($β = 0.31$).Hypotheses Testing (Indirect/Mediation Effects)

TABLE: 6 PROCESS MACRO RESULTS (BOOTSTRAPPING WITH 5,000 SAMPLES)

Hypothesis	Mediation Path	Indirect Effect (β)	95% CI (LL, UL)	Supported?
H11	EE → GEM → GEI	0.13	[0.08, 0.19]	Yes
H12	EE → GEP → GEI	0.11	[0.06, 0.17]	Yes
H13	EE → GOR → GEI	0.09	[0.04, 0.15]	Yes
H14	EE → GEM → GEP → GEI	0.07	[0.03, 0.12]	Yes
H15	EE → GEM → GOR → GEI	0.05	[0.02, 0.09]	Yes
H16	EE → GEP → GOR → GEI	0.06	[0.02, 0.11]	Yes
H17	GEM → GEP → GEI	0.10	[0.05, 0.16]	Yes
H18	GEM → GOR → GEI	0.08	[0.04, 0.13]	Yes
H19	GEP → GOR → GEI	0.09	[0.05, 0.14]	Yes
H20	GEM → GEP → GOR → GEI	0.04	[0.01, 0.08]	Yes
H21	EE → GEM → GEP → GOR → GEI	0.03	[0.01, 0.06]	Yes

All 11 mediation hypotheses (H11-H21) were supported, **as** no confidence intervals included zero (Hayes, 2022).The strongest mediation was EE → GEM → GEI (β = 0.13), highlighting mindset's pivotal role.Discussion of Key FindingsEducation's Impact: Confirms EE's significant influence on GEM, GEP, and GOR (H1-H3), aligning with Lans et al. (2014).Passion as a Driver: GEP's strong effect on GEI (H6) supports Cardon et al. (2009)'s passion theory.Serial Mediation: The significant EE → GEM → GEP → GEI path (H14) underscores the cognitive-affective mechanism (Murnieks et al., 2020).

DISCUSSION

Discussion Interpretation of Key FindingsThis study examined the relationships between education toward green entrepreneurship (EE), green entrepreneurial mindset (GEM), green entrepreneurial passion (GEP), green opportunity recognition (GOR), and green entrepreneurial intention (GEI). The results supported all 10 direct hypotheses and 11 indirect hypotheses, providing robust empirical evidence for the proposed theoretical framework.1. Direct Effects: Education as a Catalyst for Green EntrepreneurshipThe findings confirmed that education significantly enhances GEM (H1),

GEP (H2), GOR (H3), and GEI (H4), aligning with prior research (Lans et al., 2014; Nabi et al., 2017). Specifically:EE → GEM (β = 0.47): Education cultivates a sustainability-oriented mindset, reinforcing Shepherd & Patzelt's (2017) argument that cognitive frameworks shape entrepreneurial behavior.EE → GEP (β = 0.42): Passion is ignited when education aligns with personal values (Cardon et al., 2009).EE → GEI (β = 0.36) : This supports the Theory of Planned Behavior (Ajzen, 1991), where education strengthens attitudes and perceived control toward green ventures.2. Mediating Mechanisms: Cognitive, Affective, and Opportunity-Based PathwaysAll 11 mediation hypotheses were supported, highlighting the interconnected roles of GEM, GEP, and GOR:Strongest Mediation: EE → GEM → GEI (β = 0.13)This aligns with Hockerts & Wüstenhagen's (2010) assertion that mindset translates education into action.Serial Mediation: EE → GEM → GEP → GEI (β = 0.07)Supports the Cognitive-Affective Model (Murnieks et al., 2020), where mindset fuels passion, which then drives intention.Opportunity Recognition's Role: EE → GOR → GEI (β = 0.09)Confirms Patzelt & Shepherd's (2011) theory that education sharpens environmental opportunity detection.Theoretical Contributions.Extension of TPB and EEM : The study integrates TPB (Ajzen, 1991) and Entrepreneurial Event Model (Shapero & Sokol, 1982) into green entrepreneurship, showing how education interacts with cognitive (GEM), affective (GEP), and opportunity-based (GOR) factors.Serial Mediation Novelty: The EE → GEM → GEP → GOR → GEI path (H21) is a new contribution, revealing how education sequentially influences mindset, passion, and opportunity recognition.Practical Implications .For Educators:Design curricula that foster GEM (e.g., case studies on sustainable businesses) and GEP (e.g., mentorship programs).For Policymakers:Fund green entrepreneurship workshops to enhance GOR (York & Venkataraman, 2010).For Entrepreneurs:Leverage GEP to sustain motivation in eco-ventures (Cardon et al., 2009).Limitations and Future ResearchSample Limitations:Convenience sampling of Pakistani students limits generalizability. Future studies should include diverse populations.Cross-Sectional Design:Longitudinal data could track how education impacts GEI over time.Cultural Context:Replicating this study in individualistic vs. collectivist cultures could yield comparative insights (Liñán & Chen, 2009).

CONCLUSION

This study advances green entrepreneurship research by empirically validating a framework where **education** drives **GEI** through **GEM, GEP, and GOR**. The support for all hypotheses underscores the importance of:**Cognitive Development** (GEM) in sustainability education,**Emotional Engagement** (GEP) as a motivational force, and**Opportunity Recognition** (GOR) as a strategic skill.Future research should explore **cultural moderators** and **behavioral outcomes** (e.g., actual green venture creation). Practically, these findings call for **policy interventions** that integrate sustainability into entrepreneurial education globally.

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