

ENTREPRENEURIAL EDUCATION, INSTITUTIONAL SUPPORT, AND OBSTACLES: DETERMINANTS OF RESOURCE-ORIENTED ENTREPRENEURIAL INTENTIONS IN HIGHER EDUCATION

SITI NUR `ATIKAH ZULKIFFLI^{1*}, GHULAM MUJTABA¹, SITI FALINDAH PADLEE¹, WAN NORHAYATI MOHAMED¹, NAJAHUL KAMILAH AMINY SUKRI¹, MUHAMMAD FIKKRI ZAINAL EFENDI¹ AND WALEED KHALID²

¹Faculty of Business, Economics and Social Development, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia

²WK Fabric Pvt. Ltd., Bakshupura, 50700 Gujrat, Pakistan

*Corresponding author: atikahzulkiffli@umt.edu.my

ARTICLE INFO

Article History:

Received: 2 March 2025

Revised: 8 November 2025

Accepted: 12 November 2025

Published: 15 August 2026

Keywords:

Entrepreneurial education, entrepreneurial intention, educational institutions, entrepreneurial obstacles, resource efficiency

ABSTRACT

Pakistan continues to face critical natural resource challenges, including water scarcity, inefficient waste management, and unsustainable energy use, posing serious risks to economic resilience and environmental stability. Addressing these issues requires strategic integration of higher education into national frameworks for resource planning, utilisation, and management. This study examines how entrepreneurial education and institutional support influence the formation of entrepreneurial intentions, prioritising resource efficiency among final-year undergraduate business students at private universities in Punjab, Pakistan. Grounded in Social Cognitive Theory and the Natural Resource-Based View, the study employed a quantitative design using survey data from 755 respondents. Partial Least Squares Structural Equation Modelling (PLS-SEM), using SmartPLS 4, was used to test the hypothesised relationships. Results indicate that both entrepreneurial education and institutional support significantly enhance students' intentions to establish ventures designed to optimise natural resource use, reduce waste, and adopt sustainable production practices. However, these effects are diminished by entrepreneurial obstacles such as restricted access to green technologies, inadequate sustainability-focused mentorship, and limited exposure to resource-efficient business models. The findings underscore the need for curriculum reform and institutional frameworks that embed entrepreneurship education into national resource management policies, strengthen innovation ecosystems, and promote circular-economy practices. This alignment can enable higher education institutions to contribute directly to Sustainable Development Goal 12 (SDG 12) on responsible consumption and production, while advancing Pakistan's long-term objectives for natural resource conservation and sustainable economic development.

© UMT Press

Introduction

Pakistan is experiencing intensifying pressures on its natural resources, including severe water scarcity, inefficient waste management systems, unsustainable energy consumption, and degradation of agricultural land and biodiversity. These challenges threaten ecological stability, human well-being, and long-term economic

resilience. Addressing such complex issues requires integrated strategies that combine environmental stewardship with economic development. This approach is particularly essential in resource-constrained contexts where the efficient planning, utilisation, and

management of natural resources is critical for sustainable growth.

Furthermore, within this framework, entrepreneurial education in higher education institutions has emerged as a promising mechanism for building human capacity to address natural resource challenges through innovation, resource efficiency, and sustainable business practices (Peprah *et al.*, 2020; Medase *et al.*, 2023). Entrepreneurship oriented towards natural resource efficiency can play a transformative role in reducing waste, conserving energy and water, and enhancing the productive use of materials. When higher education institutions embed principles of sustainability and resource stewardship into entrepreneurial curricula, graduates are better equipped to develop ventures that align economic viability with environmental responsibility (Shahzad *et al.*, 2021; Fanea-Ivanovici & Baber, 2022). Thus, such ventures can contribute to circular economy transitions, strengthen local livelihoods, and address pressing national and global sustainability priorities (Munawar *et al.*, 2023).

Punjab, the geographic focus of this study, illustrates both the urgency of and opportunities for resource-oriented entrepreneurship. The province generates approximately 35% of Pakistan's municipal solid waste and faces persistent environmental pressures. Concurrently, it is home to innovative student-led projects in recycling, clean technology, and sustainable agribusiness (Soomro *et al.*, 2020; Shahzad *et al.*, 2021). By leveraging entrepreneurial education to build competencies in resource management, higher education institutions can prepare graduates to initiate ventures that reduce waste and optimise resource use. These efforts can contribute to the Sustainable Development Goals (SDGs) on responsible consumption and production (SDG 12), decent work and economic growth (SDG 8), and industry, innovation, and infrastructure (SDG 9).

However, despite the recognised potential of entrepreneurial education for advancing sustainability goals, structural and institutional

barriers hinder the translation of entrepreneurial intentions into resource-efficient practices. These barriers include limited access to green financing, insufficient mentorship for eco-venturing, and inadequate integration of resource management themes into curricula (Agrawal *et al.*, 2024). Hence, overcoming these challenges requires coordinated interventions involving curriculum redesign, institutional support mechanisms, and enabling policy frameworks. Emerging national initiatives such as Uraan Pakistan's Sustainable Development and Green Energy infrastructure pillar, demonstrate growing systemic interest in aligning education, entrepreneurship, and resource planning, utilisation, and management (Ministry of Planning, Development, and Special Initiatives, 2024).

In particular, this study applies Social Cognitive Theory (Bandura, 2001) and the Natural Resource-Based View (Hart, 1995; Etzion, 2007; Hart & Dowell, 2011) to examine how entrepreneurial education and institutional support influence sustainability-oriented entrepreneurial intentions among final-year undergraduate business students in private universities in Punjab, Pakistan. The study also investigates how entrepreneurial obstacles moderate these relationships. Social Cognitive Theory explains how personal, behavioural, and environmental factors interact to shape entrepreneurial action in resource-constrained contexts.

In contrast, the Natural Resource-Based View emphasises how educational and institutional resources, when aligned with environmental objectives, can be transformed into strategic capabilities for eco-innovation and sustainable competitive advantage. By situating entrepreneurial intention within a natural resource management framework, this study addresses a critical gap in empirical research on the linkages among higher education, entrepreneurship, and sustainable resource utilisation in developing economies. In the context of Pakistan, there remains limited empirical evidence on how higher education can foster entrepreneurship that advances resource planning, utilisation, and sustainable development.

Materials and Methods

Study Area

This study was conducted in Punjab, Pakistan's most populous province, which accounts for approximately 53% of the country's population and contributes significantly to the national Gross Domestic Product (GDP). Punjab faces persistent environmental pressures, including municipal solid waste generation exceeding 20,000 tonnes per day, widespread water scarcity, unsustainable energy consumption, and land degradation (Soomro *et al.*, 2020; World Bank, 2025). Additionally, the region demonstrates significant potential for resource-oriented entrepreneurship, with emerging student-led initiatives in recycling, renewable energy, and sustainable agribusiness (Shahzad *et al.*, 2021). This context provides an ideal setting to examine how higher education can foster entrepreneurial intentions aligned with resource planning, utilisation, and sustainable development.

Research Design

A quantitative, cross-sectional survey design was employed to assess the relationships between entrepreneurial education, institutional support, entrepreneurial obstacles, and sustainability-oriented entrepreneurial intentions. The research integrated Social Cognitive Theory (Bandura, 2001) and the Natural Resource-Based View (Hart, 1995; Hart & Dowell, 2011) to frame the role of human, institutional, and environmental resources in fostering eco-entrepreneurship. Notably, this combination of theoretical lenses

is increasingly applied in entrepreneurship and sustainability studies to explain capability development in resource-constrained contexts (Somwethee *et al.*, 2023; Crick & Crick, 2024).

Conceptual Framework and Hypotheses Development

To guide this study, a conceptual framework was developed that integrates Social Cognitive Theory and the Natural Resource-Based View. As illustrated in Figure 1, the framework illustrates the relationships between entrepreneurial education, institutional support, entrepreneurial obstacles, and entrepreneurial intentions.

Based on this framework, the following hypotheses were formulated:

- Hypothesis 1, *H1*: Entrepreneurial education positively influences students' entrepreneurial intentions.
- Hypothesis 2, *H2*: Educational institutions positively influence students' entrepreneurial intentions.
- Hypothesis 3, *H3*: Entrepreneurial obstacles significantly moderate the relationship between entrepreneurial education and entrepreneurial intentions.
- Hypothesis 4, *H4*: Entrepreneurial obstacles significantly moderate the relationship between educational institutions and entrepreneurial intentions.

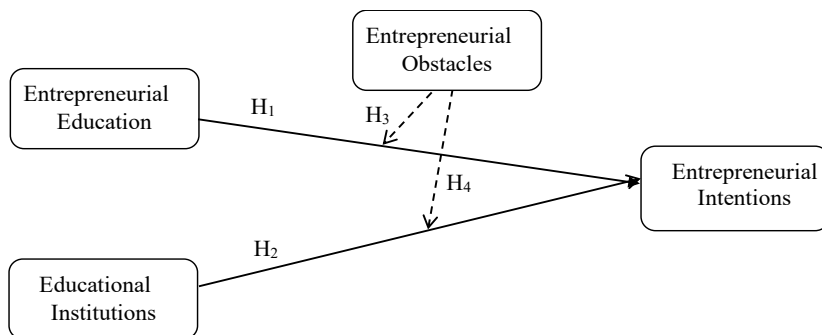


Figure 1: Conceptual framework of the study

Population and Sampling

The target population comprised final-year undergraduate business students enrolled in private universities in Punjab, as they represent a critical transition stage from academic learning to entrepreneurial action. A purposive sampling strategy was adopted to ensure participants had completed at least one entrepreneurship-related course, thereby possessing a foundational understanding of business creation and sustainability principles. Subsequently, the sample size was determined using Krejcie and Morgan's (1970) formula, which indicated a minimum requirement of 384 respondents. A total of 850 questionnaires were distributed, yielding 762 responses, of which 755 were retained after rigorous screening for completeness and validity. This final sample represents a response rate of approximately 90%, which exceeds the thresholds commonly recommended for quantitative research in higher education and entrepreneurship studies (Krejcie & Morgan, 1970; Hair *et al.*, 2021).

Instrument Development

The survey instrument consisted of five sections: Demographic information, entrepreneurial education, institutional support, entrepreneurial obstacles, and sustainability-oriented entrepreneurial intention. All constructs were measured using validated multi-item scales adapted from previous studies (Liñán & Chen, 2009; Nabi *et al.*, 2017; Shahzad *et al.*, 2021). Modifications were made to align items with the context of resource planning, utilisation, and management in Pakistan. Responses were recorded on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Furthermore, content validity was ensured through expert review by three academics in entrepreneurship and sustainability research. At the same time, a pilot test with 30 students confirmed the clarity and reliability of the items (Cronbach's $\alpha > 0.70$) (Hair *et al.*, 2021).

Data Collection Procedure

Data were collected between March and May 2023 using both online and paper-based questionnaires to ensure accessibility for students across urban and semi-urban campuses. Participation was voluntary, and informed consent was obtained from all respondents in accordance with established ethical research protocols. Anonymity and confidentiality were safeguarded by assigning unique respondent codes, and all data were stored securely in password-protected files accessible only to the research team (Bryman, 2021).

Data Analysis

Partial Least Squares Structural Equation Modelling (PLS-SEM) using SmartPLS 4.0 was employed to test the hypothesised relationships. This method is appropriate for predictive modelling and theory development in studies involving complex, multi-path relationships and relatively small to medium sample sizes (Hair *et al.*, 2021). The analysis followed a two-step approach. The first step was the assessment of the measurement model (reliability, convergent validity, and discriminant validity), and the second was the evaluation of the structural model (path coefficients, coefficient of determination [R^2], and effect sizes [f^2]). Bootstrapping with 5,000 resamples was conducted to assess the significance of the path estimates.

Results

Demographic Profile of the Respondents

A total of 755 valid responses were collected from final-year undergraduate business students enrolled at 10 private universities in Punjab, Pakistan. The sample reflects a balanced representation across institutional types, with each university contributing between 8% and 12% of the total respondents (Table 1). This distribution enhances the reliability of the findings by reducing institutional bias and ensuring generalisability within the provincial context (Sekaran & Bougie, 2016; Bryman, 2021).

Table 1: Demographic profile of respondents ($n = 755$)

Category	Frequency	Percentage (%)
Gender		
Male	474	62.8
Female	281	37.2
Academic specialisation		
Accounting	154	20.4
Business Studies	175	23.2
Human Resource Management	141	18.7
Marketing	136	18.0
Finance	149	19.7
Institutional affiliation		
The University of Lahore	86	11.4
Gift University	91	12.1
University Management and Technology	71	9.4
University of Central Punjab	84	11.1
The Commission on Science and Technology for Sustainable Development	61	8.1
Superior University	67	8.9
The Foundation for Advancement of Science and Technology	81	10.7
The Shaheed Zulfikar Ali Bhutto Institute of Science and Technology	71	9.4
National College of Business Administration and Economics	66	8.7
Lahore University of Management Sciences	77	10.2
Entrepreneurial intention		
Yes	357	47.3
No	398	52.7

Respondents represented a diverse range of academic specialisations, including accounting, business studies, human resource management, marketing, and finance. This diversity is significant because entrepreneurial orientation and sustainability awareness can vary across disciplines, influencing the propensity to integrate resource-efficient practices in future ventures (Nabi *et al.*, 2018). The gender distribution comprised 62.8% male and 37.2% female participants, reflecting broader patterns in Pakistani higher education enrolment, where male students continue to dominate in business

and management disciplines (Shaukat *et al.*, 2014; Rana *et al.*, 2024).

Notably, 47.3% of the participants reported a clear intention to engage in entrepreneurial activities after graduation. This proportion aligns with global trends that link entrepreneurial intention among youth to both economic necessity and perceived opportunities in emerging markets (International Labour Office, 2020; Mehboob *et al.*, 2025). In Punjab, such intentions have additional implications for sustainable development, given the province's environmental context. Punjab generates over

one-third of Pakistan's municipal solid waste and faces persistent challenges related to water scarcity, inefficient waste management, and resource over-exploitation (Zafar *et al.*, 2024). Simultaneously, the region has emerged as a hub for student-led green innovation initiatives, including recycling projects, renewable energy prototypes, and community-based environmental awareness campaigns (Khan *et al.*, 2022; Rana *et al.*, 2024).

Consequently, by capturing data from students in a region that is both resource-constrained and innovation-active, the study situates entrepreneurial intention within a real-world context where business creation is inextricably linked to natural resource planning, utilisation, and management. This demographic profile, therefore, provides a relevant foundation for analysing how entrepreneurial education, institutional support, and perceived obstacles shape the capacity of future graduates to establish ventures that contribute to resource efficiency and sustainability (Nabi *et al.*, 2018; Mehboob *et al.*, 2025).

Measurement Model Assessment

The study employed SmartPLS 4 to evaluate the measurement model and assess the reliability and validity of each construct. Following Hair *et al.* (2021), this assessment included analysis of indicator loadings, Composite Reliability (CR), Average Variance Extracted (AVE), and discriminant validity. All constructs were modelled reflectively.

Construct Reliability and Sustainability Alignment

Factor loadings for the entrepreneurial education, educational institutions, entrepreneurial obstacles, and entrepreneurial intentions constructs ranged from 0.613 to 0.835. However, although a few indicators were slightly below the recommended threshold of 0.708, all constructs had AVEs above 0.50, confirming acceptable convergent validity (Hair *et al.*, 2021). CR values between 0.765 and 0.868 indicate strong internal consistency, demonstrating that the

measurement model reliably captures the latent constructs.

Specifically, these constructs were designed to encompass general entrepreneurial capabilities, as well as competencies directly relevant to sustainable resource management. The entrepreneurial education construct, for example, incorporated modules on energy efficiency practices, conducting waste audits for operational optimisation, and integrating renewable energy into business processes. This design ensures that the measured education variable reflects both entrepreneurial skills and the capacity to plan and utilise natural resources responsibly.

In this study, entrepreneurial intentions are operationalised as students' motivational readiness and willingness to establish ventures that optimise resource utilisation, minimise environmental impact, and contribute to sustainable development. The reliability and validity metrics confirm that the indicators are both statistically sound and conceptually aligned with the study's aim of assessing how educational and institutional factors influence the formation of entrepreneurial intentions within a natural resource management context.

Convergent Validity Results

Convergent validity was confirmed through standardised factor loadings, CR, and AVE. All constructs exceeded the AVE benchmark of 0.50, while CR values ranged from 0.765 to 0.868, demonstrating strong internal consistency (Hair *et al.*, 2021). The measures for entrepreneurial education and educational institutions were intentionally developed to capture sustainability-oriented dimensions. These dimensions include knowledge of environmentally responsible entrepreneurship, promotion of green business practices, and readiness to address environmental challenges through innovation. Moreover, the dimensions reflect a strategic role for higher education and institutional support in fostering ventures that align with efficient resource utilisation, reduced environmental footprint, and integration of

circular economy principles. The dependent variable, entrepreneurial intentions, represents students' commitment to creating enterprises that employ resource-efficient operations and contribute to broader natural resource management objectives.

Discriminant Validity Assessment

Discriminant validity was assessed using the Heterotrait-Monotrait Ratio (HTMT). As depicted in Table 3, all HTMT values were below the conservative threshold of 0.85, confirming that the constructs are conceptually

Table 2: Measurement model results

Variable	Items	Loading	CR	AVE
Entrepreneurial education	EE1: I believe that entrepreneurial education made me more interested in becoming an entrepreneur who addresses environmental challenges.	0.718	0.817	0.563
	EE2: Through entrepreneurship education, my knowledge in environmentally responsible entrepreneurship has improved.	0.733		
	EE3: I believe that entrepreneurial education will help me deal with unexpected environmental changes.	0.827		
	EE4: I believe that entrepreneurship education makes me innovative in making decisions that also consider ecological and/or social impacts.	0.792		
	EE5: My lower entrepreneurial intention, especially in eco-friendly business, is due to a poor entrepreneurial education.	0.673		
Entrepreneurial obstacles	EO1: Negative attitudes towards risk-taking may cause low entrepreneurial intention.	0.814	0.868	0.569
	EO2: My prior entrepreneurial experience may lead to lower entrepreneurial interest.	0.810		
	EO3: Lack of knowledge about supporting centres can stop me from starting a business.	0.613		
	EO4: Lack of financial support from institutions is a major obstacle to starting a business.	0.835		
	EO5: A lack of family business experience can be a hurdle to starting a business.	0.672		
Educational institutions	EI1: The university atmosphere promotes students' entrepreneurship with a focus on environmental responsibility.	0.722	0.791	0.511
	EI2: My university helped me meet successful entrepreneurs, including those involved in eco-friendly ventures, who motivated me.	0.826		
	EI3: My university organises entrepreneurial conferences and seminars that cover green business topics.	0.831		
	EI4: I am satisfied with the university's entrepreneurship programme, especially its integration of environmental concerns.	0.748		

Entrepreneurial intention	INT1: I have a strong intention to choose entrepreneurship in the future, with a focus on sustainable resource use.	0.713	0.765	0.501
	INT2: My professional objective is to become an entrepreneur who integrates resource efficiency into business operations.	0.676		
	INT3: I have meaningful thoughts about choosing entrepreneurship in the future, especially ventures that optimise resource utilisation.	0.721		
	INT4: I am willing to pursue entrepreneurship as a career despite the risks involved	0.744		
	INT5: After attending an entrepreneurship course, my intention to become an entrepreneur who adopts sustainable practices increased.	0.719		

Table 3: Heterotrait-Monotrait Ratio (HTMT)

Construct Pair	HTMT Value
Entrepreneurial Education ↔ Educational Institutions	0.822
Entrepreneurial Education ↔ Entrepreneurial Intention	0.805
Educational Institutions ↔ Entrepreneurial Intention	0.774
Entrepreneurial Obstacles ↔ Entrepreneurial Intention	0.553
Entrepreneurial Obstacles ↔ Entrepreneurial Education	0.332
Entrepreneurial Obstacles ↔ Educational Institutions	0.548

and statistically distinct. This is crucial for maintaining construct integrity when examining interactions that contribute to natural resource conservation and responsible consumption behaviours among emerging entrepreneurs.

The validated measurement model is illustrated in Figure 2, which shows standardised factor loadings and relationships among the constructs. The results confirm the robustness of the instrument in capturing the multidimensional influences shaping students' sustainable entrepreneurial intentions.

Structural Model Assessment: Collinearity Diagnostics

Prior to estimating the structural relationships, multicollinearity among the predictor constructs was examined using the Variance Inflation Factor (VIF). All VIF values reported in Table 4 are well below the recommended threshold of 3.3, indicating that each construct contributes unique explanatory power to the

prediction of entrepreneurial intention without inflating standard errors (Hair *et al.*, 2021). This result affirms that the model is free from multicollinearity concerns and is therefore suitable for subsequent hypothesis testing focused on sustainability-oriented entrepreneurial outcomes.

Structural Model Assessment: Coefficient of Determination (R^2)

The coefficient of determination for the endogenous construct, entrepreneurial intention, is 0.704. This value implies that 70.4% of the variance in students' intention to create ventures is accounted for by entrepreneurial education, institutional support, entrepreneurial obstacles, and their interaction terms (Table 5). According to the criteria outlined by Chin *et al.* (2010), this represents substantial predictive accuracy and underscores the relevance of educational and contextual variables in shaping environmentally responsible entrepreneurial behaviour.

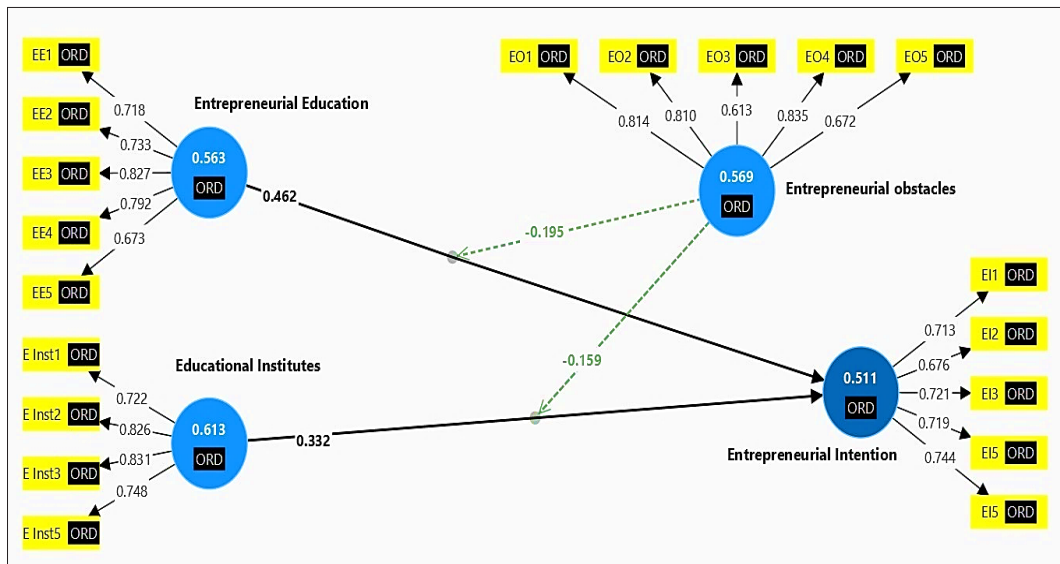


Figure 2: Measurement model demonstrating factor loadings and construct relationships

Table 4: Collinearity assessment (VIF values)

Predictor Variable	VIF
Entrepreneurial Education ↔ Educational Institutions	2.378
Educational Institutions ↔ Entrepreneurial Intention	2.311
Entrepreneurial Obstacles ↔ Entrepreneurial Intention	1.103
Entrepreneurial Obstacles × Entrepreneurial Education → Entrepreneurial Intention	2.176
Entrepreneurial Obstacles × Educational Institutions → Entrepreneurial Intention	2.183

Table 5: Coefficient of determination

Endogenous Variable	R ²
Entrepreneurial intention	0.704

Structural Model Assessment: Hypothesis Testing and Path Analysis

The structural model was assessed using a bootstrapping procedure with 5,000 resamples in SmartPLS 4. Table 6 presents the estimated path coefficients, *t*-values, and *p*-values for both direct and moderating effects, evaluated at the 5% significance level (Hair *et al.*, 2021). For the direct effects, entrepreneurial education demonstrated a positive and statistically significant influence on students' entrepreneurial intention ($\beta = 0.462$, $t = 2.896$), thereby supporting Hypothesis 1. This result highlights the pivotal role of sustainability-integrated

entrepreneurship curricula in motivating students to initiate ventures that optimise resource utilisation, minimise environmental impact, and incorporate innovative green business practices. Similarly, educational institutions exerted a significant positive effect on entrepreneurial intention ($\beta = 0.332$, $t = 2.184$), confirming Hypothesis 2. This finding emphasises the role of supportive institutional environments in fostering exposure to green innovation, circular economy principles, and responsible natural resource management.

Furthermore, with respect to moderating effects, entrepreneurial obstacles significantly weakened the relationship between entrepreneurial education and entrepreneurial intention ($\beta = -0.195$, $t = 1.987$). The findings support Hypothesis 3, indicating that

Table 6: Hypotheses testing results

Hypotheses	Path	T-value	Path Coefficient (β)	P-value	Decision
Direct effects					
H1	Entrepreneurial Education → Entrepreneurial Intention	2.896	0.462	0.002	Accepted
H2	Educational Institutions → Entrepreneurial Intention	2.184	0.332	0.015	Accepted
Moderating effects					
H3	Entrepreneurial Obstacles x Entrepreneurial Education → Entrepreneurial Intention	1.987	-0.195	0.000	Accepted
H4	Entrepreneurial Obstacles x Educational Institutions → Entrepreneurial Intention	1.896	-0.159	0.001	Accepted
Interaction effects					
	Entrepreneurial Obstacles → Entrepreneurial Intention	2.437	-0.289	0.007	Accepted (Control Path)

entrepreneurial obstacles negatively moderate the relationship between entrepreneurial education and entrepreneurial intention. Likewise, the positive impact of educational institutions on entrepreneurial intention was also negatively moderated by entrepreneurial obstacles ($\beta = -0.159$, $t = 1.896$), thereby validating Hypothesis 4. These outcomes indicate that structural, financial, and experiential barriers can substantially diminish the effectiveness of educational interventions, even when these are designed to promote sustainability.

Additionally, a significant negative control path emerged from entrepreneurial obstacles to entrepreneurial intention ($\beta = -0.289$, $t = 2.437$). This finding suggests that constraints such as limited access to financial capital, lack of prior entrepreneurial experience, and inadequate family or community support serve as strong deterrents to pursuing environmentally responsible entrepreneurship. Overall, these findings underscore the need for policy and institutional strategies that simultaneously address contextual challenges and strengthen

sustainability-oriented entrepreneurship education to maximise the potential for youth-led, resource-efficient ventures.

The significant positive paths for entrepreneurial education and institutional support indicate that sustainability-oriented pedagogy and supportive campus ecosystems can substantially enhance students' likelihood of pursuing ventures aimed at reducing waste, adopting circular economy practices, and optimising resource utilisation. In contrast, the moderating role of entrepreneurial obstacles suggests that even well-designed educational interventions may fall short in generating sustainable entrepreneurial action when students face structural or psychological constraints. These results emphasise the importance of integrated strategies that combine environmentally focused education with targeted support measures, such as seed funding for eco-startups or mentorship schemes dedicated to natural resource conservation.

Figure 3 presents the validated structural model, including the standardised path coefficients and the explained variance (R^2) for

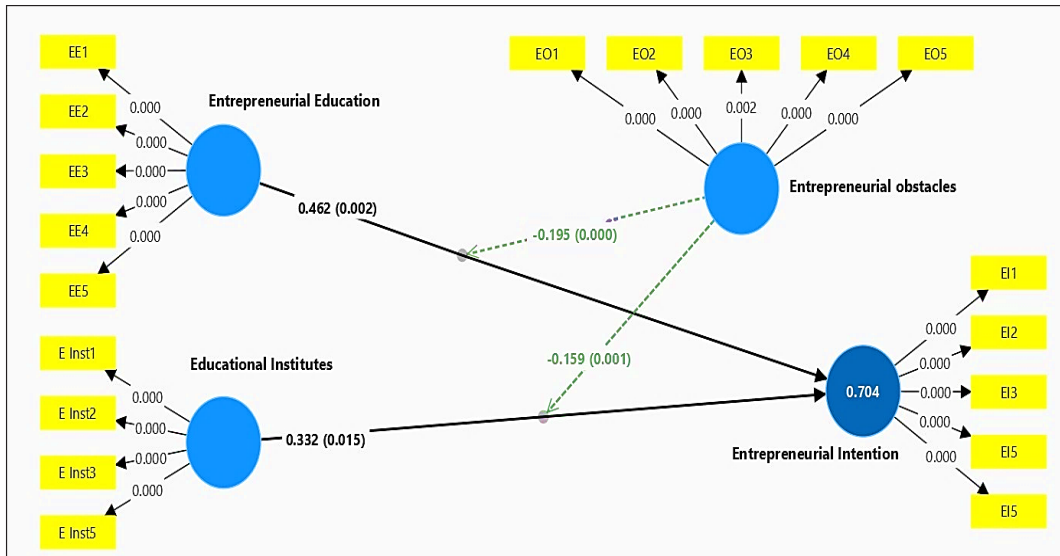


Figure 3: Structural model illustrating path coefficients and explained variance (R^2) for resource-efficient entrepreneurial intention

entrepreneurial intention. Overall, the model shows that higher education institutions in resource-constrained regions such as Punjab can nurture resource-efficient entrepreneurial intentions, provided they address contextual barriers that limit students' ability to turn environmental opportunities into viable, sustainable business ventures.

Discussion

This study provides empirical evidence on the factors influencing entrepreneurial intentions among private university students in Pakistan, using Social Cognitive Theory and the Natural Resource-Based View as guiding frameworks. The findings confirm the pivotal role of entrepreneurial education and supportive institutional environments in motivating students to pursue ventures that align with sustainable resource management and natural resource conservation. Concurrently, entrepreneurial obstacles emerge as significant moderating factors that reduce the effectiveness of these positive drivers, underscoring the importance of addressing both enabling and constraining conditions. By situating entrepreneurial

development within a sustainability-oriented framework, the study demonstrates how higher education can facilitate student-led initiatives in circular economy practices, resource efficiency, and green innovation. This expands current understanding of how academic ecosystems can empower future entrepreneurs to address environmental challenges while contributing to national and global sustainability goals.

Hypotheses 1 and 2: Entrepreneurial Education, Educational Institutions, and Entrepreneurial Intention

The findings from this study confirm Hypothesis 1, demonstrating that entrepreneurial education has a positive and statistically significant influence on students' intention to establish new ventures ($\beta = 0.462$, $t = 2.896$, $p < 0.05$). This relationship aligns with previous research demonstrating that structured coursework, workshops, and experiential learning enhance students' entrepreneurial motivation, opportunity recognition, and self-efficacy (Hassan *et al.*, 2020; Shahzad *et al.*, 2021; Munawar *et al.*, 2023). When such education is enriched with sustainability-oriented content, including life-cycle assessment, eco-design principles, and

sustainable supply chain mapping in line with SDG 12, it equips graduates with essential competencies in resource planning, utilisation efficiency, and management (León *et al.*, 2024; Valencia-Arias *et al.*, 2025). Notably, these skills enable future entrepreneurs to reduce ecological footprints, optimise the use of natural resources, and integrate innovative low-carbon business models. These skills ensure that entrepreneurial motivation is directed towards ventures that actively advance resource sustainability rather than treating it as a secondary consideration.

Additionally, entrepreneurial intention is shaped by broader institutional environments, as supported by Hypothesis 2, which showed that educational institutions significantly influence entrepreneurial intention ($\beta = 0.332$, $t = 2.184$, $p < 0.05$). This effect reflects the universities' capacity to act as incubators for sustainable entrepreneurship through access to mentorship, industry linkages, role models, and experiential learning opportunities (Kintu *et al.*, 2019; Nowiński *et al.*, 2019; Mujtaba *et al.*, 2025). Institutions that implement sustainability-oriented strategies such as green business incubators, eco-entrepreneurship laboratories, and community-based learning platforms, provide students with direct exposure to circular economy practices, resource-efficiency solutions, and ecosystem service enhancement projects (Wei *et al.*, 2019; Lamperti *et al.*, 2025). This exposure enhances entrepreneurial competencies and ensures that start-ups are better aligned with national priorities for resource management and environmental stewardship.

In the context of Pakistan's national sustainability agenda, both entrepreneurial education and institutional support emerge as complementary drivers of graduate capacity for resource-conserving business practices. However, while education develops the knowledge base and technical skills required for sustainable innovation, institutional frameworks offer the infrastructure, networks, and policy alignment necessary for implementation (Mehboob *et al.*, 2025). Collectively, they address critical national priorities outlined

in the National Sustainable Development Strategy, including water conservation, waste minimisation, and energy-efficient production systems. These results also resonate with findings from South Asia, where youth unemployment and environmental degradation represent interconnected challenges, highlighting entrepreneurship as a dual pathway to economic opportunity and ecological restoration (Fanea-Ivanovici & Baber, 2022; Albhirat *et al.*, 2024).

Nevertheless, despite these positive associations, the potential of higher education to catalyse sustainable entrepreneurship in Pakistan remains constrained by outdated curricula, limited integration of sustainability frameworks, and underinvestment in eco-entrepreneurship infrastructure (Zreen *et al.*, 2019; Noor *et al.*, 2020; Mehboob *et al.*, 2025). Addressing these gaps requires coordinated action between universities, policymakers, and development agencies to establish supportive ecosystems that embed natural resource efficiency into business incubation and provide sustainability-focused seed funding and mentorship. Such reforms would enhance graduate employability and foster the creation of ventures that contribute to long-term environmental resilience and sustainable economic growth.

Hypotheses 3 and 4: Moderating Role of Entrepreneurial Obstacles on Entrepreneurial Intention

The moderation analysis supports Hypothesis 3, indicating that entrepreneurial obstacles significantly weaken the relationship between entrepreneurial education and entrepreneurial intention. This finding suggests that even when students acquire sustainability-related skills through coursework and experiential learning, structural and operational barriers can limit the translation of knowledge into resource-efficient business ventures. These barriers include limited access to eco-friendly technologies, weak institutional incentives for green innovation, and inadequate market infrastructure for sustainable products (Wardana *et al.*, 2020; Shahin *et al.*, 2024; Lamperti *et al.*, 2025).

From a resource management perspective, these obstacles disrupt the progression from skill acquisition to the implementation of practices such as water-saving irrigation, closed-loop manufacturing, and waste-to-energy solutions. As a result, graduates' capacity to contribute meaningfully to national sustainability objectives is reduced. Specifically, when these obstacles are high, the beneficial impact of education on students' entrepreneurial motivation is weakened. This effect is reflected by a negative path coefficient ($\beta = -0.195$, $t = 1.987$), indicating that higher entrepreneurial obstacles weaken the positive influence of entrepreneurial education on entrepreneurial intention. This moderating relationship is illustrated in Figure 4.

A similar trend is observed in the interaction between institutional support and entrepreneurial intention. The presence of entrepreneurial obstacles also reduces the positive influence of educational institutions on students' entrepreneurial aspirations. This relationship is reflected by a negative path coefficient ($\beta = -0.159$, $t = 1.896$), indicating that entrepreneurial obstacles weaken the positive influence of educational institutions

on entrepreneurial intention. This moderating relationship is illustrated in Figure 5. Although institutional support provides access to incubators, mentorship, and sustainability-focused funding, these resources may not be sufficient to fully overcome the negative effects of structural and systemic barriers on green entrepreneurship in Pakistan. In the Pakistani context, persistent issues such as policy fragmentation, limited cross-sectoral collaboration, and weak enforcement of environmental regulations continue to limit the scalability of resource-conserving enterprises, even when institutional frameworks are in place.

These findings are especially relevant in Pakistan, where most private universities have yet to establish comprehensive support structures for sustainability-driven entrepreneurship (Shahzad *et al.*, 2021; Mehboob *et al.*, 2025). Many campuses lack green incubators, circular economy hubs, or partnerships with environmental organisations that could provide hands-on learning experiences (Mhatre *et al.*, 2023; León *et al.*, 2024; Mawardi *et al.*, 2025; Mehboob *et al.*, 2025). Consequently, students who are otherwise motivated often lack the institutional and environmental infrastructure

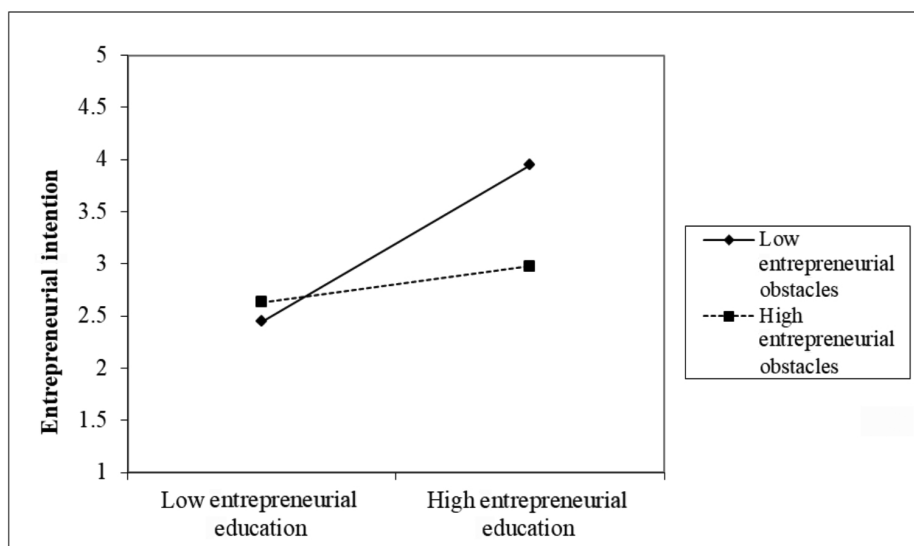


Figure 4: Moderating effect of entrepreneurial obstacles on the relationship between entrepreneurial education and entrepreneurial intention

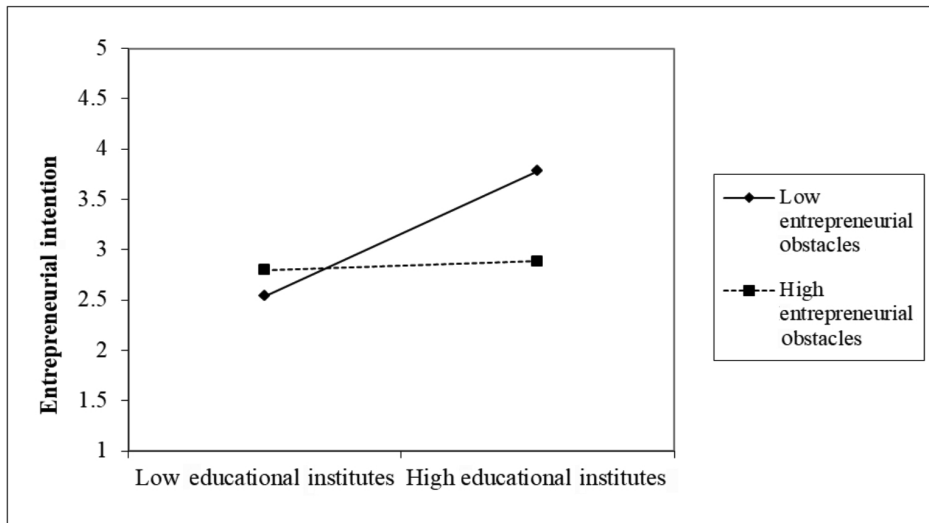


Figure 5: Moderating effect of entrepreneurial obstacles on the relationship between educational institutions and entrepreneurial intention

necessary to initiate ventures that contribute to waste minimisation, clean energy, or ecosystem restoration (Ibrahim *et al.*, 2021; Albhirat *et al.*, 2024; He *et al.*, 2024). The direct negative effect of entrepreneurial obstacles on entrepreneurial intention ($\beta = -0.289$, $t = 2.437$) further reinforces the importance of addressing these constraints among university students. Furthermore, students facing financial uncertainty, fear of failure, or a lack of eco-entrepreneurial role models are less likely to engage in business activities that support environmental goals such as reducing solid waste, improving energy efficiency, or enhancing ecosystem services (Butkouskaya *et al.*, 2020; Soomro *et al.*, 2020; Khan *et al.*, 2022). These findings have direct implications for advancing SDG 12, which emphasises responsible consumption and production.

To overcome these limitations, higher education institutions in Pakistan must take deliberate steps to enable sustainability-oriented entrepreneurship. These approaches include integrating resource-efficiency modules into business programmes, offering access to green technology labs, establishing financial support schemes for student-led environmental

ventures, and creating networks with public and private stakeholders involved in environmental management. Institutions should also promote policy literacy among students by exposing them to national environmental strategies and global frameworks such as the United Nations Environment Programme (Noor *et al.*, 2020; Tanveer *et al.*, 2021; Mehboob *et al.*, 2025).

In conclusion, the moderating role of entrepreneurial obstacles reveals a critical tension between entrepreneurial capacity and systemic barriers. Without comprehensive institutional interventions, the potential of university students to contribute meaningfully to natural resource conservation and sustainable development will remain unrealised. Thus, addressing these barriers is essential for transforming entrepreneurship education into a practical mechanism for environmental protection and long-term ecological resilience in Pakistan. Collectively, these findings illustrate that while entrepreneurial education and institutional support play vital roles in shaping entrepreneurial intention, their true value emerges when such intentions are directed towards ventures that optimise resource use, minimise waste, and foster environmental

sustainability. This study demonstrates that aligning entrepreneurship development strategies with resource planning, utilisation, and management benefits economic outcomes and strengthens environmental resilience. Addressing entrepreneurial obstacles through targeted interventions such as seed funding for eco-startups, mentorship programmes in natural resource sectors, and policy advocacy can enable youth-driven enterprises to become active agents in achieving SDG 12 on responsible consumption and production.

Notably, this study's findings highlight both the opportunities and constraints facing sustainability-oriented entrepreneurship in Pakistan. Entrepreneurial education and institutional support provide students with the knowledge, skills, and networks needed to initiate ventures that reduce waste, optimise resource use, and adopt sustainable business models. However, systemic barriers such as financial limitations, weak policy implementation, and limited access to green technologies continue to undermine these positive effects. This duality underscores that while the foundations for resource-oriented entrepreneurship exist within higher education, their effectiveness depends on addressing contextual challenges that hinder students from translating intentions into practice.

Overall, this study demonstrates that entrepreneurial education and institutional support can significantly strengthen students' capacity to establish ventures that contribute to environmental sustainability and natural resource conservation. Nevertheless, structural, financial, and psychological obstacles persist and continue to limit the realisation of these intentions. Tackling these barriers requires aligning curriculum reform, institutional support systems, and policy measures that deliberately target sustainability-driven entrepreneurship. By embedding entrepreneurship within a sustainability framework, universities can nurture graduates who are motivated to innovate and equipped to advance national priorities in resource management and sustainable development.

Conclusions

This study examined how entrepreneurial education and institutional support shape the entrepreneurial intentions of private university students in Punjab, Pakistan, through the lenses of Social Cognitive Theory and the Natural Resource-Based View. The findings confirm that education and supportive institutional environments significantly enhance students' intentions to pursue ventures that contribute to natural resource efficiency, waste reduction, and sustainable development.

However, entrepreneurial obstacles such as limited access to financing, weak sustainability mentorship, and inadequate policy alignment were identified as weakening these positive effects. These obstacles highlight the critical tension between capacity building and systemic barriers. These results suggest that while universities can play a central role in equipping students with sustainability-oriented entrepreneurial skills, their impact will remain constrained unless structural and psychological barriers are addressed.

Therefore, it is recommended that universities and policymakers integrate resource-focused entrepreneurial curricula with targeted institutional support mechanisms such as green incubators, seed funding, and sustainability-focused mentorship. These initiatives can enable young entrepreneurs to translate their intentions into ventures that strengthen Pakistan's long-term resource resilience.

Acknowledgements

This publication was supported by the Faculty of Business, Economics, and Social Development, Universiti Malaysia Terengganu, through Postgraduate Bench Fees. Sincere appreciation goes to the FBESD Postgraduate Coordinators (2022–2025) for their outstanding dedication throughout this publication project. Sincere appreciation is also extended to all respondents for their time, effort, and willingness to participate in this research.

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

References

- Agrawal, R., Samadhiya, A., Banaitis, A., & Kumar, A. (2024). Entrepreneurial barriers in achieving sustainable business and cultivation of innovation: A resource-based view theory perspective. *Management Decision*, 63(4), 1207–1228. <https://doi.org/10.1108/MD-11-2023-2032>
- Albhirat, M. M., Rashid, A., Rasheed, R., Rasool, S., Zulkiffli, S. N. A., Zia-ul-Haq, H. M., & Mohammad, A. M. (2024). The PRISMA statement in enviropreneurship study: A systematic literature and a research agenda. *Cleaner Engineering and Technology*, 18, 100721. <https://doi.org/10.1016/j.clet.2024.100721>
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52(1), 1–26. <https://doi.org/10.1146/annurev.psych.52.1.1>
- Bryman, A. (2021). *Social research methods* (6th ed.). Oxford University Press.
- Butkouskaya, V., Romagosa, F., & Noguera, M. (2020). Obstacles to sustainable entrepreneurship amongst tourism students: A gender comparison. *Sustainability*, 12(5), 1812. <https://doi.org/10.3390/su12051812>
- Chin, W. W., Thatcher, J. B., & Wright, R. T. (2010). Assessing common method bias: Problems with the ULMC technique. *MIS Quarterly*, 34(2), 473–495. <https://doi.org/10.2307/41703491>
- Crick, J. M., & Crick, D. (2024). Student entrepreneurs with triple bottom line objectives: Capabilities in creating viable business models. *Education + Training*, 66(9), 1230–1245. <https://doi.org/10.1108/ET-04-2024-0175>
- Etzion, D. (2007). Research on organisations and the natural environment, 1992–present: A review. *Journal of Management*, 33(4), 637–664. <https://doi.org/10.1177/0149206307302553>
- Fanea-Ivanovici, M., & Baber, H. (2022). Sustainability at universities as a determinant of entrepreneurship for sustainability. *Sustainability*, 14(1), 454. <https://doi.org/10.3390/su14010454>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Executing and interpreting applications of PLS-SEM: Updates for family business researchers. *Journal of Family Business Strategy*, 12(3), 100392. <https://doi.org/10.1016/j.jfbs.2020.100392>
- Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, 20(4), 986–1014. <https://doi.org/10.5465/amr.1995.9512280033>
- Hart, S. L., & Dowell, G. (2011). A natural-resource-based view of the firm: Fifteen years after. *Journal of Management*, 37(5), 1464–1479. <https://doi.org/10.1177/0149206310390219>
- Hassan, A., Saleem, I., Anwar, I., & Hussain, S. A. (2020). Entrepreneurial intention of Indian university students: The role of opportunity recognition and entrepreneurship education. *Education + Training*, 62(7/8), 843–861. <https://doi.org/10.1108/ET-02-2020-0033>
- He, J., Wang, Z., Hu, H., & Fan, Z. (2024). Exploring the formation of sustainable entrepreneurial intentions among Chinese university students: A dual path moderated mediation model. *Sustainability*, 16(18), Article 8069. <https://doi.org/10.3390/su16188069>
- Ibrahim, A., Ijaz, M., & Shah, M. (2021). The essential of entrepreneurship inclination in higher learning institutions (HLI). *International Journal of Academic Research in Business and Social Sciences*, 11(7), 1677–1686. <https://doi.org/10.6007/IJARBS/v11-i7/10553>

- International Labour Office. (2020). *Global employment trends for youth 2020: Technology and the future of jobs*. ILO. https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40dgreports/%40dcomm/%40publ/documents/publication/wcms_737648.pdf
- Khan, S. U., Shah, S. I., & Ali, M. D. (2022). Understanding the entrepreneurial motivations and barriers for aspiring entrepreneurs: A case of religious education institutions' students in Pakistan. *Journal of Management Research*, 8(2), 96–128. <https://doi.org/10.1234/pjlaw.v2i02.69>
- Kintu, D., Kitaienge, K., & Ferej, A. (2019). An exploration of strategies for facilitating graduates' transition to the world of work: A case of technical, vocational education and training graduates in Uganda. *International Journal of Vocational Education and Training Research*, 5(1), 1–9. <https://doi.org/10.11648/j.ijvetr.20190501.11>
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610. <https://doi.org/10.1177/001316447003000308>
- Lamperti, S., Courrent, J.-M., & Sammut, S. (2025). Sustainability orientation in business incubators: Empirical evidence from France. *Journal of Business Research*, 194, 115377. <https://doi.org/10.1016/j.jbusres.2025.115377>
- León, M. Y. O., Ballesteros, M. A. A., Ramos Farroñán, E. V., Lezama, M. T. F., & Silva, J. M. D. (2024). Sustainable entrepreneurship: Key competencies determining entrepreneurial intention in Peruvian secondary students. *Sustainability*, 16(20), 9105. <https://doi.org/10.3390/su16209105>
- Liñán, F., & Chen, Y. W. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrepreneurship Theory and Practice*, 33(3), 593–617. <https://doi.org/10.1111/j.1540-6520.2009.00318.x>
- Mawardi, M. K., Noor, A. Y. M., Edityastono, L., Zulkiffli, S. N. A., & Mashahadi, F. (2025). Green entrepreneurship in the era of sustainability: The relationship between intent, institutional support, and student behavior. *Cogent Business & Management*, 12(1), Article 2460625. <https://doi.org/10.1080/23311975.2025.2460625>
- Medase, S. K., Ahali, A. Y., & Belitski, M. (2023). Natural resources, quality of institutions and entrepreneurship activity. *Resources Policy*, 83, 103592. <https://doi.org/10.1016/j.resourpol.2023.103592>
- Mehboob, K., Ali, M., Hassan, N., Mehboob, Z., Mushtaq, M. F., Ullah, R. H., Zahid Akhtar, M., Tariq, M. A., Parveen, K., & Mehboob, R. (2025). Exploring the landscape of entrepreneurship in Pakistan: A comparative analysis of perceptions, challenges, and the need for psychoeducational interventions in the academic sector. *Frontiers in Education*, 10, 1516734. <https://doi.org/10.3389/educ.2025.1516734>
- Mhatre, P., Gedam, V. V., Unnikrishnan, S., & Raut, R. D. (2023). Circular economy adoption barriers in built environment: A case of emerging economy. *Journal of Cleaner Production*, 392, 136201. <https://doi.org/10.1016/j.jclepro.2023>
- Ministry of Planning Development & Special Initiatives. (2024). *5Es framework to turnaround Pakistan*. Government of Pakistan. <https://www.pc.gov.pk/web/5Esframework>
- Mujtaba, G., Zulkiffli, S. N. A., Padlee, S. F., Mohamed, W. N., & Sukri, N. K. A. (2025). Impact of entrepreneurial inspiration, awareness, and skills on university students' entrepreneurial intentions: The mediating role of entrepreneurial education. *Administrative Sciences*, 15(1), 15. <https://doi.org/10.3390/admsci15010015>

- Munawar, S., Yousaf, H. Q., Ahmed, M., & Rehman, S. (2023). The influence of online entrepreneurial education on entrepreneurial success: An empirical study in Pakistan. *The International Journal of Management Education*, 21(1), 100752. <https://doi.org/10.1016/j.ijme.2022.100752>
- Nabi, G., Walmsley, A., Liñán, F., Akhtar, I., & Neame, C. (2018). Does entrepreneurship education in the first year of higher education develop entrepreneurial intentions? The role of theory of planned behavior and entrepreneurial self-efficacy. *Studies in Higher Education*, 43(3), 452–467. <https://doi.org/10.1080/03075079.2016.1177716>
- Noor, S., Lodhi, R. N., & Ahmad, M. (2020). Contributing factors of women entrepreneurs' business growth and failure in Pakistan. *International Journal of Business and Globalisation*, 25(4), 503–518. <https://doi.org/10.1504/IJBG.2020.109115>
- Nowiński, W., Haddoud, M. Y., Lančarič, D., Egerová, D., & Czeglédi, C. (2019). The role of inspiring role models in enhancing entrepreneurial intention. *Journal of Business Research*, 96, 183–193. <https://doi.org/10.1016/j.jbusres.2018.11.005>
- Peprah, A. A., & Adekoya, A. F. (2020). Entrepreneurship and economic growth in developing countries: Evidence from Africa. *Business Strategy and Development*, 3(3), 388–394. <https://doi.org/10.1002/bsd2.104>
- Rana, M. Q., Lee, A., Saher, N., & Shabbir, Z. (2024). Barriers to empowerment: Examining the transition of Pakistani women from higher education (HE) to professional life. *Social Sciences*, 13(10), 514. <https://doi.org/10.3390/socsci13100514>
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill-building approach* (7th ed.). Wiley.
- Shahin, V., Alimohammaddlou, M., & Abbasi, A. (2024). Identifying and prioritising the barriers to green innovation in SMEs and the strategies to counteract the barriers: An interval-valued intuitionistic fuzzy approach. *Technological Forecasting and Social Change*, 204, 124300. <https://doi.org/10.1016/j.techfore.2023.124300>
- Shahzad, F., Raza, S. A., Saleem, A., & Rashid, Q. U. A. (2021). What factors affect the entrepreneurial intention to start-ups? The role of entrepreneurial skills, propensity to take risks, and innovativeness in open business models. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(3), 173. <https://doi.org/10.3390/joitmc7030173>
- Shaukat, S., Siddiquah, A., & Pell, A. W. (2014). Gender discrimination in higher education in Pakistan: A survey of university faculty. *Eurasian Journal of Educational Research*, 56, 109–126. <http://dx.doi.org/10.14689/ejer.2014.56.2>
- Somwethee, P., Aujirapongpan, S., & Ru-Zhue, J. (2023). The influence of entrepreneurial capability and innovation capability on sustainable organisation performance: Evidence of community enterprise in Thailand. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(2), 100082. <https://doi.org/10.1016/j.joitmc.2023.100082>
- Soomro, B. A., Shah, N., & Fatima, T. (2020). Perceptions of young entrepreneurial aspirants towards sustainable entrepreneurship in Pakistan. *Kybernetes*, 50(7), 2134–2154. <https://doi.org/10.1108/apjie-12-2019-0093>
- Tanveer, M., Shah, S. Z. A., Sheikh, A. A., & Sajid, M. (2021). Educational entrepreneurship policy challenges and recommendations for Pakistani universities. *Academy of Strategic Management Journal*, 20(2), 1–15. <https://www.abacademies.org/articles/Educational-entrepreneurship-policy-challenges-and-recommendations-for-pakistani-universities-1939-6104-20-2-704.pdf>
- Valencia-Arias, A., Londoño-Celis, W., & Moya, L. P. (2025). Sustainable entrepreneurial intention in undergraduates: The influence

- of entrepreneurship education. *Discover Sustainability*, 6, Article 588. <https://doi.org/10.1007/s43621-025-01379-3>
- Wardana, L. W., Narmaditya, B. S., Wibowo, A., Mahendra, A. M., Wibowo, N. A., Harwida, G., & Rohman, A. N. (2020). The impact of entrepreneurship education and students' entrepreneurial mindset: The mediating role of attitude and self-efficacy. *Heliyon*, 6(9), e04922. <https://doi.org/10.1016/j.heliyon.2020.e04922>
- Wei, X., Liu, X., & Sha, J. J. F. (2019). How does the entrepreneurship education influence the students' innovation? Testing on the multiple mediation model. *Frontiers in Psychology*, 10, 1557. <https://doi.org/10.3389/fpsyg.2019.01557>
- World Bank. (2025, March 28). *Pakistan: World Bank supports Punjab's smog mitigation action plan with \$300 million concessional loan*. <https://www.worldbank.org/en/news/press-release/2025/03/27/pakistan-world-bank-supports-punjab-s-smog-mitigation-action-plan-with-300-million-concessional-loan>
- Zafar, A. M., Shahid, S., Nawaz, M. I., Mustafa, J., Iftikhar, S., Ahmed, I., Tabraiz, S., Bontempi, E., Assaf, M., Ghafoor, F., Al-Farraj, S., Sillanpää, M., & Souissi, S. (2024). Waste to energy feasibility, challenges, and perspective in municipal solid waste incineration and implementation: A case study for Pakistan. *Chemical Engineering Journal Advances*, 18, 100595. <https://doi.org/10.1016/j.cej.2024.100595>
- Zreen, A., Farrukh, M., Nazar, N., & Khalid, R. (2019). The role of internship and business incubation programs in forming entrepreneurial intentions: An empirical analysis from Pakistan. *Central European Management Journal*, 27(2), 97–113. <https://doi.org/10.7206/jmba.ce.2450-7814.255>