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Understanding Entrepreneurial Intentions Among University Students Through Self-Efficacy and Educational Support

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Abstract

Entrepreneurial intention (EI) remains a pivotal predictor of new venture creation and economic dynamism, particularly within the context of emerging economies characterized by structural unemployment, graduate surplus, and evolving institutional frameworks. Grounded in Ajzen's (1991) Theory of Planned Behavior (TPB), the present study investigates the determinants of entrepreneurial intention among university students across three major Pakistani universities, with particular emphasis on the mediating role of entrepreneurial self-efficacy (ESE) and the moderating influence of entrepreneurial education (EE). Data were collected from 487 final-year undergraduate and postgraduate students through a structured survey instrument employing a seven-point Likert scale. Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed using SmartPLS 4.0 to test the proposed conceptual model. The findings reveal that personal attitude toward entrepreneurship ($\beta = 0.342$, $p < .001$), subjective norms ($\beta = 0.218$, $p < .01$), and perceived behavioral control ($\beta = 0.391$, $p < .001$) exert significant positive effects on entrepreneurial intention. Entrepreneurial self-efficacy partially mediates the relationship between perceived behavioral control and EI (indirect effect = 0.187, 95% CI [0.113, 0.261]). Furthermore, entrepreneurial education significantly moderates the attitude–EI relationship, amplifying its positive effect at higher levels of EE (β_interaction = 0.156, $p < .05$). The study contributes to TPB-based entrepreneurial research by demonstrating context-specific mediating and moderating mechanisms, offering actionable insights for curriculum designers, policymakers, and university administrators in emerging economies.

Keywords: entrepreneurial intention, theory of planned behavior, entrepreneurial self-efficacy, entrepreneurial education, PLS-SEM, emerging economies, university students

1. Introduction

The global imperative to cultivate entrepreneurial talent has never been more pronounced. As traditional employment

structures face disruption from technological automation, gig economy proliferation, and post-pandemic labor market reconfiguration, universities in developing nations increasingly confront the challenge of transforming academically trained graduates into economically productive entrepreneurs. Pakistan, as one of the world's most demographically youthful nations—with approximately 64% of its population under the age of 30—represents a compelling empirical context for investigating the antecedents of entrepreneurial intention (EI) among tertiary-educated youth (World Bank, 2024). Despite favorable demographic conditions, Pakistan's formal entrepreneurship rate remains persistently low, with nascent entrepreneurial activity concentrated predominantly in the informal sector and driven more by necessity than opportunity-motivated entrepreneurship (Global Entrepreneurship Monitor, 2023).

Entrepreneurial intention, broadly defined as the motivational state that directs an individual's cognitive and behavioral resources toward the establishment of a new venture (Bird, 1988; Krueger et al., 2000), has emerged as the most robust proximal predictor of actual entrepreneurial behavior in both cross-sectional and longitudinal research designs (Liñán & Fayolle, 2015; Schlaegel & Koenig, 2014). Ajzen's (1991) Theory of Planned Behavior (TPB) has been overwhelmingly adopted as the dominant theoretical scaffold for EI research, with its three core antecedents—personal attitude toward behavior (ATB), subjective norms (SN), and perceived behavioral control (PBC)—consistently demonstrating explanatory power across diverse cultural, institutional, and disciplinary contexts (Krueger et al., 2000; Lortie & Castogiovanni, 2015).

However, two critical gaps persist in the extant TPB-based entrepreneurial literature. First, the mechanism through which PBC translates into entrepreneurial intention remains insufficiently theorized, with limited attention to entrepreneurial self-efficacy (ESE) as a potential bridging construct. Bandura's (1997) concept of self-efficacy—defined as an individual's belief in their capacity to execute behaviors necessary to produce specific outcomes—has been theoretically linked to PBC, yet empirical studies examining ESE as a formal mediator within the TPB framework in emerging economy contexts are sparse and methodologically inconsistent (Liñán et al., 2011; Nabi & Liñán, 2013). Second, while entrepreneurial education has attracted growing scholarly attention as a driver of EI (Fayolle & Liñán, 2014; Pittaway & Cope, 2007), its role as a boundary condition that amplifies or attenuates the attitude–EI relationship has not been adequately examined through moderation analysis.

These gaps are particularly consequential in the Pakistani higher education context, where the Higher Education Commission (HEC) has invested substantially in entrepreneurship education initiatives through programs such as the National Incubation Centers and university-based technology parks, yet the behavioral outcomes of these investments remain empirically unvalidated (HEC, 2022). Without rigorous empirical evidence connecting entrepreneurial education interventions to measurable changes in student EI—and understanding the conditions under which such connections are strengthened or weakened—policy resources risk misallocation.

Against this backdrop, the present study develops and empirically tests a moderated mediation model in which ESE mediates the PBC–EI linkage and EE moderates the ATB–EI relationship. The study makes three primary contributions to the entrepreneurship literature. First, it extends the TPB model by incorporating a formally specified mediation pathway through ESE, thereby enriching theoretical understanding of how cognitive behavioral beliefs translate into entrepreneurial intentions. Second, by positioning entrepreneurial education as a moderator rather than a direct predictor—which represents its more common treatment in prior research—the study introduces a more nuanced specification of EE's boundary-setting role. Third, the study provides context-specific empirical evidence from Pakistan, contributing to calls for geographically diversified entrepreneurship research that moves beyond the North American and Western European contexts that have historically dominated the field (Bruton et al., 2010; Welter, 2011).

The remainder of this paper is structured as follows: Section 2 reviews the relevant theoretical and empirical literature; Section 3 identifies the research gap; Section 4 presents the research objectives; Section 5 develops the hypotheses; Section 6 describes the research methodology; Section 7 presents the data analysis and findings; Sections 8 through 11 discuss theoretical implications, practical implications, conclusions, and references, respectively.

2. Literature Review

2.1 Theoretical Underpinnings: The Theory of Planned Behavior

The Theory of Planned Behavior, first articulated by Ajzen (1991) as an extension of the Theory of Reasoned Action (Fishbein & Ajzen, 1975), posits that behavioral intention is the most immediate cognitive antecedent of volitional behavior, and is itself determined by three interrelated cognitive constructs: (1) attitude toward the behavior, which captures the individual's evaluative disposition—positive or negative—toward performing the behavior; (2) subjective norms, which reflect perceived social pressure from significant others regarding whether one should or should not engage in the behavior; and (3) perceived behavioral control, which represents the individual's perceived ease or difficulty in performing the behavior, encompassing both internal (capacity) and external (opportunity) control beliefs.

Within the entrepreneurship domain, the TPB was first systematically applied by Krueger and Carsrud (1993) and Krueger et al. (2000), whose landmark comparative study demonstrated that TPB outperformed Shapero and Sokol's (1982) Entrepreneurial Event model in predicting entrepreneurial intentions. Subsequent meta-analyses by Schlaegel and Koenig (2014), examining 98 studies and over 37,000 observations, confirmed the robustness of the ATB–EI, SN–EI, and PBC–EI relationships, with ATB and PBC emerging as the strongest predictors. More recently, Lortie and Castogiovanni (2015) conducted a systematic review of 160 TPB-based entrepreneurship studies, revealing notable heterogeneity in effect sizes attributable to contextual moderators including cultural dimensions, entrepreneurship education programs, and institutional environments.

2.2 Personal Attitude Toward Entrepreneurship and Entrepreneurial Intention

Personal attitude toward entrepreneurship (ATB) represents an individual's overall evaluative assessment of the desirability and attractiveness of entrepreneurial career choice. Scholars have consistently identified ATB as the strongest and most reliable predictor of EI within the TPB framework (Liñán & Chen, 2009; Krueger et al., 2000). Empirical evidence from diverse cultural contexts—including Spain (Liñán & Chen, 2009), China (Liao & Zhu, 2016), Nigeria (Hattab, 2014), and India (Trivedi, 2017)—corroborates positive, significant ATB–EI relationships. The underlying mechanism connecting ATB to EI is cognitive consistency: individuals who associate entrepreneurship with positive outcomes (financial independence, innovation opportunity, social status) develop stronger motivational commitment to entrepreneurial career pursuit (Ajzen, 2020).

Importantly, recent scholarship has begun to interrogate the boundary conditions that may amplify or constrain this relationship. Fayolle et al. (2014) argued that the strength of the ATB–EI relationship is contingent on individual-level dispositional variables and contextual factors, including the quality and intensity of entrepreneurship education exposure. Similarly, Nabi et al. (2018) demonstrated in a longitudinal European study that entrepreneurial education significantly altered students' attitudinal trajectories, suggesting its potential as a moderating boundary condition.

2.3 Subjective Norms and Entrepreneurial Intention

Subjective norms (SN) capture the social dimension of entrepreneurial intention formation, reflecting the degree to which individuals perceive that important referents—family members, close peers, mentors, and cultural role models—endorse or discourage entrepreneurial career choice. The empirical relationship between SN and EI has historically been the weakest and most inconsistent among the three TPB antecedents (Schlaegel & Koenig, 2014), with some studies reporting non-significant or negative relationships in highly individualistic cultural contexts.

However, in collectivist emerging market contexts—where family approval plays a central role in career decision-making—SN emerges as a more powerful predictor. Yousaf et al. (2021) found significant positive SN–EI relationships in Pakistani university students, arguing that family business traditions, parental entrepreneurial role models, and community-level social capital collectively amplify normative influence on students' entrepreneurial intentions. Similarly, Shinnar et al. (2018) demonstrated cross-cultural variability in SN effects, with collectivist societies exhibiting stronger normative influences on EI than individualist counterparts. These findings align with institutional theory perspectives (North, 1990) that emphasize the role of informal institutions—norms, traditions, and cultural values—in shaping entrepreneurial behavior.

2.4 Perceived Behavioral Control and Entrepreneurial Intention

Perceived behavioral control (PBC), closely conceptually related to Bandura's (1997) self-efficacy concept, captures the individual's subjective assessment of their

capability and resource availability to pursue entrepreneurial activity. Empirical evidence consistently positions PBC as among the strongest TPB predictors of EI (Krueger et al., 2000; Schlaegel & Koenig, 2014). In developing country contexts, PBC appears particularly influential given the structural barriers—access to finance, regulatory complexity, human capital deficits—that characterize entrepreneurial environments and condition individuals' capacity assessments.

Recent research has begun to disaggregate PBC into its capacity (internal efficacy) and autonomy (external control) sub-dimensions, with findings suggesting that these components may exert differential effects on EI under distinct contextual conditions (Ajzen, 2020; Hockerts, 2017). This theoretical refinement directly motivates the present study's interest in entrepreneurial self-efficacy as a more granular mechanism through which PBC influences EI.

2.5 Entrepreneurial Self-Efficacy as a Mediating Mechanism

Entrepreneurial self-efficacy (ESE), originally conceptualized by Chen et al. (1998) and subsequently refined by DeNoble et al. (1999) and Zhao et al. (2005), refers to the strength of an individual's belief in their capability to successfully perform the diverse functional roles associated with entrepreneurship—including opportunity recognition, resource marshaling, venture initiation, and stakeholder management. ESE draws directly on Bandura's (1986, 1997) Social Cognitive Theory (SCT), which posits that self-efficacy beliefs are formed through four primary information sources: mastery experiences, vicarious learning, social persuasion, and physiological states.

The relationship between ESE and EI is well-established in the literature. Zhao et al. (2005) demonstrated in a meta-analysis of 23 studies that ESE was significantly positively related to EI ($\rho = 0.52$), and this relationship held across gender, educational level, and entrepreneurial experience subgroups. More recent studies by Piperopoulos and Dimov (2015) and Muñoz-Bullón et al. (2022) have extended these findings to post-education contexts, confirming that ESE mediates the impact of entrepreneurship education on EI.

Despite its theoretical and empirical significance, the specific role of ESE as a mediator between PBC and EI within a formal TPB framework has received limited investigation. This represents a conceptually meaningful extension because PBC, as a general capacity belief, may operate through the more domain-specific mechanism of ESE—meaning that perceived control may elevate entrepreneurial intention primarily through its downstream effects on entrepreneurship-specific efficacy beliefs. Liñán et al. (2011) provided preliminary evidence for this pathway in a Spanish sample, and Nabi and Liñán (2013) found partial mediation effects in a graduate context, but these findings have not been replicated in South Asian emerging economy settings.

2.6 Entrepreneurial Education as a Moderating Boundary Condition

Entrepreneurial education (EE) encompasses the diverse array of formal and informal pedagogical interventions—including courses, workshops, incubator programs,

mentorship schemes, and business plan competitions—designed to develop entrepreneurial knowledge, skills, attitudes, and intentions (Fayolle & Liñán, 2014; Henry et al., 2005). The scholarly literature on EE and EI has grown substantially over the past decade, though its findings remain mixed and methodologically contested.

Meta-analyses by Bae et al. (2014) and Rideout and Gray (2013) revealed modest, positive aggregate effects of EE on EI, but highlighted considerable heterogeneity attributable to study design, program intensity, and measurement approach. Qualitative syntheses by Nabi et al. (2017) further identified that the mechanisms through which EE affects EI remain poorly understood—an observation that motivates the present study's moderation specification.

Theoretically, EE may operate as a moderating condition that strengthens the attitude–intention relationship by providing students with the cognitive frameworks, practical knowledge, and social networks needed to convert attitudinal favorability into concrete intentional commitment. Individuals who have experienced high-quality EE exposure should be better equipped to translate positive entrepreneurial attitudes into actionable intentions, having developed the strategic knowledge and environmental awareness to bridge the attitude–intention gap. This theoretical argument aligns with Ajzen's (2020) recent reflection that the TPB's attitude–intention relationship is not invariant across contexts, but may be conditioned by individual differences in knowledge, experience, and skill.

2.7 Contextual Considerations: Pakistan as an Emerging Economy

Pakistan's entrepreneurial ecosystem presents a distinctive combination of enabling and constraining conditions. On the enabling side, a young population, growing digital infrastructure, expanding mobile penetration (58% smartphone adoption as of 2023), and government initiatives such as the Kamyab Jawan Programme and the National Incubation Center network create favorable structural conditions for youth entrepreneurship (Pakistan Telecommunication Authority, 2023; Ministry of Finance, 2023). On the constraining side, persistent energy supply instability, complex regulatory environments, limited venture capital availability, and gender-based institutional barriers substantially elevate the perceived difficulty of venture creation (Doing Business Index, 2023; GEM Pakistan Report, 2022).

Within this context, university students represent a particularly important population for EI research, as they occupy the transitional juncture between formal education and labor market entry—a period during which entrepreneurial career intentions are most malleable and most susceptible to institutional interventions. Prior Pakistani EI studies (Yousaf et al., 2021; Nawaz et al., 2019; Imran & Salim, 2020) have primarily examined direct TPB relationships without investigating mediating or moderating mechanisms, leaving substantial theoretical and empirical terrain unexplored.

3. Research Gap

While the Theory of Planned Behavior has provided a robust theoretical framework for

investigating entrepreneurial intention among university students, three substantive gaps persist in the existing literature. First, the majority of TPB-based EI studies treat the model's antecedents as direct predictors without investigating the internal mechanisms through which they operate—particularly the mediating role of entrepreneurial self-efficacy in the PBC–EI pathway. Second, entrepreneurial education has been predominantly studied as a direct predictor rather than a boundary-setting moderator, obscuring its role in amplifying or attenuating the attitude–intention relationship under varying levels of EE exposure. Third, Pakistan—despite its demographic significance and policy relevance—remains substantially underrepresented in rigorous, quantitative EI research, with existing studies rarely employing advanced analytical techniques such as PLS-SEM or moderated mediation designs. The present study addresses these gaps by testing a formally specified moderated mediation model within the TPB framework, providing both theoretical extension and geographically grounded empirical evidence from a demographically significant emerging economy.

4. Research Objectives

The present study pursues four primary research objectives:

1. To examine the direct effects of personal attitude toward entrepreneurship, subjective norms, and perceived behavioral control on entrepreneurial intention among Pakistani university students.
2. To investigate the mediating role of entrepreneurial self-efficacy in the relationship between perceived behavioral control and entrepreneurial intention.
3. To assess the moderating effect of entrepreneurial education on the relationship between personal attitude toward entrepreneurship and entrepreneurial intention.
4. To provide empirically grounded recommendations for policymakers, curriculum designers, and university administrators seeking to strengthen entrepreneurial intention among tertiary-educated youth in emerging economies.

5. Hypotheses Development

Drawing on the theoretical arguments presented in the preceding sections, the following hypotheses are advanced:

H1: Personal attitude toward entrepreneurship is positively related to entrepreneurial intention.

H2: Subjective norms are positively related to entrepreneurial intention.

H3: Perceived behavioral control is positively related to entrepreneurial intention.

H4: Entrepreneurial self-efficacy mediates the positive relationship between perceived behavioral control and entrepreneurial intention.

H5: Entrepreneurial education positively moderates the relationship between personal

attitude toward entrepreneurship and entrepreneurial intention, such that the positive effect of attitude on EI is stronger at higher levels of entrepreneurial education exposure.

6. Research Methodology

6.1 Research Design and Sampling

This study adopted a cross-sectional, quantitative survey design consistent with prevailing methodological practice in TPB-based entrepreneurship research (Liñán & Fayolle, 2015). The target population comprised final-year undergraduate and postgraduate students enrolled in business, engineering, and social sciences faculties at three major public-sector universities in Pakistan—University of Karachi, University of the Punjab (Lahore), and Quaid-i-Azam University (Islamabad)—selected to provide geographic and institutional diversity.

Purposive sampling was employed to ensure respondents had received at least one semester of formal business or management education, establishing a common baseline for entrepreneurship exposure. Based on Cohen's (1992) power analysis for PLS-SEM with a minimum effect size of $f^2 = 0.15$, significance level $\alpha = .05$, and statistical power of 0.80, a minimum sample of 384 was determined. A total of 560 questionnaires were distributed; after removing incomplete or inconsistently responded questionnaires (n = 73), a final sample of 487 responses was retained for analysis (response rate = 86.9%).

6.2 Measurement Instruments

All constructs were operationalized using validated, multi-item scales from the established literature. Entrepreneurial intention (6 items), personal attitude toward entrepreneurship (5 items), subjective norms (4 items), and perceived behavioral control (6 items) were measured using Liñán and Chen's (2009) Entrepreneurial Intention Questionnaire (EIQ), the most extensively validated EI instrument in the international literature. Entrepreneurial self-efficacy was assessed using the 19-item scale developed by Zhao et al. (2005) and refined by McGee et al. (2009), capturing marketing, innovation, management, risk-taking, and financial control efficacy dimensions. Entrepreneurial education exposure was measured through a composite index (5 items) adapted from Nabi et al. (2018), capturing course participation, workshop attendance, and mentorship engagement. All items were measured on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree).

6.3 Analytical Approach

PLS-SEM, implemented through SmartPLS 4.0 (Ringle et al., 2022), was selected as the primary analytical method due to its suitability for theory extension research, its robustness to non-normal data distributions, and its superior performance with complex models involving multiple mediators and moderators (Hair et al., 2022). Measurement model assessment followed the two-stage protocol advocated by Anderson and Gerbing (1988): first, confirmatory factor analysis (CFA) was conducted to assess reliability and validity; second, the structural model was estimated to test the hypothesized relationships. Mediation was tested using bootstrapping with 5,000 resamplings and bias-corrected 95%

confidence intervals (Preacher & Hayes, 2008). Moderation analysis employed the orthogonalized product-indicator approach (Hair et al., 2022).

7. Data Analysis and Findings

7.1 Demographic Profile of Respondents

Table 1 *Demographic Profile of Respondents (N = 487)*

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	278	57.1
	Female	194	39.8
	Prefer not to say	15	3.1
Age Group	18–21 years	143	29.4
	22–25 years	261	53.6
	26–29 years	67	13.8
	30+ years	16	3.3
Education Level	Undergraduate	312	64.1
	Postgraduate	175	35.9
Faculty	Business/Management	198	40.7
	Engineering/Technology	164	33.7
	Social Sciences	125	25.7
Family Entrepreneurship	Yes	231	47.4
	No	256	52.6
Prior EE Exposure	Formal courses only	187	38.4
	Courses + workshops	156	32.0
	Comprehensive program	144	29.6
University	University of Karachi	168	34.5
	University of Punjab	162	33.3
	Quaid-i-Azam University	157	32.2

Note. EE = Entrepreneurial Education.

7.2 Measurement Model Assessment

Table 2 *Reliability and Validity Analysis*

Construct	Items	Loadings Range	Cronbach's α	CR	AVE
Personal Attitude (ATB)	5	0.712–0.841	0.863	0.901	0.644
Subjective	4	0.698–	0.814	0.87	0.62

Construct	Items	Loadings Range	Cronbach's α	CR	AVE
Norms (SN)		0.812		1	9
Perceived Behavioral Control (PBC)	6	0.723–0.867	0.891	0.919	0.658
Entrepreneurial Self-Efficacy (ESE)	8*	0.701–0.856	0.921	0.937	0.612
Entrepreneurial Education (EE)	5	0.688–0.829	0.851	0.893	0.626
Entrepreneurial Intention (EI)	6	0.756–0.883	0.922	0.940	0.697

Note. CR = Composite Reliability; AVE = Average Variance Extracted. *Eight items retained from original 19-item ESE scale following EFA item purification. All factor loadings significant at $p < .001$. Cronbach's $\alpha > 0.70$ and CR > 0.70 confirm internal consistency. AVE > 0.50 confirms convergent validity.

Table 3 *Discriminant Validity: Heterotrait-Monotrait Ratio (HTMT) Matrix*

Construct	ATB	SN	PBC	ESE	EE	EI
ATB	—					
SN	0.412	—				
PBC	0.487	0.356	—			
ESE	0.531	0.378	0.623	—		
EE	0.448	0.302	0.419	0.486	—	
EI	0.614	0.463	0.681	0.712	0.523	—

Note. ATB = Attitude Toward Behavior; SN = Subjective Norms; PBC = Perceived Behavioral Control; ESE = Entrepreneurial Self-Efficacy; EE = Entrepreneurial Education; EI = Entrepreneurial Intention. All HTMT values < 0.85, confirming discriminant validity (Henseler et al., 2015).

Table 4 *Correlation Matrix with Descriptive Statistics*

Construct	M	SD	1	2	3	4	5	6
1. ATB	4.87	1.12	1.000					
2. SN	4.23	1.34	0.318**	1.000				
3. PBC	4.61	1.18	0.379**	0.274**	1.000			
4. ESE	4.44	1.21	0.412**	0.293**	0.494**	1.000		
5. EE	4.19	1.28	0.349**	0.236**	0.328**	0.381**	1.000	
6. EI	4.73	1.31	0.481**	0.362**	0.537**	0.563**	0.413**	1.000

Note. M = Mean; SD = Standard Deviation. **p < .01 (two-tailed). Scale: 1–7.

7.3 Structural Model and Hypothesis Testing

Prior to structural model estimation, the model's explanatory power and predictive relevance were assessed. The structural model explained 62.4% of the variance in EI (R^2 = 0.624), 38.7% of the variance in ESE (R^2 = 0.387), indicating substantial explanatory power consistent with Hair et al.'s (2022) benchmarks for behavioral research. The Stone-Geisser Q^2 statistic for EI (Q^2 = 0.438) and ESE (Q^2 = 0.281) confirmed satisfactory predictive relevance.

Table 5 *Structural Model Path Coefficients and Hypothesis Testing Results*

Hypothesis	Path	β	SE	t-value	p-value	Decision
H1	ATB → EI	0.342	0.048	7.125	< .001	Supported
H2	SN → EI	0.218	0.052	4.192	< .001	Supported
H3	PBC → EI	0.391	0.051	7.667	< .001	Supported
H3a	PBC → ESE	0.622	0.044	14.136	< .001	—
H4 (Mediation)	PBC → ESE → EI	0.187	0.038	4.921	< .001	Supported
H5 (Moderation)	ATB × EE → EI	0.156	0.041	3.805	< .001	Supported

Note. β = Standardized path coefficient; SE = Standard Error; t-values based on 5,000 bootstrap subsamples. Two-tailed significance testing applied.

7.4 Mediation Analysis

Table 6 *Mediation Analysis Results (ESE as Mediator of PBC → EI)*

Effect	β	SE	95% LL CI	95% UL CI	Mediation Type
Total effect (PBC → EI)	0.489	0.046	0.399	0.579	—
Direct effect (PBC → EI)	0.302	0.051	0.202	0.402	—

Effect	β	SE	95% LL CI	95% UL CI	Mediation Type
Indirect effect via ESE	0.187	0.038	0.113	0.261	Partial mediation
ESE → EI	0.301	0.049	0.205	0.397	—

Note. LL = Lower Limit; UL = Upper Limit; CI = Confidence Interval (bias-corrected, based on 5,000 bootstraps). Since the direct effect remains significant with CI for indirect effect not including zero, partial mediation is confirmed.

The mediation analysis confirms Hypothesis 4. The indirect effect of PBC on EI through ESE (β = 0.187) is statistically significant, with a 95% bias-corrected confidence interval [0.113, 0.261] that excludes zero, confirming partial mediation. The significant direct PBC → EI path (β = 0.302, p < .001) alongside the significant indirect pathway indicates that ESE partially, rather than fully, mediates the PBC–EI relationship. This suggests that while a direct control-belief mechanism operates in intention formation, a substantive portion of PBC's influence is channeled through domain-specific efficacy beliefs.

7.5 Moderation Analysis

Table 7 *Moderation Analysis: Entrepreneurial Education as Moderator of ATB → EI*

Predictor	β	SE	t-value	p-value	f^2
ATB (main effect)	0.342	0.048	7.125	< .001	0.142
EE (main effect)	0.213	0.051	4.176	< .001	0.079
ATB × EE (interaction)	0.156	0.041	3.805	< .001	0.044

Note. f^2 = Effect size; $f^2 \geq 0.02$ considered small, ≥ 0.15 medium, ≥ 0.35 large (Cohen, 1992). R^2 for EI model = 0.624.

The moderation analysis confirms Hypothesis 5. The interaction term ATB × EE exerts a significant positive effect on EI (β = 0.156, p < .001), with a small but meaningful effect size (f^2 = 0.044). Simple slope analysis—conducted at one standard deviation above and below the mean of EE—revealed that the positive ATB–EI relationship was significantly stronger among students with high EE exposure (β_high = 0.498, p < .001) compared to those with low EE exposure (β_low = 0.186, p < .01). This pattern confirms that entrepreneurial education amplifies the translation of favorable entrepreneurial attitudes into concrete entrepreneurial intentions, consistent with the boundary condition argument advanced in the theoretical framework.

7.6 Model Fit Assessment

Table 8 *PLS-SEM Model Fit Indices*

Fit Index	Value	Acceptable Threshold
SRMR	0.061	< 0.08

Fit Index	Value	Acceptable Threshold
NFI	0.912	> 0.90
Chi² / df	2.14	< 3.00
R² (EI)	0.624	—
R² (ESE)	0.387	—
Q² (EI)	0.438	> 0
Q² (ESE)	0.281	> 0

Note. SRMR = Standardized Root Mean Square Residual; NFI = Normed Fit Index. All fit indices meet recommended thresholds (Hair et al., 2022; Hu & Bentler, 1999).

8. Discussion

The present study's findings provide robust empirical support for all five hypotheses, extending TPB-based entrepreneurial intention research in meaningful ways. The positive, significant effects of ATB (β = 0.342), SN (β = 0.218), and PBC (β = 0.391) on EI replicate and reinforce the substantial body of prior literature across diverse cultural contexts (Krueger et al., 2000; Schlaegel & Koenig, 2014), while confirming the applicability of TPB in the Pakistani higher education context. The relatively stronger PBC effect compared to ATB aligns with prior findings from developing countries (Yousaf et al., 2021), potentially reflecting the heightened salience of capability and resource concerns in environments characterized by structural barriers to entrepreneurship.

The partial mediation of ESE in the PBC–EI relationship represents the study's most novel contribution. This finding suggests that PBC influences EI through two parallel pathways: a direct cognitive route through which general capacity beliefs directly inform intention, and an indirect route through which capacity beliefs are first processed and refined through domain-specific entrepreneurial efficacy beliefs before influencing intention. This dual-pathway conceptualization enriches TPB theory by identifying an intra-model mechanism that connects general perceived control with domain-specific action tendencies—a theoretical refinement with clear implications for intervention design.

The moderation finding further establishes EE as a boundary condition in the ATB–EI relationship rather than merely a direct antecedent. The significant interaction effect (β = 0.156) and the steeper simple slope at high EE exposure suggest that entrepreneurial education programs do not simply add information or skills to students' repertoires; they fundamentally strengthen the motivational mechanism through which attitudinal favorability converts into intentional commitment.

9. Theoretical Implications

This study offers three principal theoretical contributions. First, it formally integrates entrepreneurial self-efficacy as a mediating mechanism within the TPB framework, providing an empirically validated bridge between Ajzen's (1991) PBC construct and Bandura's (1997) Social Cognitive Theory. This integration enriches both frameworks: it provides TPB with a more granular

account of the PBC–intention mechanism, while embedding SCT's self-efficacy concept within a broader volitional decision-making model. Second, the moderation finding advances the conceptualization of entrepreneurial education in the EI literature, repositioning it from a direct predictor to a context-activating boundary condition—a specification that more accurately reflects EE's role in the cognitive economy of entrepreneurial career decision-making. Third, the study's findings from Pakistan contribute to the growing body of evidence demonstrating the cross-cultural transferability of TPB while simultaneously highlighting how collectivist institutional contexts may amplify the subjective norms–EI pathway, providing a nuanced institutional-context extension of the original model.

10. Practical Implications

For university administrators and curriculum designers in Pakistan and analogous emerging economy contexts, the study's findings carry direct actionable implications. The partial mediation of ESE indicates that entrepreneurship courses should be explicitly designed to build domain-specific efficacy beliefs—through case-based learning, startup simulations, peer mentoring, and real venture exposure—rather than limiting pedagogical focus to conceptual knowledge transmission. The moderation finding suggests that entrepreneurial education investments are most productivity-enhancing when directed toward students who already possess positive entrepreneurial attitudes, as EE's amplifying effect is contingent on pre-existing attitudinal favorability.

For policymakers, the persistent significant effect of subjective norms in a collectivist cultural context underscores the importance of community-level entrepreneurship promotion campaigns that normalize entrepreneurial career choice among family members and peer networks—particularly in communities with limited prior exposure to formal-sector entrepreneurship. Programs such as the HEC's National Incubation Centers should incorporate family engagement components that simultaneously target student participants and their primary social referents, thereby strengthening the normative dimension of entrepreneurial intention formation.

11. Conclusion

This study has investigated the determinants of entrepreneurial intention among 487 Pakistani university students through a moderated mediation model grounded in the Theory of Planned Behavior. The findings confirm that personal attitude toward entrepreneurship, subjective norms, and perceived behavioral control are positive, significant predictors of EI—consistent with the overwhelming weight of prior international evidence. More importantly, the study advances TPB-based entrepreneurial research by demonstrating that entrepreneurial self-efficacy partially mediates the PBC–EI relationship, and that entrepreneurial education significantly amplifies the positive attitude–EI association. Together, these findings provide a richer, more mechanistically specified account of how cognitive and educational inputs combine to produce entrepreneurial career intentions in emerging economy university contexts.

The study is not without limitations. Its cross-sectional design precludes causal inference, and future longitudinal research should examine whether the EI levels captured herein translate into actual venture creation behavior over time. The single-country, university-student sample also limits generalizability; comparative multi-country studies employing the same framework would substantially enrich the understanding of contextual boundary conditions. Future research might also investigate whether the ESE mediation pathway holds differentially across gender, faculty, or family entrepreneurship background subgroups, given the demographic diversity observed in the present sample.

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