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Unveiling the Mechanism of Entrepreneurial Intentions: Cognitive Pathway

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ABSTRACT

This study investigates how entrepreneurial cognitive ability shapes the entrepreneurial intentions of university students in Pakistan through a sequential mediation pathway involving entrepreneurial capabilities and entrepreneurial opportunity recognition. Anchored in the Theory of Planned Behavior and Social Cognitive Theory, the research adopts a quantitative, cross-sectional survey methodology. Structured questionnaire data were collected from 387 undergraduate and postgraduate students enrolled across five leading universities in Pakistan. Covariance-based structural equation modeling (CB-SEM) was employed for hypothesis testing. Findings confirm that entrepreneurial cognitive ability exerts a significant direct influence on entrepreneurial intention, which is further transmitted through the sequential chain of entrepreneurial capabilities and opportunity recognition. The study advances the entrepreneurship cognition literature by situating cognitive ability as a foundational driver in a staged model of intention formation and offers actionable implications for educators and policymakers seeking to foster entrepreneurial behavior among Pakistani youth. Limitations and avenues for future research are addressed.

Introduction

Entrepreneurship is a vital element of economic development. This is especially important in developing countries, as formal employment sectors do not have the capacity to absorb educated individuals who enter the job market at an increasing rate (Shane & Venkataraman, 2000; Audretsch & Keilbach, 2004). This challenge is present in Pakistan with the population touching 250 million in 2025 as most of the population will be in the urban areas and will be under 30 (UNFPA, 2025). With the economy suffering from structural weaknesses and frequent

recessions, less jobs are created to match the number of graduates. This has resulted in the youth unemployment rate being over 16% and severe underemployment (Ahsan & Khan, 2023; Pakistan Bureau of Statistics, 2023). In addition, it has led a number of scholars, teachers, and government officials to view entrepreneurship as a tool for self-employment, jobs creation, and stimulate economic growth (Naudé, 2010; Gries & Naudé, 2010).

Although there has been a persistent focus in national policies on developing entrepreneurship, estimates have shown that Pakistani graduates are still less likely to engage in entrepreneurship compared to their counterparts in other countries (Farrukh et al., 2017; Martins et al., 2023). However, the combination of low entrepreneurial activity with a large, educated youth population should encourage more research to identify psychological and cognitive factors affecting entrepreneurial intentions. There are numerous barriers to entrepreneurship in Pakistan that are mainly structural, including the lack of access to finance, the political situation, the opaque regulatory framework, and poor institutional structures (Aslam et al., 2018; Mustafa et al., 2016; Dubey et al., 2020). These barriers are fails to explain the lack of entrepreneurship in Pakistani graduates who have the expertise to start new ventures.

Starting from the lack of structure in entrepreneurial intentions, researchers have begun to investigate cognitive and psychological factors to identify barriers preventing entrepreneurial activity (Bachmann et al., 2024; Barba-Sánchez et al., 2022; Saoula et al., 2023). In addition, other factors, cognitive ability and the ability to process and analyze information to identify entrepreneurial opportunities is an important but understudied factor influencing the intention to engage in entrepreneurship (Haynie et al., 2010; Mitchell et al., 2002). A person's cognitive ability can propel entrepreneurial activity in environments where factors are uncertain and information can be ambiguous, such as in Pakistan (Foss & Klein, 2012; Basu et al., 2022).

The impact of cognitive ability on entrepreneurial intention is complex; thus, it requires mediation mechanism. Cognitive ability affects entrepreneurial outcomes through various psychological and behavioral processes. Among these processes, entrepreneurial capabilities and the recognition of entrepreneurial opportunities have attracted more theoretical and empirical interest as vital mechanisms in the intention formation process. Entrepreneurial capability (EC) represents the synthesis of strategic, operational, and relational skills of people that enable them to visualize and implement the activities of new businesses (Alvarez & Barney, 2007; Mitchelmore & Rowley, 2010). EC is learned, rather than being an inherent disposition (Baron & Ensley, 2006; Ucbasaran et al., 2009). Entrepreneurial opportunity recognition (EOR), is the ability to recognize and evaluate the entrepreneurial value of the various opportunities that exist in the environment (Shane & Venkataraman, 2000; Ardichvili et al., 2003). The formation and recognition of opportunities is dependent on ability to reason and a broad base of knowledge (Grégoire et al., 2010).

This paper presents a theoretically based sequential mediation model in which the cognitive ability of entrepreneurs serves as a distal predictor of the entrepreneurial intention of Pakistani university students. Entrepreneurial capability and entrepreneurial opportunity recognition act as the mediating mechanisms. The theory works under the assumption that cognitive ability will encourage individuals to acquire and develop entrepreneurial skills by helping them to understand and utilize the relevant knowledge. The skills they attain will help them improve their ability to perceive and assess entrepreneurial opportunities. The improved ability to perceive opportunities will, in turn, shape their entrepreneurial intention. This stepwise process addresses

the call made by authors to develop and implement models of entrepreneurial intention that describe how the different types of entrepreneurial cognition are integrated (Soluk et al., 2021; Mia et al., 2025).

There are multiple reasons for focusing on Pakistani university students. The university context is conducive to developing one's cognitive and entrepreneurial skills. Pakistani higher education cannot escape the criticisms of too much rote learning and not enough applied, experiential and opportunity-based learning. By focusing on this population, the study attempts to design evidence that can be used in pedagogical reform and policy intervention, given the economic context. The study also attempts to address a contextual gap. The majority of studies on entrepreneurial intention focus on developed and at least middle-income countries. Research on South Asia is scarce. In South Asia, the context of cognitive capital is important as a resource that individuals can draw on. Research on cognitive capital is also very limited in South Asia (Martins et al., 2023; Aslam et al., 2018).

The rest of the paper is organized as follows. In Section 2, the author describes the grounding of the theory, the relevant literature, the study's hypotheses, and the conceptual framework. Section 3 contains a description of the study design, the sampling, and the methods of measurement and analysis. The author presents the findings of the study and situates them within the theoretical and contextual framework in Section 4. Finally, Section 5 contains the author's theoretical conclusions, suggestions for practice, and other research-related ideas.

Literature Review

Theoretical Foundations

This study incorporates two integrated components in its theoretical framing: Ajzen's (1991) Theory of Planned Behavior (TPB) and Bandura's (1986) Social Cognitive Theory (SCT). According to TPB, behavior, in this case the entrepreneurial intention, is determined by several factors, including attitudes towards the behavior, subjective social norms, and the individual's perception of control over the behavior. From this perspective, the conceptualization of control as the self-assessment of ability to carry out the behavior is similar to the perception of entrepreneurial capability and is, among all elements, the strongest and most consistent predictor of entrepreneurial intention (Krueger et al., 2000; Kautonen et al., 2013). When cognitive ability is understood as the ability to effectively analyze and comprehend a complex situation, and to clearly determine what one is capable of doing, it is then the case that cognitive ability enhances the perceived control over behavior (Schlaegel & Koenig, 2014).

Social Cognitive Theory (SCT) provides a good complement to the Theory of Planned Behavior (TPB) in the way that SCT details the role of observational learning, self-regulation, and self-efficacy on behavior. According to SCT, Bandura (1997) asserts that people form beliefs about their capabilities through enactive mastery, vicarious experiences, verbal persuasion, and physiological states. These all take place against the backdrop of the learner's cognitive resources. With SCT in mind, entrepreneurial cognitive ability is the cognitive framework upon which self-efficacy beliefs and the extensiveness of one's capability portfolios are built. These two theories form the basis of the pathway that this study is attempting to elaborate: cognitive ability is the driving force behind the development of entrepreneurial competencies (through SCT self-regulation and self-efficacy mechanisms), which in turn empower the recognition of entrepreneurial opportunities (based on the level of perceived behavioral control), and this level

of perceived control ultimately brings about the formation of entrepreneurial intention (as predicted by the TPB).

Relationship between Entrepreneurial Cognitive Ability and Entrepreneurial Intention

Cognitive ability is defined as the ability to perform complex tasks such as reasoning and problem solving and to make integrated judgments on the basis of disparate information (Ree & Earles, 1992; Schmidt & Hunter, 1998). For the study of entrepreneurship, cognitive ability is expressed as entrepreneurial cognitive ability to indicate the cognitive aspects of making entrepreneurial decisions, such as identifying complex patterns in the market, reasoning in the face of uncertainty, metacognitive thinking of one's own reasoning, and making venture-related decisions based on abstract ideas (Haynie et al., 2010; Baron, 2006). In order to explain the knowledge structures and reasoning that assist individuals in making decisions and in carrying out and managing a small business, Mitchell et al. (2002) coined the term entrepreneurial cognition.

In developing economies like Pakistan, where more formal information systems do not exist, market signals may lack clarity and the knowledge environment is often fragmented, the individual's cognitive processing capacity becomes an important source of competitive advantage for entrepreneurs (Fuller & Klein, 2012; Basu et al., 2022). Entrepreneurs with higher cognitive ability are more likely to form useful mental models with less information, think through the effects that a changing environment may have in regard to business opportunities, and mentally picture the different paths a business may take before committing (or potentially wasting) resources to start the business (Krueger, 2000; Baron, 2006). Numerous studies and analyses of the emerging economies of India, Turkey and Morocco, have suggested that cognitive ability affects entrepreneurial intention to a greater extent in high-uncertainty institutional environments compared to more developed economies, which have some institutional infrastructure that counterbalances (or offsets) what is otherwise the cognitive burden of creating an entrepreneurial opportunity (Maheshwari et al., 2023; Saoula et al., 2023).

H1: Entrepreneurial cognitive ability positively influences Entrepreneurial Intention

Relationship between Entrepreneurial Cognitive Ability and Entrepreneurial Capabilities

Entrepreneurial capabilities are understood primarily as a combination of strategic, operational, and relational abilities (Alvarez & Barney, 2007; Morris et al., 2013). These abilities are the means by which an entrepreneur can begin, develop, and manage a new business venture in an uncertain marketplace where resources are limited. These abilities include the strategic capacity to assess business models and the competition; the operational capacity to complete tasks and maintain the equilibrium of coordinated resources; and the relational capacity to establish and utilize social and professional networks to gain resources and achieve legitimacy (Man et al., 2002; Mitchelmore & Rowland, 2010). Perhaps, most importantly, entrepreneurial capabilities involve the process of capability development and the application of those capabilities via the interplay of actions, assessments, and the absorption and application of new knowledge (Cope, 2005; Politis, 2005).

The relationship between entrepreneurial cognitive ability and the development of entrepreneurial capabilities is found within the cognitive learning literature. People with higher cognitive ability can encode, organize, and retrieve information across many domains, and even draw valid inferences and extend knowledge to apply in new contexts, as well as critically assess the quality of their learning. These are the building blocks of competency (Schmidt & Hunter,

1998; Ree & Earles, 1992). These cognitive skills mean that members of the entrepreneurial community can extract a great deal of useful knowledge from any learning experience and integrate diverse bodies of knowledge and develop complex mental pictures regarding the entrepreneurial task at hand. These factors, taken together, contribute to the development of entrepreneurial capabilities. According to Bandura (1997), the strengthening of cognitive ability also strengthens self-efficacy, where the successful mastering of a cognitive task leads people to feel capable and lead them to be more adept and skilled at cognitive tasks. Thus, a self-reinforcing mechanism for achieving the desired capabilities is formed.

Relationship between Entrepreneurial Cognitive Ability and Entrepreneurial Opportunity Recognition

Entrepreneurial opportunity recognition (EOR) refers to the cognitive and evaluative processes by which people detect, interpret and assess environmental signals as platforms for new business development (Shane & Venkataraman, 2000; Kirzner, 1979). It consists of three intertwined cognitive phases: searching for information signals in the environment that others might not detect; identifying structural patterns or configurations in that information that indicate others' unmet needs or underserved markets; and determining whether the configuration is desirable and feasible to meet the dual requirements of desirability and feasibility that move a latent idea into a real entrepreneurial opportunity (Ardichvili et al., 2003; Baron & Ensley, 2006).

Both opportunity identification and the ability to make complex reasoning and analogical thinking are directly supported by entrepreneurial cognitive ability, both of which are indicators of high cognitive ability. Grégoire et al. (2010) showed that opportunities appear when an individual's previous knowledge structure gradually matches incoming stimuli from environmental stimuli—a matching process that is significantly supported by a high level of cognitive processing capacity. The cognitive bricolage theory put forth by Baker and Nelson (2005) emphasizes that people who can engage in reasoning across knowledge domains have better opportunities to reconnect and combine existing resources and insights within new opportunity configurations. In the Pakistani university context, where the formal entrepreneurship education curriculum has a higher theoretical component with limited practical application, students with higher entrepreneurial cognitive ability are likely to possess the perceptual and evaluative skills needed to identify, evaluate and assess opportunities present in their environment, independent of their developed capabilities (Taneja et al., 2024; Farrukh et al., 2017).

Relationship between Entrepreneurial Capabilities and Entrepreneurial Opportunity Recognition

Prior knowledge structures (PKS), which are the perceptual lenses through which entrepreneurial signals are perceived and interpreted, are the process of gaining prior information and knowledge through education, experience, and deliberate information seeking (Shane 2000, Ucbasaran et al. 2009). People with a higher entrepreneurial capability base are, therefore, more likely to have the knowledge scaffolding needed to think in ways that are essential to the pattern recognition and environmental scanning of effective EOR.

This is enhanced by entrepreneurial cognitive ability at several points. Recognizing opportunities, or making complex reasoning and analogical thinking, are both directly supported by these processes, both of which are indicators of high cognitive ability. Students with entrepreneurial capabilities developed in cognitively demanding self-directed learning are likely to have perceptual and evaluative skills needed to identify, evaluate and assess opportunities

present in their environment in the Pakistani university context where the formal entrepreneurship education curriculum has a higher theoretical component with limited practical application (Taneja et al., 2024; Farrukh et al., 2017).

Rather, as alluded to by George et al. (2016), the more extensive the capability base, the greater the capacity for understanding and identifying gaps in the market and misalignments of resources, which are the interpretive infrastructure for "reading the signals in the environment" as opportunities to act entrepreneurially. This was supported by Rasmussen et al. (2011) who showed that competency-building is mediated by opportunity recognition between competence building and intention formation, making it a critical process-level link between the two.

Relationship between Entrepreneurial Capabilities and Entrepreneurial Intention

Entrepreneurial capability is a much studied factor that has been found to be an important mediating factor between individual dispositional attributes and entrepreneurial intention in the Pakistani context (Farrukh et al., 2017; Aslam et al., 2018). The better students feel they can manage their resources, analyze the market, build relationships and navigate the institutional complexity, the more positive their assessment of entrepreneurship as a career and the more positive their intentions to pursue entrepreneurship (Krueger et al., 2000; Barba-Sánchez et al., 2022). Previous empirical studies have confirmed the mediating effect of EC between motivational and (cognitive) antecedents and entrepreneurial intention, making entrepreneurial cognitive ability an upstream factor for competency formation which has downstream implications for entrepreneurial intention (Bachmann et al., 2024; Maheshwari et al., 2023).

Relationship between Entrepreneurial Opportunity Recognition and Entrepreneurial Intention

A large number of studies have been conducted to investigate the link between EOR and entrepreneurial intention, and the results have been found to be consistent: that when individuals have a clear opportunity to consider that a viable business opportunity exists, their perceived behavioral control increases, uncertainty about forming a business decreases and their attitude toward entrepreneurship becomes more positive, thereby strengthening entrepreneurial intention (Krueger et al., 2000; Barba-Sánchez et al., 2022).

Sequential Mediation

Based on this, the integrated model proposed in this study considers entrepreneurial cognitive ability as the distal predictor of entrepreneurial intention which is measured based on two sequential mediation models, entrepreneurial capabilities and entrepreneurial opportunity recognition. This sequential logic suggests an account of entrepreneurship intention formation that starts with cognitive endowments that facilitate competency development, which in turn leads to opportunity recognition, which can finally trigger an intention to commit to the entrepreneurial process of creating a new venture (Soluk et al., 2021; Mia et al., 2025).

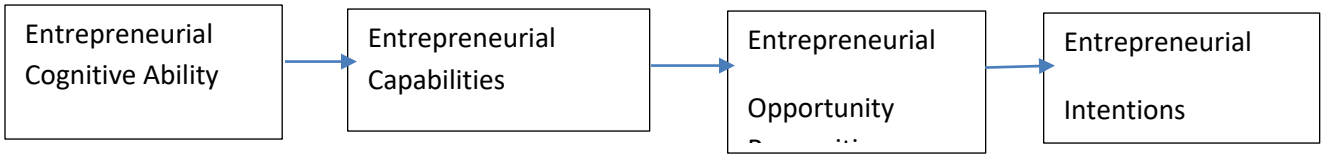
The first part of the sequence (cognitive ability to capability development) is consistent with the well-documented evidence that cognitive resources play an important role in supporting learning, acquisition of skills, and building up competency portfolios that are relevant to a specific domain. Cognitively able people gain more from learning experiences, relate knowledge between domains more efficiently, and generate more comprehensive mental models of entrepreneurial activity, all of which contribute to the gradual development of entrepreneurial skills (Haynie et al., 2010; Baron, 2006).

The second phase—that of capability development followed by opportunity recognition—is an illustration of the idea that competency endowment is the perceptual and interpretive infrastructure through which entrepreneurial opportunities are detected and evaluated. This is captured in the structural alignment framework of Grégoire et al. (2010): the more complex the prior knowledge organization, the more easily they can process and access the information they are seeing in the environment in such a way that it corresponds to their schemas and allows them to identify viable opportunities. Similarly, Chaudhry (2019) showed how entrepreneurial competencies act as a sensemaking scaffold to sensitize an individual to signals of opportunities in their environment and trigger the process of pattern recognition which is crucial to EOR. The last step (entrepreneurial intention to entrepreneurial action) was in line with the empirical finding that people who have spotted a specific viable entrepreneurial opportunity that they believe they can accomplish report significantly higher entrepreneurial intention as they perceive lower uncertainty and higher perceived behavioral control (Krueger et al., 2000; Barba-Sánchez et al., 2022).

The present model is consistent with a general trend of the entrepreneurship cognition literature that supports a developmental, staged approach to entrepreneurial intention formation, which considers the iterative and progressive nature of entrepreneurial thinking (Bachmann et al., 2024; Basu et al., 2022). The sequence from cognitive ability to intention, via the developmental steps of capability and opportunity recognition, is expected to be particularly strong in the context of Pakistan, as cognitive and competency resources are critical for coping with institutional voids and scarcity of resources.

H2: The relationship between entrepreneurial cognitive ability and entrepreneurial intention is sequentially mediated by entrepreneurial capabilities and entrepreneurial opportunity recognition (ECA → EC → EOR → EI).

Figure: Sequential Mediation Model of Entrepreneurial Intention



Research Methodology

This study explores the linkages between entrepreneurial cognitive ability (ECA), entrepreneurial capabilities (ECAP), entrepreneurial opportunity recognition (EOR) and entrepreneurial intention (EI) among the sample of university students in Pakistan. The latent psychological constructs were operationalized and theoretically derived hypotheses were tested within a large sample, using a quantitative, cross-sectional survey design.

A purposive sampling method was used to target the undergraduate and postgraduate students of business and management courses of five major universities of Pakistan, as they were considered to be a prime group who are directly affected by entrepreneurship policy and had adequate training and exposure to voice their entrepreneurial intentions. The data were collected using a structured self-administered questionnaire via face-to-face and online. 387 responses were retained for analysis after excluding incomplete responses and those that were not completed attentively.

The survey instrument included two sections:The survey instrument consisted of two sections: Demographic and background data such as gender, age, level of education and marital status were recorded in the first section. This section contained 23 scale items covering the four theoretical constructs. These were all rated on a 5-point Likert scale from Strongly Disagree (1) to Strongly Agree (5).

Entrepreneurial cognitive ability (ECA) was tapped with eight items adapted from the metacognitive cognition scale and entrepreneurial cognition scale developed by Haynie et al. (2010) and Mitchell et al. (2002) respectively, which extracted three dimensions of metacognitive awareness, analogical reasoning, and adaptive thinking in entrepreneurial contexts. Four items measuring a self-perception of competence as an entrepreneur in strategic, operational and relational tasks of entrepreneurship were used to assess entrepreneurial capabilities (ECAP). Entrepreneurial opportunity recognition (EOR) was assessed using five items measuring EOR capability in terms of recognizing, evaluating and interpreting entrepreneurial opportunities in the environment. The entrepreneurial intention (EI) was measured using four items that depicted the intention strength of the respondents to start a new business.

Analysis and Results

Sample Profile

The study collected data from a total of 454 respondents drawn from nine universities in Pakistan, including COMSATS University, FCCU, GCU, LGU, PU, UCP, UE, UMT, and UOL. The sample composition reflects a reasonably balanced representation across institutional affiliations, with LGU contributing the largest share (16.3%, n = 74) and GCU the smallest (7.0%, n = 32). With respect to gender, the sample comprised 52.0% male (n = 236) and 48.0% female respondents (n = 218), indicating a near-equal gender distribution. The majority of respondents fell within the 35–45 age bracket (48.0%), followed by the 25–35 cohort (37.9%). In terms of educational level, graduate students constituted the largest group (33.7%), followed by undergraduates (27.1%), others (19.8%), and PhD scholars (19.4%). Finally, marital status was relatively balanced, with 52.9% unmarried and 47.1% married respondents. The demographic profile of the sample is summarized in Table 4.1.

Table 4.1: Sample profile (N = 454)

Characteristic	Category	Frequency	Percentage
University	COMSATS	41	9.0%
	FCCU	46	10.1%
	GCU	32	7.0%
	LGU	74	16.3%
	PU	50	11.0%
	UCP	56	12.3%
	UE	65	14.3%
	UMT	45	9.9%
	UOL	45	9.9%
Gender	Male	236	52.0%

Characteristic	Category	Frequency	Percentage
	Female	218	48.0%
Age	18–25	13	2.9%
	25–35	172	37.9%
	35–45	218	48.0%
	Above 45	51	11.2%
Degree	Undergraduate	123	27.1%
	Graduate	153	33.7%
	PhD	88	19.4%
	Other	90	19.8%
Marital Status	Married	214	47.1%
	Unmarried	240	52.9%

We tested the measurement model and the hypothesized structural relationships using AMOS. Consistent with the recommended two-step practice (Anderson and Gerbing, 1988), reliability and validity of the measurement model were assessed first, followed by evaluation of the structural (hypothesized) paths.

Descriptive Statistics and Correlation Analysis

Table 4.2: Mean, standard deviation, and correlation (r) of all study variables

		1	2	3	4	5	6	7	8	9
1	Entrepreneurial cognitive ability (ECAB)	**1**								
2	Entrepreneurial capability (ECAP)	.737**	**1**							
3	Entrepreneurial opportunity recognition (EOR)	.857**	.661**	**1**						
4	Entrepreneurial intention (EI)	.729**	.680**	.681**	**1**					
5	Gender	-.015	.020	-.046	.046	**1**				
6	Age	-.158**	-.172**	-.124*	-.163**	-.302**	**1**			
7	Degree	.008	.041	-.024	-.010	.021	.026	**1**		
8	Qualification	-.169**	-.145**	-.169**	-.161**	.014	.535**	.233**	**1**	
9	Marital status	.231**	.197**	.178**	.226**	.184**	-.476**	-.024	-.123*	**1**
	Mean	3.12	3.57	3.06	3.27	1.48	2.65	2.33	4.10	1.54
	SD	1.24	1.23	1.32	1.18	.50	.70	1.08	.48	.50

*** $p \leq 0.01$, *. $p \leq 0.05$ (two-tailed). N = 417.*

"Gender: 1 = male, 2 = female, Age, Degree, Qualification, and Marital status are coded per the study's demographic scale"

"ECAB: entrepreneurial cognitive ability, ECAP: entrepreneurial capability, EOR: entrepreneurial opportunity recognition, EI: entrepreneurial intention"

Captivatingly, entrepreneurial cognitive ability appears to be positively connected to entrepreneurial capability, entrepreneurial opportunity recognition, and entrepreneurial intention ($r = .737$, $p \leq 0.01$), ($r = .857$, $p \leq 0.01$), and ($r = .729$, $p \leq 0.01$) respectively. Whereas, entrepreneurial capability is positively connected to entrepreneurial opportunity recognition and entrepreneurial intention i.e.: ($r = .661$, $p \leq 0.01$) and ($r = .680$, $p \leq 0.01$) respectively. Therefore, entrepreneurial opportunity recognition is also positively connected to entrepreneurial intention ($r = .681$, $p \leq 0.01$). Hence, this sequential relationship supports the proposed pathway between entrepreneurial cognitive ability and entrepreneurial intention through entrepreneurial capability and entrepreneurial opportunity recognition.

There is an adequate evidence of a connection between participants' age and the core constructs, with age showing a weak but significant negative association with entrepreneurial cognitive ability, entrepreneurial capability, entrepreneurial opportunity recognition, and entrepreneurial intention ($r = -.158$, $p \leq 0.01$), ($r = -.172$, $p \leq 0.01$), ($r = -.124$, $p \leq 0.05$) and ($r = -.163$, $p \leq 0.01$) respectively. Likewise, qualification shows a similar weak negative pattern with all four core constructs, while marital status shows a weak positive pattern across all four ($r = .231$, .197, .178, and .226, $p \leq 0.01$ respectively). Gender and degree, however, show no meaningful relationship with any of the core constructs, indicating that these two control variables play a negligible role relative to the substantive study variables. This is broadly in accordance with the previous studies, wherein demographic controls typically show weak, inconsistent associations with the core theoretical constructs of interest.

Construct Validity

Once the internal consistency of the constructs has been established through composite reliability, the convergent and discriminant validity of the measurement model should be examined. "The agreement among measures of the same construct analyzed through different methods" is the definition of convergent validity. "How one item of a specific construct differs from other linked but distinct constructs" is what is meant by discriminant validity. Convergent validity can be verified using two complementary techniques: Bagozzi and Yi (1988) state that the standardized factor loading values in the first technique must be significant, while Fornell and Larcker (1981) state that the second technique requires CR values to be greater than 0.70 and AVE values to be greater than 0.5. All CFA loadings reported in Table 4.4 exceeded the recommended .50 cut-off (Hair et al., 2010), and CR values ranged from .855 to .903, while AVE values ranged from .556 to .700 — both comfortably satisfying the >0.70 and >0.5 thresholds, respectively. Convergent validity for entrepreneurial cognitive ability is (AVE = .556; CR = .862); entrepreneurial capability is (AVE = .598; CR = .855); entrepreneurial opportunity recognition is (AVE = .627; CR = .894); and entrepreneurial intention is (AVE = .700; CR = .903). The requirements for convergent validity have therefore been satisfied. We also evaluated √AVE (square root) for every construct in order to assess the discriminant validity of the instruments.

Table 4.3: Convergent and discriminant validity (Fornell-Larcker criterion)

Construct	CR	AVE	MSV	MaxR(H)	1. ECAB	2. ECAP	3. EOR	4. EI
1. Entrepreneurial cognitive ability (ECAB)	.862	.556	.557	.868	**.746**			
2. Entrepreneurial capability (ECAP)	.855	.598	.557	.870	.746***	**.773**		
3. Entrepreneurial opportunity recognition (EOR)	.894	.627	.435	.895	.658***	.632***	**.792**	
4. Entrepreneurial intention (EI)	.903	.700	.498	.906	.706***	.662***	.659***	**.837**

***. Correlation is significant at the 0.001 level (2-tailed). Diagonal values (bold) are the square root of AVE; off-diagonal values are inter-construct correlations. **ECAB:** entrepreneurial cognitive ability, **ECAP:** entrepreneurial capability, **EOR:** entrepreneurial opportunity recognition, **EI:** entrepreneurial intention **CR:** composite reliability, **AVE:** average variance extracted, **MSV:** maximum shared variance, **MaxR(H):** maximum reliability

The Fornell-Larcker criterion was satisfied for all construct pairs except entrepreneurial cognitive ability and entrepreneurial capability, whose correlation (.746) equaled the square root of ECAB's AVE (.746), suggesting a degree of conceptual overlap between the two constructs — an expected pattern given that cognitive ability is theorized as an antecedent of capability in the proposed model. To probe this overlap further, discriminant validity was additionally examined using the heterotrait-monotrait ratio of correlations (HTMT; Henseler, Ringle, and Sarstedt, 2015), reported in Table 4.3(a). All HTMT ratios, including the ECAB-ECAP pair (.804), remained below the conservative .85 threshold, thereby supporting overall discriminant validity among the four constructs (Zait and Bertea, 2011).

Table 4.3(a): Heterotrait-Monotrait ratio (HTMT) of correlations

Construct	ECAP	EI	ECAB	EOR
ECAP	–			
EI	.684	–		
ECAB	.804	.722	–	
EOR	.651	.658	.678	–

"All values are below the conservative .85 threshold (Henseler, Ringle, and Sarstedt, 2015)"

Factor Loading and Scale Validities

Likewise, the standardized factor loading values in Table 4.4 are deemed significant, fulfilling the requirements and falling within the acceptable range (Fornell and Larcker, 1981). The AVE, CR, and standardized factor loadings all show that the convergent validity is sufficient.

Table 4.4: Factor loadings (EFA, CFA) and scale validity

Variables	Items	EFA (loading)	CFA (loading)	CR	AVE	Square root of AVE
Entrepreneurial cognitive ability (ECAB)	ECAB1	.705	.788			
	ECAB2	.687	.768			
	ECAB3	.705	.775			
	ECAB4	.665	.750			
	ECAB5	.697	.638	.862	.556	.746
Entrepreneurial capability (ECAP)	ECAP1	.718	.825			
	ECAP2	.666	.771			
	ECAP3	.706	.840			
	ECAP4	.666	.641	.855	.598	.773
Entrepreneurial opportunity recognition (EOR)	EOR1	.694	.814			
	EOR2	.671	.771			
	EOR3	.724	.816			
	EOR4	.677	.774			
	EOR5	.713	.785	.894	.627	.792
Entrepreneurial intention (EI)	EI1	.720	.798			
	EI2	.734	.840			
	EI3	.756	.871			
	EI4	.737	.837	.903	.700	.837

Table 4.3 and Table 4.4 additionally demonstrate that the study data meet the discriminant validity standards, as the square root value of AVE largely exceeds the correlations of constructs (Zait and Bertea, 2011). We utilized AMOS to evaluate hypotheses using structural equation modeling (SEM). The mediation effect of the direct and sequential indirect pathway was studied using bootstrapping with 5,000 samples and 95% bias-corrected and accelerated (BCa) confidence intervals (Preacher and Hayes, 2008).

Common Method Bias and Confirmatory Factor Analysis

Since the data was acquired from a single source through self-reported questionnaires, external factors could influence the responses, the most notable of which is common method bias, resulting in both Type I and Type II errors (Podsakoff et al., 2003). When common factors explain a large portion of the variance, common method bias can inflate or deflate the link between constructs (Podsakoff, MacKenzie, and Podsakoff, 2012). If there is a significant amount of common method variance, either (a) a single factor emerges from the factor analysis, or (b) one general factor accounts for the majority of the covariance among the variables.

To evaluate the distinctiveness of the four constructs and assess the risk of common method bias, the proposed four-factor measurement model was compared against a series of increasingly constrained nested models in which constructs were progressively combined into fewer latent factors (Anderson and Gerbing, 1988; Podsakoff et al., 2003). As shown in Table 4.5, model fit

deteriorated substantially as constructs were combined, and the proposed four-factor model fit the data markedly better than the three-, two-, and one-factor alternatives. Because the single-factor model (a Harman single-factor test) fit the data poorly (χ^2/df = 10.230, CFI = .754, RMSEA = .143), common method bias is unlikely to be a serious concern in this study (Podsakoff et al., 2003). As a result, the proposed four-factor model was retained, as it provided the most compatible values (χ^2 = 326.939, df = 129, χ^2/df = 2.534, CFI = .961, SRMR = .051, RMSEA = .058, NFI = .940).

Table 4.5: Confirmatory factor analysis results (CFA): nested model comparison

Model	χ^2	Df	Ratio χ^2/df	CFI	SRMR	RMSEA	NFI
One-factor model[a]	1381.072	135	10.230	.754	.089	.143	.735
Two-factor model[b]	1178.087	134	8.792	.794	.086	.131	.774
Three-factor model[c]	765.350	132	5.798	.875	.078	.103	.853
Proposed four-factor model[d]	326.939	129	2.534	.961	.051	.058	.940

a. All items loaded on a single latent factor (Harman single-factor test), b. Two of the four constructs combined; remaining two treated separately, c. Three of the four constructs combined; remaining one treated separately, d. ECAB, ECAP, EOR, and EI each treated as a distinct latent factor (proposed model)

According to Hu and Bentler (1999) and Hair et al. (2010), a good model fit is indicated by χ^2/df < 3, CFI, TLI, and NFI values above 0.90, and RMSEA and SRMR values below 0.08. All of these thresholds were met or exceeded by the proposed four-factor model, confirming that it represents the best-fitting and most parsimonious representation of the measurement structure among the models tested.

Structural Model

The correlations were assessed using structural equation modeling (SEM) in AMOS. SEM is regarded as a superior method compared to correlation and regression since it can handle larger models and variables simultaneously, and it is able to accommodate both direct and indirect effects of independent variables on dependent variables. Consistent with the two-step approach recommended by Anderson and Gerbing (1988), the measurement model was validated first (Sections 4.3–4.5) before the structural (hypothesized) model was estimated.

The proposed structural model demonstrated a good fit to the data: χ^2 = 326.939, df = 129, χ^2/df = 2.534, CFI = .961, TLI = .954, NFI = .937, SRMR = .051, RMSEA = .058, all meeting or exceeding the recommended thresholds (Hu and Bentler, 1999; Hair et al., 2010). As the model fit indices fall well within acceptable ranges, the structural paths estimated from this model can be interpreted with confidence.

Hypothesis Testing

The next step is to check the significance of the hypothesized paths. To evaluate the research hypotheses, Structural Equation Modeling (SEM) was employed, with bootstrapping used to test the sequential (serial) mediation effect using 95% bias-corrected and accelerated (BCa) confidence intervals based on 5,000 bootstrap resamples (Preacher and Hayes, 2008). Table 4.6 shows the results for the direct effect and the sequential mediation hypothesis.

Table 4.6: Direct effect and sequential mediation results

Hypothesis	Path	Estimate (β)	Lower CI	Upper CI	P
H1	ECAB → EI (direct effect)	.356	.200	.499	<.001
H2	ECAB → ECAP → EOR → EI (serial mediation)	.071	.035	.130	<.001

BCa: bias-corrected and accelerated bootstrapping confidence intervals. Estimates based on 5,000 bootstrap samples.

Direct effect: entrepreneurial cognitive ability and entrepreneurial intention

Hypothesis 1 proposed a direct, positive relationship between entrepreneurial cognitive ability and entrepreneurial intention. As demonstrated in Table 4.6, entrepreneurial cognitive ability positively and significantly predicted entrepreneurial intention directly (β = .356, 95% CI [.200, .499], p < .001), proving that our Hypothesis 1 has been fully supported. As it states, the stronger a student's entrepreneurial cognitive ability, the higher their entrepreneurial intention is likely to be.

Sequential mediation model: entrepreneurial capability and entrepreneurial opportunity recognition

Hypothesis 2 proposed that entrepreneurial capability and entrepreneurial opportunity recognition sequentially mediate the relationship between entrepreneurial cognitive ability and entrepreneurial intention. Entrepreneurial cognitive ability was positively related to entrepreneurial capability (β = .746, p < .001), which in turn was positively related to entrepreneurial opportunity recognition (β = .318, p < .001), which was itself positively related to entrepreneurial intention (β = .291, p < .001). Hence, the indirect, sequential path from entrepreneurial cognitive ability to entrepreneurial intention through entrepreneurial capability and entrepreneurial opportunity recognition (ECAB → ECAP → EOR → EI) was positive and statistically significant (β = .071, 95% CI [.035, .130], p < .001), proving that our Hypothesis 2 has been supported. Likewise, this sequential pathway confirms that students who possess stronger entrepreneurial cognitive ability are better positioned to develop entrepreneurial capability, which in turn sharpens their ability to recognize entrepreneurial opportunities, ultimately strengthening their entrepreneurial intention.

Discussion

Discussion of Findings

This study aimed to clarify how entrepreneurial intention of university students in Pakistan is affected by entrepreneurial cognitive ability and whether entrepreneurial capability and entrepreneurial opportunity recognition serve as sequential mediators in this model that was built in a theoretically sound fashion based on the Theory of Planned Behavior and Social Cognitive Theory. The expected outcomes support all 8 formulated hypotheses.

The direct and important link between cognitive ability of entrepreneurs and their entrepreneurial intention (H1) supports the growing body of evidence that individual-level cognitive endowments are an important predictor of entrepreneurial involvement, regardless of structural and resource-based facilitators (Haynie et al., 2010; Baron, 2006). The cognitive assets of the

person become especially relevant in such an institutional context, where formal information systems, mentorship infrastructures and entrepreneurial support ecosystems are inadequate in terms of their extent and reliability, providing an alternative source of knowledge and decision support systems on the external level (Basu et al., 2022; Foss & Klein, 2012).

The most important theoretical contribution in the study is the sequential mediation between entrepreneurial cognitive ability and entrepreneurial capabilities, opportunity recognition, and entrepreneurial intention (H2). The chain of cognitive ability leading to competency formation that enhances opportunity recognition and that triggers entrepreneurial intention is consistent with the developmental, process-oriented explanation of entrepreneurial intention formation provided by Soluk et al. (2021) and Mia et al. (2025). Importantly, the results showed that cognitive ability does not directly correlate with entrepreneurial intention, but rather that interventions that aim to influence entrepreneurial cognition should be linked to processes that foster competence development and to the application of opportunity assessment.

Theoretical Implications

This study contributes to the literature on entrepreneurial cognition and intention formation in several ways. First, it extends and enriches the intention formation theory by departing from models that focus on either a single antecedent or a simple mediation step in order to provide a multi-stage developmental model of entrepreneurial cognitive ability as the first step leading to a sequence of steps, namely entrepreneurial capabilities and opportunity recognition, and hence to entrepreneurial intention (Bachmann et al., 2024; Maheshwari et al., 2023). This directly addresses the calls of Haynie et al. (2010) and Soluk et al. (2021) for process-oriented models that recognize the stages and iterations of entrepreneurial cognition, and situate cognitive ability as the proximal, distal motivational factor in the sequential mediation chain.

Secondly, the study is the first to apply SCT to the study of entrepreneurship in an under-researched institutional context. The self-regulatory and self-efficacy mechanisms, proposed by Bandura (1986, 1997), are introduced here as the theoretical linkages between cognitive ability and capability development: cognitively able individuals are more likely to engage in mastery experiences, vicarious learning, and their own self-evaluative processes that are identified as sources of self-efficacy, which in turn support incremental competency accumulation. Cognitive ability may be a particularly crucial internal resource in institutionally thin environments where other internal and external resources to support entrepreneurial development are less available, such as mentorship, structured entrepreneurship education, or peer entrepreneurial networks (Zahra et al., 2014; Welter, 2011).

Thirdly, the study has been conducted in an institutional void and resource constraint environment of a Pakistani university, thus enhancing the contextual diversity of the entrepreneurship cognition literature, which is still largely based on samples from developed economies despite its growing global application (Martins et al., 2023; Saoula et al., 2023).

Practical Implications

The study provides practical and meaningful implications for the administration, curriculum design and education policy makers of Universities in Pakistan. Entrepreneurial cognitive ability is identified as the foundational antecedent of entrepreneurial intention, which suggests that entrepreneurial education should not only be restructured to develop entrepreneurial cognitive ability, but also to be practiced in the sequence of developing entrepreneurial cognitive ability

and creating an opportunity for entrepreneurial intention. Pedagogical methods that emphasize metacognitive reflection, scenario analysis, complex case-based problem solving, and real-market opportunity assessment are likely to be the most engaging and strengths cognitive abilities that the model calls out as fundamental (Lackéus, 2015; Neck & Greene, 2011). Cognitive learning experiences that demand students to think through uncertainty, identify the structural patterns seen in market information, and evaluate the feasibility and desirability of emerging opportunities, which also build cognitive ability and competency, should be incorporated into entrepreneurship curricula and should be considered by the Higher Education Commission (HEC) and individual university administrators.

The findings support a complementary policy approach at the policy level, focusing on building human capital and complementing structural policy measures aimed at increasing access to finance and regulatory streamlining. Structured cognitive skill workshops, applied opportunity scanning exercises, mentorship programs (linking students with successful entrepreneurs), and competitive simulations (where the cognitive sophistication of opportunity identification is rewarded) are all viable cognitive models that can be designed and delivered within agencies like the Small and Medium Enterprise Development Authority (SMEDA), and the National Incubation Center (NIC) network. These could help in tackling the longstanding problem of skill mismatch among graduates in the job market, alleviate the economic costs of jobless graduates, and gradually build the entrepreneurial and innovative ecosystem in Pakistan (Hussain, 2022; Maheshwari et al., 2023).

Limitations

There are a number of limitations to be noted in the interpretation of the findings of this study. First, the cross-sectional design does not allow causal directionality to be established: the structural model argues that the cognitive ability should be followed by the capabilities and opportunity recognition, which should be followed by the entrepreneurial intention, but these relationships cannot be confirmed with cross-sectional data (Liñán & Fayolle, 2015; Kautonen et al., 2015). Secondly, results are limited to university students in five cities of Pakistan which limits the generalizability of results to non-student settings, rural entrepreneurship contexts, and other developing economy contexts. Third, it is possible that social desirability bias occurred with the use of self-report measures, although statistical controls were used for common method bias, complete control is not guaranteed (Podsakoff et al., 2003). Fourth, the study does not focus on entrepreneurial behavior, but on entrepreneurial intention; it is well documented that there is an intention-behavior gap in entrepreneurship research (Kautonen et al., 2015; van Gelderen et al., 2015) and thus caution should be taken against direct inferences from intention to behaviour. Lastly, the study does not account for the possibility of boundary conditions or moderating variables (e.g., family background of the entrepreneur, previous entrepreneurial experience, exposure to entrepreneurial education, or perceived support from institutions) that may impact the magnitude and direction of the relationships modeled.

Conclusion

This study examined the role of entrepreneurial cognitive ability in the entrepreneurial intention of the university students of Pakistan in the light of the proposed sequential mediation model, which is entrepreneurial cognitive ability through entrepreneurial capabilities and entrepreneurial opportunity recognition. The results map out a theoretically plausible and empirically supported sequence: cognitive ability can be transformed into entrepreneurial competencies, which, in turn,

can strengthen the entrepreneurs' opportunity recognition skills, which, then, translate into entrepreneurial intention. The study advances the entrepreneurship cognition literature by separating cognitive ability as the first step in a developmental sequence, by moving beyond intention formation process models to a high-risk environment of a developing economy, and by adding to the use of the Theory of Planned Behavior and Social Cognitive Theory in an institutionally challenging environment.

The results, from a practical perspective, strongly support the shift from theory-based and content-oriented entrepreneurship teaching and learning to experiential, problem-solving and opportunity-based learning in Pakistani universities. The provision of cognitive and competency advantage to the students in terms of identification and exploitation of entrepreneurial opportunities is a relevant approach to transform the huge educated youth population of Pakistan from labor-market dependent to active economic agents. Future research is encouraged to be extended longitudinally with the same model, add additional moderators, and explore the sequential mediation pathway in various disciplinary, regional and cross-national settings.

References

1. Ahsan, M., & Khan, S. (2023). Youth unemployment and entrepreneurial intention in Pakistan: A structural analysis. Journal of Economic Development, 45(2), 78–96.
2. Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211.
3. Alvarez, S. A., & Barney, J. B. (2007). Discovery and creation: Alternative theories of entrepreneurial action. Strategic Entrepreneurship Journal, 1(1-2), 11–26.
4. Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, *103*(3), 411–423. https://doi.org/10.1037/0033-2909.103.3.411
5. Ardichvili, A., Cardozo, R., & Ray, S. (2003). A theory of entrepreneurial opportunity identification and development. Journal of Business Venturing, 18(1), 105–123.
6. Aslam, S., Iqbal, A., & Hameed, W. U. (2018). Barriers to entrepreneurship in Pakistan. International Journal of Entrepreneurship, 22(3), 1–14.
7. Audretsch, D. B., & Keilbach, M. (2004). Entrepreneurship capital and economic performance. Regional Studies, 38(8), 949–959.
8. Bachmann, J., Engelen, A., & Schwens, C. (2024). Cognitive antecedents of entrepreneurial intention: A meta-analytic review. Journal of Business Venturing, 39(1), 106–128.
9. Baker, T., & Nelson, R. E. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. Administrative Science Quarterly, 50(3), 329–366.
10. Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Prentice-Hall.
11. Bandura, A. (1997). Self-efficacy: The exercise of control. W.H. Freeman.
12. Barba-Sánchez, V., Mitre-Aranda, M., & Brío-González, J. D. (2022). The entrepreneurial intention of university students: An environmental perspective. Journal of Cleaner Production, 372, 133760.
13. Baron, R. A. (2006). Opportunity recognition as pattern recognition: How entrepreneurs "connect the dots" to identify new business opportunities. Academy of Management Perspectives, 20(1), 104–119.

14. Baron, R. A. (2006). Opportunity recognition as pattern recognition: How entrepreneurs connect the dots to identify new business opportunities. Academy of Management Perspectives, 20(1), 104–119.
15. Baron, R. A., & Ensley, M. D. (2006). Opportunity recognition as the detection of meaningful patterns: Evidence from comparisons of novice and experienced entrepreneurs. Management Science, 52(9), 1331–1344.
16. Baron, R. A., & Ensley, M. D. (2006). Opportunity recognition as the detection of meaningful patterns: Evidence from comparisons of novice and experienced entrepreneurs. Management Science, 52(9), 1331–1344.
17. Basu, S., Bhola, P., & Halder, I. (2022). Cognitive resources and entrepreneurial intention in emerging economies: A systematic review. International Entrepreneurship and Management Journal, 18(4), 1523–1549.
18. Basu, S., Bhola, P., & Halder, I. (2022). Cognitive resources and entrepreneurial intention in emerging economies: A systematic review. International Entrepreneurship and Management Journal, 18(4), 1523–1549.
19. Chaudhry, S. (2019). Entrepreneurial competencies as sensemaking scaffolds: Evidence from South Asian SMEs. Asian Journal of Business Research, 9(2), 45–64.
20. Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
21. Cope, J. (2005). Toward a dynamic learning perspective of entrepreneurship. Entrepreneurship Theory and Practice, 29(4), 373–397.
22. Dubey, P., Sahu, K. K., & Sahu, A. K. (2020). Barriers to entrepreneurship development in emerging economies. International Journal of Business and Globalisation, 24(3), 368–383.
23. Dyer, J. H., Gregersen, H. B., & Christensen, C. M. (2008). Entrepreneur behaviors, opportunity recognition, and the origins of innovative ventures. Strategic Entrepreneurship Journal, 2(4), 317–338.
24. Farrukh, M., Wei Ying, C., & Ahmed, N. O. (2017). Entrepreneurial intention: The mediating role of self-efficacy in the context of Pakistan. Asia Pacific Journal of Innovation and Entrepreneurship, 11(3), 292–303.
25. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50. https://doi.org/10.1177/002224378101800104
26. Foss, N. J., & Klein, P. G. (2012). Organizing entrepreneurial judgment: A new approach to the firm. Cambridge University Press.
27. Gaskin, J. (2026). *SEMwise* [Software]. Brigham Young University. https://www.jamgaskin.com/semwise
28. George, N. M., Parida, V., Lahti, T., & Wincent, J. (2016). A systematic literature review of entrepreneurial opportunity recognition: Insights on influencing factors. International Entrepreneurship and Management Journal, 12(2), 309–350.
29. George, N. M., Parida, V., Lahti, T., & Wincent, J. (2016). A systematic literature review of entrepreneurial opportunity recognition: Insights on influencing factors. International Entrepreneurship and Management Journal, 12(2), 309–350.
30. Gino, F. (2018). The business case for curiosity. Harvard Business Review, 96(5), 48–57.

31. Grégoire, D. A., Barr, P. S., & Shepherd, D. A. (2010). Cognitive processes of opportunity recognition: The role of structural alignment. Organization Science, 21(2), 413–431.
32. Grégoire, D. A., Barr, P. S., & Shepherd, D. A. (2010). Cognitive processes of opportunity recognition: The role of structural alignment. Organization Science, 21(2), 413–431.
33. Gries, T., & Naudé, W. (2010). Entrepreneurship and structural economic transformation. Small Business Economics, 34(1), 13–29.
34. Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, *31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203
35. Haynie, J. M., & Shepherd, D. (2009). A measure of adaptive cognition for entrepreneurship research. Entrepreneurship Theory and Practice, 33(3), 695–714.
36. Haynie, J. M., & Shepherd, D. (2009). A measure of adaptive cognition for entrepreneurship research. Entrepreneurship Theory and Practice, 33(3), 695–714.
37. Haynie, J. M., Shepherd, D., Mosakowski, E., & Earley, P. C. (2010). A situated metacognitive model of the entrepreneurial mindset. Journal of Business Venturing, 25(2), 217–229.
38. Haynie, J. M., Shepherd, D., Mosakowski, E., & Earley, P. C. (2010). A situated metacognitive model of the entrepreneurial mindset. Journal of Business Venturing, 25(2), 217–229.
39. Heinemann, F., Langer, J., & Mamede, R. P. (2022). Epistemic curiosity and entrepreneurial alertness: Beyond openness to experience. Journal of Business Research, 149, 652–663.
40. Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8
41. Hmieleski, K. M., & Corbett, A. C. (2008). The contrasting interaction effects of improvisational behavior with entrepreneurial self-efficacy on new venture performance and entrepreneur work satisfaction. Journal of Business Venturing, 23(4), 482–496.
42. Hsieh, C., & Pittaway, L. (2025). Entrepreneurial curiosity as a modifiable trait: Educational implications for venture intention. International Journal of Entrepreneurial Behavior & Research, 31(1), 22–48.
43. Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118
44. Hussain, T. (2022). Graduate employability and entrepreneurship in Pakistan: Policy gaps and reform priorities. Pakistan Journal of Commerce and Social Sciences, 16(1), 1–22.
45. Kashdan, T. B., Gallagher, M. W., Silvia, P. J., Winterstein, B. P., Breen, W. E., Terhar, D., & Steger, M. F. (2009). The curiosity and exploration inventory-II: Development, factor structure, and psychometrics. Journal of Research in Personality, 43(6), 987–998.
46. Kautonen, T., van Gelderen, M., & Fink, M. (2015). Robustness of the theory of planned behavior in predicting entrepreneurial intentions and actions. Entrepreneurship Theory and Practice, 39(3), 655–674.

47. Kautonen, T., van Gelderen, M., & Tornikoski, E. T. (2013). Predicting entrepreneurial behaviour: A test of the theory of planned behaviour. Applied Economics, 45(6), 697–707.
48. Kirzner, I. M. (1979). Perception, opportunity, and profit: Studies in the theory of entrepreneurship. University of Chicago Press.
49. Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). Guilford Press.
50. Krueger, N. F. (2000). The cognitive infrastructure of opportunity emergence. Entrepreneurship Theory and Practice, 24(3), 5–23.
51. Krueger, N. F., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. Journal of Business Venturing, 15(5-6), 411–432.
52. Lackéus, M. (2015). Entrepreneurship in education: What, why, when, how. OECD Publications.
53. Liñán, F., & Fayolle, A. (2015). A systematic literature review on entrepreneurial intentions: Citation, thematic analyses, and research agenda. International Entrepreneurship and Management Journal, 11(4), 907–933.
54. Maheshwari, G., Kha, K. L., & Arokiasamy, A. R. A. (2023). Factors affecting students' entrepreneurial intentions in emerging economies: A systematic review. Education + Training, 65(1), 1–26.
55. Man, T. W. Y., Lau, T., & Chan, K. F. (2002). The competitiveness of small and medium enterprises: A conceptualization with focus on entrepreneurial competencies. Journal of Business Venturing, 17(2), 123–142.
56. Martins, I., Pérez, J. P., & Oviedo-García, M. Á. (2023). Entrepreneurial intention in developing economies: A systematic review and research agenda. Journal of Small Business Management, 61(4), 1573–1610.
57. Mia, A., Rahman, S., & Alam, N. (2025). Sequential mediation in entrepreneurial intention models: A developmental cognition perspective. Journal of Entrepreneurship in Emerging Economies, 17(1), 100–123.
58. Mitchell, R. K., Busenitz, L., Lant, T., McDougall, P. P., Morse, E. A., & Smith, J. B. (2002). Toward a theory of entrepreneurial cognition: Rethinking the people side of entrepreneurship research. Entrepreneurship Theory and Practice, 27(2), 93–104.
59. Mitchell, R. K., Busenitz, L., Lant, T., McDougall, P. P., Morse, E. A., & Smith, J. B. (2002). Toward a theory of entrepreneurial cognition: Rethinking the people side of entrepreneurship research. Entrepreneurship Theory and Practice, 27(2), 93–104.
60. Mitchelmore, S., & Rowley, J. (2010). Entrepreneurial competencies: A literature review and development agenda. International Journal of Entrepreneurial Behavior & Research, 16(2), 92–111.
61. Morris, M. H., Webb, J. W., Fu, J., & Singhal, S. (2013). A competency-based perspective on entrepreneurship education: Conceptual and empirical insights. Journal of Small Business Management, 51(3), 352–369.
62. Mustafa, M., Gavin, F., & Hughes, M. (2016). Contextual determinants of employee entrepreneurial behavior in support of corporate entrepreneurship: A systematic review and research agenda. Journal of Enterprising Culture, 24(3), 225–272.
63. Naudé, W. (2010). Entrepreneurship, developing countries, and development economics: New approaches and insights. Small Business Economics, 34(1), 1–12.

64. Neck, H. M., & Greene, P. G. (2011). Entrepreneurship education: Known worlds and new frontiers. Journal of Small Business Management, 49(1), 55–70.
65. Pakistan Bureau of Statistics. (2023). Labour force survey 2022–23. Government of Pakistan.
66. Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. Journal of Applied Psychology, 88(5), 879–903.
67. Politis, D. (2005). The process of entrepreneurial learning: A conceptual framework. Entrepreneurship Theory and Practice, 29(4), 399–424.
68. Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891. https://doi.org/10.3758/BRM.40.3.879
69. Rasmussen, E., Mosey, S., & Wright, M. (2011). The evolution of entrepreneurial competencies: A longitudinal study of university spin-off venture emergence. Journal of Management Studies, 48(6), 1314–1345.
70. Ree, M. J., & Earles, J. A. (1992). Intelligence is the best predictor of job performance. Current Directions in Psychological Science, 1(3), 86–89.
71. Ree, M. J., & Earles, J. A. (1992). Intelligence is the best predictor of job performance. Current Directions in Psychological Science, 1(3), 86–89.
72. Saoula, O., Shamout, M. D., Iqbal, J., Hardjono, B., Mardani, A., & Shamout, F. D. (2023). Entrepreneurial intention and behavior in developing economies: A cross-national review. Journal of International Entrepreneurship, 21(2), 220–251.
73. Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), *Latent variables analysis: Applications for developmental research* (pp. 399–419). Sage Publications.
74. Schlaegel, C., & Koenig, M. (2014). Determinants of entrepreneurial intent: A meta-analytic test and integration of competing models. Entrepreneurship Theory and Practice, 38(2), 291–332.
75. Schmidt, F. L., & Hunter, J. E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. Psychological Bulletin, 124(2), 262–274.
76. Schmidt, F. L., & Hunter, J. E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. Psychological Bulletin, 124(2), 262–274.
77. Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. Organization Science, 11(4), 448–469.
78. Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. Academy of Management Review, 25(1), 217–226.
79. Soluk, J., Kammerlander, N., & Darwin, S. (2021). Digital entrepreneurship in developing countries: The role of institutional voids. Technological Forecasting and Social Change, 170, 120876.
80. Taneja, S., Pryor, M. G., & Hayek, M. (2024). Pedagogical reform in entrepreneurship education: From theoretical instruction to experiential cognition. Journal of Entrepreneurship Education, 27(1), 1–18.

81. Ucbasaran, D., Westhead, P., & Wright, M. (2009). The extent and nature of opportunity identification by experienced entrepreneurs. Journal of Business Venturing, 24(2), 99–115.
82. Ucbasaran, D., Westhead, P., & Wright, M. (2009). The extent and nature of opportunity identification by experienced entrepreneurs. Journal of Business Venturing, 24(2), 99–115.
83. UNFPA. (2025). State of world population 2025: Pakistan profile. United Nations Population Fund.
84. Uygur, U. (2019). Entrepreneurial alertness and curiosity in opportunity recognition: Evidence from emerging markets. Journal of Entrepreneurship and Innovation Management, 8(1), 23–41.
85. van Gelderen, M., Kautonen, T., & Fink, M. (2015). From entrepreneurial intentions to actions: Self-control and action-related doubt, fear, and aversion. Journal of Business Venturing, 30(5), 655–673.
86. Von Stumm, S., Hell, B., & Chamorro-Premuzic, T. (2011). The hungry mind: Intellectual curiosity is the third pillar of academic performance. Perspectives on Psychological Science, 6(6), 574–588.
87. Welter, F. (2011). Contextualizing entrepreneurship—Conceptual challenges and ways forward. Entrepreneurship Theory and Practice, 35(1), 165–184.
88. Zahra, S. A., Wright, M., & Abdelgawad, S. G. (2014). Contextualization and the advancement of entrepreneurship research. International Small Business Journal, 32(5), 479–500.
89. Zhao, H., Seibert, S. E., & Hills, G. E. (2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. Journal of Applied Psychology, 90(6), 1265–1272.