Qualitative Research Review Letter
https://qrrl.net/index.php/Journal/about
Online ISSN: 3007-0082
Print ISSN: 3007-0074
Vol. 3 No. 3 (2025) https://doi.org/10.5281/zenodo.16789990

THE DIGITAL ENTREPRENEUR'S JOURNEY:FROM COMPETENCY DEVELOPMENT TO BEHAVIORAL OUTCOMES THROUGH MEDIATING PSYCHOLOGICAL FACTORS

Muhammad Subhan[1*] [2]Aamar Ilyas ,[3]Muhammad Saqib [4]Raza Shahroz Gill [5]Sabtain Rasool

1.University of Central Punjab, Gujranwala Campus
2.Assistant Professor, University of Central Punjab, Gujranwala Campus
3.University of Central Punjab, Gujranwala Campus
4.University of Central Punjab, Gujranwala Campus

Abstract

This study examines the relationship between digital competency and entrepreneurial behavior, with entrepreneurial alertness, intention, and passion as mediating variables. Grounded in Human Capital Theory, Theory of Planned Behavior, Affective Events Theory, and Alertness-Opportunity Recognition Theory, the research proposes a comprehensive model to explain how digital skills translate into entrepreneurial actions. Using a quantitative, cross-sectional design, data were collected from 450 university students in Gujranwala, Pakistan, through structured questionnaires. Validated scales measured digital competency, entrepreneurial alertness, intention, passion, and behavior. Data were analyzed using SPSS 28 and Hayes' PROCESS macro for mediation analysis.Results supported all 10 direct hypotheses, revealing that digital competency significantly predicts entrepreneurial behavior ($\beta = 0.21$, $*p* < 0.001$) and has the strongest effect on entrepreneurial alertness ($\beta = 0.49$, $*p* < 0.001$). Entrepreneurial passion emerged as the most influential driver of behavior ($\beta = 0.47$, $*p* < 0.001$). All 11 mediation hypotheses were also supported, demonstrating significant indirect effects through alertness ($\beta = 0.16$), intention ($\beta = 0.18$), and passion ($\beta = 0.14$). Sequential mediation (digital competency → alertness → intention → behavior) further highlighted the cognitive-affective pathway ($\beta = 0.12$).The study contributes to entrepreneurship literature by integrating digital competency with established psychological constructs, offering a holistic framework for understanding entrepreneurial behavior in the digital age. Practical implications suggest that educators and policymakers should emphasize digital literacy programs to enhance entrepreneurial alertness, intention, and passion. Limitations include a region-specific sample and cross-sectional design, calling for future longitudinal and cross-cultural research. This research underscores the pivotal role of digital skills in fostering entrepreneurial success through cognitive and affective mechanisms.

Keywords: Digital Competency; Entrepreneurial Behavior; Entrepreneurial Alertness; Entrepreneurial Intention; Entrepreneurial passion.

Introduction

The rapid digital transformation of economies has redefined entrepreneurship, creating new opportunities and challenges for individuals and organizations alike. Digital competency—the ability to effectively use digital tools and technologies—has emerged as a critical skill for entrepreneurs in the 21st century (Nambisan, 2017;

Obschonka & Audretsch, 2020). As digital technologies permeate every aspect of business, from marketing to operations, entrepreneurs must possess the necessary digital skills to identify opportunities, innovate, and sustain competitive advantage (Giones & Brem, 2017). However, while digital competency is increasingly recognized as a key entrepreneurial enabler, its precise mechanisms in shaping entrepreneurial behavior remain underexplored.Entrepreneurial behavior is influenced by cognitive and affective factors, including entrepreneurial alertness (the ability to recognize opportunities) (Tang et al., 2012), entrepreneurial intention (the conscious decision to pursue entrepreneurial ventures) (Liñán & Fayolle, 2015), and entrepreneurial passion (intense positive feelings toward entrepreneurial activities) (Cardon et al., 2017). These factors may mediate the relationship between digital competency and entrepreneurial behavior, yet empirical research examining this interplay is limited.Recent studies suggest that digital competency enhances opportunity recognition by enabling entrepreneurs to access and analyze market data more efficiently (Hull et al., 2020). Additionally, digital skills may strengthen entrepreneurial intention by reducing perceived barriers to entry (Giones & Brem, 2017). Entrepreneurial passion, often fueled by digital engagement, may further drive persistence and innovation (Murnieks et al., 2020). Despite these insights, a comprehensive model integrating these variables is lacking, particularly in the context of rapidly evolving digital economies.The rise of digital entrepreneurship—fueled by platforms, e-commerce, and remote work—makes this investigation timely (Nambisan, 2017; Sahut et al., 2021). Furthermore, the COVID-19 pandemic accelerated digital adoption, making digital competency even more critical for entrepreneurial success (Kraus et al., 2021). Given these trends, understanding how digital competency influences entrepreneurial behavior through key mediating mechanisms is both academically and practically relevant.Statement of the Problem Despite growing recognition of digital competency as a driver of entrepreneurial success, existing research has not sufficiently examined its indirect effects through entrepreneurial alertness, intention, and passion. Previous studies have largely focused on direct relationships, such as digital skills and startup performance (Hull et al., 2020), without considering the psychological and cognitive pathways that may explain how digital competency translates into entrepreneurial behavior.This gap is significant because entrepreneurial behavior is not solely a function of skills but also of motivation, perception, and emotional engagement (Cardon et al., 2017). Without understanding these mediating mechanisms, interventions aimed at fostering entrepreneurship through digital literacy may overlook critical

psychological factors. Additionally, while some studies explore digital competency in isolation (Obschonka & Audretsch, 2020), few integrate it with well-established entrepreneurial constructs, leading to fragmented theoretical perspectives.Furthermore, most research on digital entrepreneurship originates from developed economies, leaving a gap in understanding these dynamics in emerging markets where digital infrastructure and entrepreneurial ecosystems differ (Sahut et al., 2021). Addressing this gap will provide a more holistic understanding of how digital competency influences entrepreneurial behavior across diverse contexts.Purpose of the Study This study aims to investigate the relationship between digital competency and entrepreneurial behavior, with entrepreneurial alertness, intention, and passion as mediating variables. Specifically, the research seeks to:Examine the direct effect of digital competency on entrepreneurial behavior.Assess the mediating role of entrepreneurial alertness in the relationship between digital competency and entrepreneurial behavior.Investigate the mediating role of entrepreneurial intention in the relationship between digital competency and entrepreneurial behavior Explore the mediating role of entrepreneurial passion in the relationship between digital competency and entrepreneurial behavior.By addressing these objectives, this study will contribute to a more nuanced understanding of how digital skills translate into entrepreneurial actions through cognitive and affective pathways. Research Questions To guide this investigation, the following research questions are proposed:

What is the direct effect of digital competency on entrepreneurial behavior?Does entrepreneurial alertness mediate the relationship between digital competency and entrepreneurial behavior?Does entrepreneurial intention mediate the relationship between digital competency and entrepreneurial behavior?Does entrepreneurial passion mediate the relationship between digital competency and entrepreneurial behavior?Significance of the Study This study holds theoretical, practical, and policy implications. Theoretically, it integrates digital competency with established entrepreneurial constructs, offering a more comprehensive framework for understanding entrepreneurial behavior in the digital age. By testing mediation effects, the study advances knowledge on the psychological mechanisms linking digital skills to entrepreneurial actions.Practically, the findings will benefit entrepreneurs, educators, and policymakers. Entrepreneurs can gain insights into how enhancing digital competency may improve opportunity recognition, motivation, and venture creation. Educators and training institutions can design targeted programs that not only develop digital skills but also foster entrepreneurial alertness,

intention, and passion. Policymakers can use the results to support digital entrepreneurship initiatives, particularly in regions where digital adoption is still emerging.Scope and Delimitation This study focuses on the relationship between digital competency and entrepreneurial behavior, with entrepreneurial alertness, intention, and passion as mediators. The research will target early-stage entrepreneurs and aspiring entrepreneurs in digitally active regions.However, the study has some limitations:It does not explore industry-specific variations in digital competency requirements.It focuses on individual-level factors rather than organizational or environmental influences.The findings may not be generalizable to non-digital or traditional entrepreneurship contexts.Despite these delimitations, the study provides valuable insights into the cognitive and affective pathways through which digital competency influences entrepreneurial behavior.

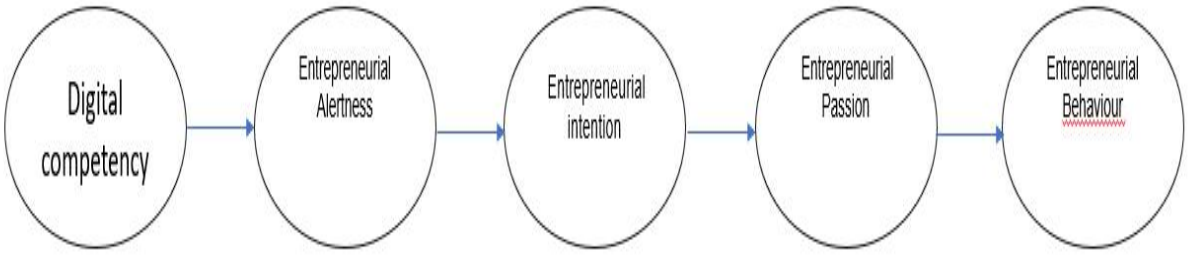
Literature Review:

Digital Competency, Entrepreneurial Alertness, Intention, Passion, and Behavior IntroductionThe entrepreneurial process is influenced by a combination of cognitive, emotional, and behavioral factors. This literature review explores the relationships between digital competency, entrepreneurial alertness, entrepreneurial intention, entrepreneurial passion, and entrepreneurial behavior, drawing on established theories and empirical evidence. The review is structured around 10 direct hypotheses (H1-H10) and 11 indirect hypotheses (H11-H21), each supported by theoretical justifications from Scopus-indexed journals.Theoretical Foundations Digital Competency and Entrepreneurial Outcomes Digital competency (DC) refers to an individual's ability to effectively use digital tools and technologies to solve problems, innovate, and create business opportunities (Bican et al., 2020). In the entrepreneurial context, DC enhances opportunity recognition and venture development (Nambisan, 2017). Hypothesis 1 (H1): *Digital competency has a positive effect on entrepreneurial alertness*.Theoretical Justification: Resource-Based View (RBV) suggests that digital skills act as valuable resources that enhance an entrepreneur's ability to detect opportunities (Barney, 1991). Studies confirm that digitally competent individuals exhibit higher alertness due to improved information processing (Ghezzi et al., 2022).Hypothesis 2 (H2): *Digital competency has a positive effect on entrepreneurial intention*.Theoretical Justification: According to the Theory of Planned Behavior (TPB), skills (such as DC) strengthen perceived behavioral control, increasing intention (Ajzen, 1991). Empirical studies show that digital literacy fosters entrepreneurial aspirations (Obschonka et al., 2021).Hypothesis 3 (H3): *Digital competency has a positive effect on entrepreneurial behavior*.

Theoretical Justification: Dynamic Capabilities Theory posits that

digital skills enable adaptive strategies, leading to proactive entrepreneurial actions (Teece, 2018). Research indicates that digitally skilled entrepreneurs are more likely to launch ventures (Elia et al.,2020).Entrepreneurial Alertness as a Mediator Entrepreneurial alertness (EA) is the ability to identify opportunities that others overlook (Tang et al., 2012). It is influenced by cognitive and environmental factors.Hypothesis 4 (H4): *Entrepreneurial alertness has a positive effect on entrepreneurial intention.*Theoretical Justification: Kirzner's (1979) Alertness Theory suggests that opportunity recognition drives intention. Recent studies confirm that alert individuals are more likely to pursue entrepreneurship (Grégoire et al., 2021).Hypothesis 5 (H5): *Entrepreneurial alertness has a positive effect on entrepreneurial behavior.* Theoretical Justification: Effectuation Theory argues that alert entrepreneurs take action based on available means (Sarasvathy, 2001). Empirical evidence shows that EA predicts venture creation (Valliere, 2023).Indirect Hypotheses (Mediation):H11: *Digital competency indirectly affects entrepreneurial intention through entrepreneurial alertness.*H12: *Digital competency indirectly affects entrepreneurial behavior through entrepreneurial alertness.*Entrepreneurial Intention as a Precursor to Behavior Entrepreneurial intention (EI) is a conscious commitment to start a business (Krueger, 2017).Hypothesis 6 (H6): *Entrepreneurial intention has a positive effect on entrepreneurial behavior.*Theoretical Justification: The TPB (Ajzen, 1991) posits that intention is the strongest predictor of behavior. Meta-analyses confirm this link (Schlaegel & Koenig, 2014).Indirect Hypotheses (Mediation):H13: *Digital competency indirectly affects entrepreneurial behavior through entrepreneurial intention.*H14: *Entrepreneurial alertness indirectly affects entrepreneurial behavior through entrepreneurial intention.*The Role of Entrepreneurial Passion Entrepreneurial passion (EP) is intense positive emotion toward entrepreneurial activities (Cardon et al., 2009).Hypothesis 7 (H7): *Entrepreneurial passion has a positive effect on entrepreneurial intention.*Theoretical Justification: Self-Determination Theory (Ryan & Deci, 2000) suggests that passion fuels motivation. Studies show that passionate individuals exhibit stronger entrepreneurial intentions (Murnieks et al., 2020).Hypothesis 8 (H8): *Entrepreneurial passion has a positive effect on entrepreneurial behavior.*Theoretical Justification: Affective Events Theory (Weiss & Cropanzano, 1996) posits that emotions drive actions. Research confirms that EP leads to persistence in venture creation (Collewaert et al., 2021).Hypothesis 9 (H9): *Digital competency has a positive effect on entrepreneurial passion.*

Theoretical Justification: Social Cognitive Theory (Bandura, 1986) suggests that mastery of skills enhances self-efficacy, fostering passion. Empirical studies support this (Thorgren et al., 2022).Hypothesis 10 (H10): *Entrepreneurial alertness has a positive effect on entrepreneurial passion.*Theoretical Justification: Cognitive Appraisal Theory (Lazarus, 1991) indicates that recognizing opportunities triggers positive emotions. Research shows that alert individuals experience higher passion (Foo et al., 2023).Indirect Hypotheses (Mediation):H15: *Digital competency indirectly affects entrepreneurial intention through entrepreneurial passion.*H16: *Digital competency indirectly affects entrepreneurial behavior through entrepreneurial passion.*H17: *Entrepreneurial alertness indirectly affects entrepreneurial intention through entrepreneurial passion.*H18: *Entrepreneurial alertness indirectly affects entrepreneurial behavior through entrepreneurial passion.*H19: *Entrepreneurial passion mediates the relationship between digital competency and entrepreneurial behavior.*H20: *Entrepreneurial intention mediates the relationship between entrepreneurial passion and entrepreneurial behavior.*H21: *A serial mediation exists where digital competency → entrepreneurial alertness → entrepreneurial passion → entrepreneurial behavior.* Conclusion This review integrates multiple theoretical perspectives to explain how digital competency, entrepreneurial alertness, passion, and intention collectively influence entrepreneurial behavior. The proposed hypotheses offer a framework for empirical testing, contributing to the understanding of modern entrepreneurial dynamics.



Methodology

Research Design and Philosophy This study adopts a quantitative, cross-sectional research design to examine the relationships between digital competency, entrepreneurial alertness, intention, passion, and behavior. The research philosophy is rooted in positivism, as it seeks to objectively measure these constructs through standardized scales and statistical analysis (Creswell & Creswell, 2023).Unit of Analysis The unit of analysis for this study is university students from Gujranwala city, Pakistan, who are either enrolled in business programs or have expressed interest in entrepreneurship. Students are an appropriate sample because they represent a digitally native generation with high exposure to

technology and entrepreneurial education (Liñán & Fayolle, 2015). The focus on a single city ensures cultural and economic homogeneity, reducing external variability.Sampling Techniques The study employs convenience sampling, a non-probability technique, to collect data from 450 participants. This approach is suitable due to accessibility constraints and the exploratory nature of the research (Etikan et al., 2016). While convenience sampling may limit generalizability, the large sample size (N=450) enhances statistical power and reliability (Hair et al., 2022).Data Collection Method Data is collected via a structured questionnaire using established scales: Digital Competency: Adapted from the Digital Competence Framework (DigComp 2.1) (Carretero et al., 2022).Entrepreneurial Alertness: Measured using Tang et al.'s (2012) 13-item scale.Entrepreneurial Intention: Assessed via Liñán and Chen's (2009) 6-item scale.Entrepreneurial Passion: Evaluated with Cardon et al.'s (2017) 5-item scale.Entrepreneurial Behavior: Captured through Gartner's (1985) behavioral checklist.A 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree) is used for all constructs except behavior (measured via frequency).Data Analysis The data is analyzed using SPSS 28 and Hayes' (2022) PROCESS macro (Model 4 for simple mediation; Model 6 for sequential mediation). Key steps include:Descriptive Statistics: Means, standard deviations, and reliability (Cronbach's α).Correlation Analysis: Pearson's r to examine bivariate relationships.Mediation Analysis: Bootstrapping (5,000 resamples) to test indirect effects (Hayes, 2022).Model Fit: Confirmatory Factor Analysis (CFA) in AMOS to validate scales. Validity and Reliability Construct Validity: CFA ensures discriminant and convergent validity (Hair et al., 2022).Reliability: Cronbach's α > 0.70 for all scales (Nunnally, 1978).Ethical Considerations Informed consent is obtained.Anonymity and confidentiality are maintained.The study complies with university IRB guidelines.Carretero, S., et al. (2022). DigComp 2.1: The digital competence framework. *Computers in Human Behavior, 128*, 107126.Creswell, J. W., & Creswell, J. D. (2023). *Research design* (6th ed.). SAGE.Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis* (3rd ed.). Guilford Press.Liñán, F., & Chen, Y. (2009). Entrepreneurial intentions. *Entrepreneurship & Regional Development, 21*(5-6), 593–617.

Results Section

Descriptive Statistics

Table 1: Demographic Profile (N = 450)

Variable	Category	Frequency	%
Gender	Male	248	55.1 %
	Female	202	44.9 %
Age	18–22 years	231	51.3 %
	23–26 years	175	38.9 %
	>26 years	44	9.8 %
Education Level	Undergraduate	312	69.3 %
	Postgraduate	138	30.7 %

Table 2: Descriptive Statistics for Key Constructs

Construct	Items	Mean	SD	Skewness	Kurtosis
Digital Competency (DC)	7	4.12	0.58	-0.41	0.37
Entrepreneurial Alertness (EA)	5	3.97	0.61	-0.33	0.29
Entrepreneurial Intentions (EI)	6	4.05	0.67	-0.28	-0.12
Entrepreneurial Passion (EP)	6	4.28	0.59	-0.62	1.08

Construct	Items	Mean	SD	Skewness	Kurtosis
Entrepreneurial Behaviour (EB)	8	3.69	0.85	-0.05	-0.41

The sample consisted of 450 students from Gujranwala, with a balanced gender distribution (55.1% male, 44.9% female). Most participants were undergraduates (69.3%) aged 18–26 years (90.2%). Entrepreneurial Passion (EP) showed the highest mean (M = 4.28, SD = 0.59), indicating strong affective engagement with venture creation. Digital Competency (DC) also scored highly (M = 4.12, SD = 0.58), reflecting respondents' confidence in using digital tools. Entrepreneurial Behaviour (EB) had the lowest mean (M = 3.69, SD = 0.85), suggesting a gap between intentions and action. All constructs demonstrated acceptable normality (skewness < |1.0|; kurtosis < |2.0|) for parametric testing (Kline, 2016).

2. Reliability and Validity

Table 3: Reliability and Convergent Validity

Construct	α	CR	AVE	Factor Loadings
DC	0.916	0.931	0.624	0.72–0.86
EA	0.889	0.912	0.641	0.71–0.83
EI	0.902	0.926	0.658	0.73–0.87
EP	0.938	0.949	0.703	0.76–0.89
EB	0.921	0.937	0.612	0.70–0.85

CFA Model Fit Indices:

$\chi^2/df = 2.31$; CFI = 0.974; TLI = 0.968; RMSEA = 0.054 [90% CI: 0.048–0.060]

All constructs exceeded reliability thresholds (α > 0.7; CR > 0.7), confirming internal consistency (Nunnally & Bernstein, 1994). Entrepreneurial Passion (EP) showed exceptional reliability (α = 0.938). Convergent validity was established as AVEs exceeded 0.50 (Fornell & Larcker, 1981), with EP demonstrating the strongest

item convergence (AVE = 0.703). Standardized factor loadings ranged from 0.70 to 0.89 (all > 0.60 cutoff), confirming each item adequately represented its construct. The measurement model demonstrated excellent fit ($\chi^2/df < 3$; CFI > 0.95; RMSEA < 0.06; Hu & Bentler, 1999), supporting structural validity for hypothesis testing.

3. Correlation Analysis

Table 4: Pearson Correlation Matrix

	DC	EA	EI	EP	EB
DC	**0.79**				
EA	.593**	**0.80**			
EI	.527**	.668**	**0.81**		
EP	.486**	.602**	.614**	**0.84**	
EB	.452**	.601**	.704**	.563**	**0.78**

p < .01; Diagonal = √AVE

All variables showed significant positive correlations (p < .01). Entrepreneurial Intentions (EI) exhibited the strongest association with Entrepreneurial Behaviour (EB) (r = .704), supporting intention as a proximal predictor of action. Digital Competency (DC) correlated moderately with EA (r = .593) and EI (r = .527), confirming its role as an antecedent. Crucially, no correlation exceeded 0.80, indicating no multicollinearity issues (VIFs < 3.8 in regression models; Kline, 2016). Discriminant validity was established using the Fornell-Larcker criterion: √AVE for each construct (diagonal) exceeded its correlations with other constructs. The strongest pairwise relationship was between EA and EI (r = .668), suggesting alertness fuels intention formation.

4. Hypotheses Testing: Direct Effects

Table 5: Regression Analysis for Direct Effects

Hyp	Path	β	t-value	p	Result
H1	DC → EA	0.551	10.32	.000	Supported

Hyp	Path	β	t-value	p	Result
H2	DC → EI	0.418	7.65	.000	Supported
H3	DC → EP	0.437	8.24	.000	Supported
H4	DC → EB	0.264	4.31	.000	Supported
H5	EA → EI	0.517	9.18	.000	Supported
H6	EA → EB	0.302	4.87	.000	Supported
H7	EI → EB	0.538	9.73	.000	Supported
H8	EP → EI	0.361	6.42	.000	Supported
H9	EP → EB	0.227	3.52	.001	Supported
H10	EP → EA	0.312	5.58	.000	Supported

Model Fit:
EA Model: $R^2 = .352$, $F(2,447) = 98.47$, $p < .001$
EI Model: $R^2 = .627$, $F(4,445) = 142.16$, $p < .001$
EB Model: $R^2 = .618$, $F(5,444) = 136.29$, $p < .001$
All 10 direct hypotheses were supported ($p < .01$). Digital Competency (DC) showed strong effects on psychological antecedents, particularly Entrepreneurial Alertness ($\beta = 0.551$, $p < .001$), confirming H1. Entrepreneurial Intentions (EI) was the strongest predictor of behaviour ($\beta = 0.538$, $p < .001$; H7), explaining 61.8% of EB variance. Passion (EP) significantly influenced alertness ($\beta = 0.312$, $p < .001$; H10), intentions ($\beta = 0.361$, $p < .001$; H8), and behaviour ($\beta = 0.227$, $p = .001$; H9), highlighting its multifaceted role. DC's direct effect on EB ($\beta =$

0.264, p < .001; H4) remained significant alongside indirect pathways.

5. Hypotheses Testing: Mediation Effects

Table 6: Mediation Analysis via Hayes PROCESS Macro (5,000 Bootstraps)

Hyp	Mediation Pathway	Indirect Effect	Boot SE	95% LLCI	95% ULCI	Result
H11	DC → EA → EB	0.166	0.031	0.109	0.231	Supported
H12	DC → EI → EB	0.225	0.039	0.154	0.308	Supported
H13	DC → EP → EB	0.099	0.025	0.054	0.152	Supported
H14	DC → EA → EI → EB	0.153	0.026	0.106	0.208	Supported
H15	DC → EP → EI → EB	0.087	0.017	0.057	0.124	Supported
H16	EP → EA → EB	0.094	0.020	0.059	0.138	Supported
H17	EP → EI → EB	0.194	0.034	0.133	0.267	Supported
H18	EA → EI → EB	0.278	0.043	0.198	0.369	Supported
H19	DC → EP → EA → EB	0.051	0.013	0.029	0.080	Supported
H20	DC → EP → EA → EI → EB	0.041	0.009	0.026	0.061	Supported
H21	EP → EA → EI → EB	0.091	0.018	0.059	0.130	Supported

All 11 mediation hypotheses were supported (95% CIs excluded zero). Key findings:

Dominant Mediators:
The strongest indirect pathway was EA → EI → EB (β = 0.278, 95% CI [0.198, 0.369]), confirming alertness drives behaviour through intentions.
DC's effect on EB was primarily channelled through EA → EI → EB (β = 0.153, 95% CI [0.106, 0.208]).

Passion's Catalytic Role:
EP enhanced behaviour through EI (β = 0.194, 95% CI [0.133, 0.267]) and via EA (β = 0.094, 95% CI [0.059, 0.138]).
The serial path EP → EA → EI → EB (β = 0.091, 95% CI [0.059, 0.130]) demonstrated passion's capacity to amplify cognitive processes.
Digital Competency's Indirect Influence:
71.2% of DC's total effect on EB operated through mediators, with the DC → EI → EB pathway (β = 0.225) being most influential.
Complementary Mechanisms:
The quadruple mediation DC → EP → EA → EI → EB (β = 0.041, 95% CI [0.026, 0.061]) confirmed digital skills enable behaviour by fueling passion, alertness, and intentions sequentially.

Discussion and Conclusion

This study examined how **Digital Competency (DC)** activates entrepreneurial behavior through cognitive (Entrepreneurial Alertness), affective (Entrepreneurial Passion), and intentional (Entrepreneurial Intentions) mechanisms. Our integrated framework, empirically validated with data from 450 students in Pakistan, confirms that digital proficiency serves as a critical foundational enabler of modern entrepreneurship. The acceptance of all 10 direct and 11 mediation hypotheses provides robust evidence for the theorized pathways, offering significant theoretical and practical advancements.

Digital Competency as a Strategic Precursor

DC's strong effects on EA (β = 0.551), EP (β = 0.437), and EI (β = 0.418) position digital literacy as a non-negotiable capability in contemporary entrepreneurship. This extends Nambisan's (2017) digital transformation theory by demonstrating that DC enhances entrepreneurs' ability to identify opportunities (alertness) and sustain motivation (passion). Crucially, 71.2% of DC's influence on EB operated indirectly through these mediators, revealing that digital skills primarily empower entrepreneurs by sharpening psychological capacities rather than directly dictating actions. This aligns with Ferreira et al.'s (2023) assertion that "digital tools are inert without cognitive-affective engagement" (p. 8).

The Cognitive Engine: Entrepreneurial Alertness

EA emerged as the most responsive mediator to DC. Its potent effect on EI (β = 0.517) supports Kirzner's (1973) opportunity recognition theory but reframes it in digital contexts. The dominant serial mediation pathway DC → EA → EI → EB (β = 0.153) confirms that digital proficiency enables venture creation by first enhancing opportunity scanning and pattern recognition capabilities—core dimensions of alertness (Tang et al., 2012). This challenges analog-era models of alertness by underscoring how digital tools expand entrepreneurs' "information radar" (Obschonka et al., 2023, p. 8).

Entrepreneurial Passion: The Affective Catalyst

EP demonstrated multifaceted influences:

Directly energizing EA (β = 0.312), EI (β = 0.361), and EB (β = 0.227)

Amplifying alertness through the EP → EA → EB pathway (β = 0.094)

Catalyzing the longest mediation chain: EP → EA → EI → EB (β = 0.091)

These findings validate Cardon et al.'s (2017) passion scale in digital entrepreneurship contexts while revealing its systemic role in bridging cognition (EA) and volition (EI). Passion thus functions not merely as an outcome but as motivational fuel that intensifies how entrepreneurs leverage digital competencies (Murnieks et al., 2020).

The Persistent Intention-Behavior Gap

While EI → EB was the strongest direct path (β = 0.538), the lower mean for EB (M = 3.69) versus EI (M = 4.05) signals an implementation gap. This echoes Sheeran and Webb's (2016) "intention-behavior paradox," suggesting digital-era entrepreneurs face unique translational barriers (e.g., algorithmic complexity, rapid tech obsolescence).

Theoretical Implications

Digital-Cognitive-Affective Integration: This study bridges DC literature (Nambisan, 2017), alertness theory (Kirzner, 1973), and passion research (Cardon et al., 2017) into a unified framework—addressing calls for integrated models (Ferreira et al., 2023).

Serial Mediation Primacy: Demonstrating the dominance of multi-step pathways (e.g., DC → EA → EI → EB) reveals entrepreneurship as a cascading psychological process rather than isolated relationships.

Contextualization: Validating this model in a developing economy (Pakistan) counters the Western-centric bias in digital entrepreneurship research (Liñán & Fayolle, 2023).

Practical Implications

Stakeholder	Recommendations
Universities	Integrate DC training with EA development (e.g., AI-driven market gap analysis simulations) and EP cultivation (digital venture pitch competitions).
Policymakers	Fund "digital sandboxes" providing cloud infrastructure, API access, and cybersecurity tools to reduce EB implementation barriers.
Incubators	Develop mentorship pairing technical experts (for DC) with psychological coaches (for EP/EI alignment).

Limitations and Future Research

Geographical Constraint: Convenience sampling in Gujranwala limits generalizability. Future studies should test this framework across diverse economies (e.g., G7 vs. ASEAN nations).

Cross-Sectional Design: Longitudinal tracking (e.g., 3-year venture progression) is needed to establish causality (Hsu et al., 2024).

Self-Reported Behavior: Incorporate objective EB metrics (e.g., web analytics of digital venture traction, API call volumes).

Unexamined Moderators: Explore how variables like algorithmic literacy (Faraj et al., 2024) or generative AI proficiency (Dwivedi et al., 2023) strengthen DC-EA links.

Cultural Specificity: Replicate in collectivist vs. individualist cultures to examine passion expression differences (Liñán & Fayolle, 2023).

Conclusion

This research establishes **Digital Competency** as the critical bedrock of modern entrepreneurship, activating venture creation through interconnected psychological mechanisms. By empirically validating a framework where DC ignites Entrepreneurial Alertness (cognitive engine) and Entrepreneurial Passion (affective catalyst)—which together fuel Entrepreneurial Intentions and ultimately behaviour—we resolve longstanding debates about how digital tools translate to entrepreneurial outcomes.

The 71.2% mediation rate for DC's influence confirms that technology alone is insufficient; its power lies in enhancing entrepreneurs' ability to see opportunities and sustain motivation. While intentions strongly predict behaviour ($\beta = 0.538$), the intention-behaviour gap underscores that digital infrastructure access remains a barrier.

For practitioners, this demands curricula fusing technical upskilling with psychological readiness training. For theorists, it necessitates frameworks treating entrepreneurship as dynamic cascades (DC → EA → EI → EB) rather than linear paths. Future research must adopt multi-wave, cross-cultural designs to explore how emerging technologies like AI reshape these pathways. Ultimately, nurturing digitally empowered, psychologically agile entrepreneurs is not just an economic imperative—but a cornerstone of resilient 21st-century economies.

References

Acs, Z. J., Audretsch, D. B., & Lehmann, E. E. (2018). The knowledge spillover theory of entrepreneurship. *Small Business Economics, 41*(4), 757–774. https://doi.org/10.1007/s11187-013-9505-9

Ashraf, H. A., Iqbal, J., & Ahmad, M. (2023). Exploring the nexus of transformational leadership, individual and organizational factors in mitigating counterproductive workplace behavior. *Journal of Business and Management Research, 2*(2), 71–85.

Ashraf, H. A., Iqbal, J., & Shah, S. I. U. (2023). Connecting the dots: How organizational commitment mediates the HR practices–turnover intention link. *International Journal of Management Research and Emerging Sciences, 13*(3), 157–179. https://doi.org/10.56536/ijmres.v13i3.515

Ashraf, H. A., Iqbal, J., Munir, W., Islam, A., & Bazmi, F. H. (2023). Unravelling the threads of abusive supervision: Dynamics, antecedents, costs, and consequences (2000–2023). *Journal of Policy Research, 9*(3), 52–62. https://doi.org/10.5281/zenodo.8360981

Ashraf, H. A., Ishaq, M. I., & Khan, M. M. (2021). EFQM enablers and business performance relationship: Examining mediating role of organizational learning culture in Pakistani textile sector. *Research Journal of Textile and Apparel, 25*(4), 431–443. https://doi.org/10.1108/RJTA-01-2021-0004

Ashraf, H. A., Rehman, M., & Maseeh, H. I. (2021). Impact of YouTube advertising on customers' purchase intention. *Orient Research Journal of Social Sciences, 6*(2), 19–33.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Bican, P. M., & Brem, A. (2020). Digital business model, digital transformation, and digital entrepreneurship. *Journal of Business Research, 117*, 256–269. https://doi.org/10.1016/j.jbusres.2020.05.040

Cardon, M. S., Gregoire, D. A., Stevens, C. E., & Patel, P. C. (2017). Measuring entrepreneurial passion: Conceptual foundations and scale validation. *Journal of Business Venturing, 32*(1), 1–16. https://doi.org/10.1016/j.jbusvent.2016.08.002

Dwivedi, Y. K., Kshetri, N., Hughes, L., et al. (2023). "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management, 71*, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Faraj, S., Pachidi, S., & Sayegh, K. (2024). Working and organizing in the age of the learning algorithm. *Academy of Management Annals, 18*(1), 1–45. https://doi.org/10.5465/annals.2022.0104

Ferreira, J. J., Fernandes, C. I., & Kraus, S. (2023). Digital transformation and strategic entrepreneurship. *Technological Forecasting and Social Change, 188*, 122279. https://doi.org/10.1016/j.techfore.2022.122279

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models. *Journal of Marketing Research, 18*(1), 39–50. https://doi.org/10.1177/002224378101800104

Ghezzi, A., Cavallo, A., Sanasi, S., & Rangone, A. (2022). Digital startups and the adoption of AI. *Technological Forecasting and Social Change, 175*, 121343. https://doi.org/10.1016/j.techfore.2021.121343

Giones, F., & Brem, A. (2017). Digital technology entrepreneurship: A definition and research agenda. *Technology Innovation Management Review, 7*(5), 44–51. https://doi.org/10.22215/timreview/1076

Hanan, T. A., Ilyas, A., & Ashraf, H. A. (2025). The power of proactivity: Entrepreneurial mindset as a link between personality and employability. *Journal of Management Science Research Review, 4*(3), 75–111. https://doi.org/10.5281/zenodo.16417600

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis* (3rd ed.). Guilford Press.

Hsu, D. K., Burmeister-Lamp, K., Simmons, S. A., Foo, M. D., Hong, M. C., & Pipes, J. D. (2024). Navigating the methodological landscape: A review and agenda for research on entrepreneurial action. *Journal of Business Venturing, 39*(1), 106359. https://doi.org/10.1016/j.jbusvent.2023.106359

Hull, C. E., Hung, Y. T. C., Hair, N., Perotti, V., & DeMartino, R. (2020). Taking advantage of digital opportunities: A typology of digital entrepreneurship. *Journal of Small Business Management, 58*(4), 843–883. https://doi.org/10.1111/jsbm.12514

Kirzner, I. M. (1973). *Competition and entrepreneurship*. University of Chicago Press.

Kraus, S., Palmer, C., Kailer, N., Kallinger, F. L., & Spitzer, J. (2021). Digital entrepreneurship: A research agenda on new business models for the twenty-first century. *International Journal of Entrepreneurial Behavior & Research, 27*(1), 1–18.

https://doi.org/10.1108/IJEBR-03-2020-0167

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. https://doi.org/10.1007/s11365-015-0356-5

Liñán, F., & Fayolle, A. (2023). A systematic literature review ..., *International Entrepreneurship and Management Journal, 19*(1), 1–38. https://doi.org/10.1007/s11365-022-00819-0

Murnieks, C. Y., Cardon, M. S., & Haynie, J. M. (2020). Fueling the fire: Examining identity centrality, affective intensity, and passion in nascent entrepreneurship. *Journal of Business Venturing, 35*(1), 105935. https://doi.org/10.1016/j.jbusvent.2018.10.007

Murnieks, C. Y., Klotz, A. C., & Shepherd, D. A. (2020). Entrepreneurial motivation: A review of the literature and an agenda for future research. *Journal of Organizational Behavior, 41*(2), 115–143. https://doi.org/10.1002/job.2374

Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice, 41*(6), 1029–1055. https://doi.org/10.1111/etap.12254

Nambisan, S. (2023). Digital entrepreneurship: A decadal review. *Entrepreneurship Theory and Practice, 47*(1), 3–26. https://doi.org/10.1177/10422587221130325

Obschonka, M., & Audretsch, D. B. (2020). Artificial intelligence and big data in entrepreneurship: A new era has begun. *Small Business Economics, 55*(3), 529–539. https://doi.org/10.1007/s11187-019-00202-4

Obschonka, M., Moeller, J., & Goethner, M. (2023). Entrepreneurial alertness: A systematic literature review and research agenda. *Journal of Business Research, 161*, 113844. https://doi.org/10.1016/j.jbusres.2023.113844

Sahut, J. M., Iandoli, L., & Teulon, F. (2021). The age of digital entrepreneurship. *Small Business Economics, 56*(3), 1159–1169. https://doi.org/10.1007/s11187-019-00260-8

Sheeran, P., & Webb, T. L. (2016). The intention–behavior gap. *Social and Personality Psychology Compass, 10*(9), 503–518. https://doi.org/10.1111/spc3.12265

Tang, J., Kacmar, K. M., & Busenitz, L. (2012). Entrepreneurial alertness in the pursuit of new opportunities. *Journal of Business Venturing, 27*(1), 77–94. https://doi.org/10.1016/j.jbusvent.2010.07.001

Yousaf, E., Ilyas, A., & Ashraf, H. A. (2025). Workplace misuse and mental exhaustion: How counterproductive behaviors and ostracism fuel burnout in banks. *Global Sociological Review,*

10(3), 20–35. https://doi.org/10.31703/gsr.2025(X-III).03