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Integrating Digital Capability and Psychological Hardiness to Foster Sustainable Entrepreneurial Intention: Evidence from a Cross-National Indonesia–Malaysia Study

Akhmad Darmawan [1*], Fatmah Bagis [1], Suyoto [1], Ahmad Zainal bin Abd Razak [2]
[1] *Universitas Muhammadiyah Purwokerto, Indonesia*
[2] *Universiti Pendidikan Sultan Idris (UPSI), Malaysia*

Corresponding Author: akhmaddarmawan@ump.ac.id *

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ABSTRACT

The rapid diffusion of digital technologies and the imperative of sustainable economic development converge to place unprecedented demands on aspiring entrepreneurs. The cognitive and psychological pathways through which individuals translate technological competence and psychological hardiness into a firm commitment to sustainable venturing remain underexplored, particularly in cross-national ASEAN settings. This study examines how digital capability and psychological hardiness jointly shape sustainable entrepreneurial intention, with hardipreneurial self-efficacy as mediator and institutional support as moderator. Grounded in Social Cognitive Theory (Bandura, 1997; 2023) and applying PLS-SEM on N = 300 students across Indonesia and Malaysia, the findings confirm all six hypotheses. Digital capability and psychological hardiness each significantly influence hardipreneurial self-efficacy, which fully mediates both pathways to sustainable entrepreneurial intention, while institutional support significantly amplifies the efficacy–intention link. These findings advance sustainable entrepreneurship theory and generate actionable policy implications for university ecosystems and SDG-aligned entrepreneurship programs in ASEAN.

Keywords: Digital Capability; Psychological Hardiness; Hardipreneurial Self-Efficacy; Sustainable Entrepreneurial Intention

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INTRODUCTION

. Entrepreneurship has long been recognised as a cornerstone of economic transformation, social resilience, and innovation-driven growth, particularly across developing and emerging economies (Shepherd & Patzelt, 2011; Schaltegger & Wagner, 2016; Hockerts & Wüstenhagen, 2010). The contemporary challenge, however, extends far beyond simply encouraging new ventures. As global sustainability priorities converge with rapid technological disruption, the quality, orientation, and durability of entrepreneurial intention have become equally consequential (Usman et al., 2024; Talukder et al., 2025). Young entrepreneurs in Southeast Asia, most notably in Indonesia and Malaysia, now operate at the intersection of digital transformation, SDG imperatives, and institutional volatility a confluence that simultaneously demands technological fluency and psychological robustness from those who aspire to build lasting, responsible ventures (Mawardi et al., 2025; OECD, 2023).

Existing scholarship has established meaningful links between digital capability and entrepreneurial outcomes. Digital capability broadly understood as an individual's proficiency in leveraging digital tools to identify business opportunities, manage entrepreneurial workflows, and generate sustainable value has attracted growing empirical attention, particularly in relation to SME performance and new venture creation (Huong et al., 2024; Dabbous et al., 2023; Kraus et al., 2020; Wang & Zhang, 2024). In Southeast Asia, where digital platform adoption among micro, small, and medium enterprises grew substantially in the post-

pandemic period, the capacity to operate competently within technology-mediated environments has become a near-essential prerequisite for entrepreneurial entry. Notwithstanding these gains, empirical evidence also reveals that digital capability alone does not reliably translate into sustained entrepreneurial commitment: many early-stage ventures, despite adequate technological tools, falter within their first three years due to insufficient psychological readiness (Santos et al., 2023; Han et al., 2025).

Psychological hardiness addresses precisely this gap. As a dispositional resource encompassing commitment to meaningful goals, perception of personal control over outcomes, and the active reframing of challenges as developmental opportunities, hardiness has emerged as a salient predictor of entrepreneurial resilience across longitudinal and cross-sectional studies (Ayala & Manzano, 2014; Pennetta et al., 2025; Esteban Curiel et al., 2024). Entrepreneurs high in hardiness sustain effort under adversity, tolerate the ambiguity inherent in emerging markets, and maintain strategic orientation when resources are scarce qualities that are especially consequential in sustainable entrepreneurship, where profit motives must be reconciled with ecological and social responsibilities (Luthans & Youssef-Morgan, 2023; Bergner et al., 2023).

Despite these contributions, two substantive gaps remain. First, technological and psychological explanations of sustainable entrepreneurial intention have largely advanced in parallel rather than in productive dialogue. No published cross-national study, to the best of the authors' knowledge, has simultaneously integrated digital capability, psychological hardiness, and a resilience-specific efficacy construct within a unified sustainable entrepreneurship model (Maheshwari et al., 2023; Narmaditya et al., 2023). Second, contextual moderators such as institutional support encompassing university ecosystems, government policies, and incubation infrastructure have received insufficient empirical attention as boundary conditions governing whether individual-level resources translate into durable entrepreneurial motivation (Gonzalez Tamayo et al., 2024; Chahal et al., 2025; Bağış et al., 2024).

This study closes those gaps by introducing hardipreneurial self-efficacy as the cognitive bridge connecting individual resources to sustainable entrepreneurial intention. Building on Bandura's Social Cognitive Theory (1997; 2023), hardipreneurial self-efficacy captures an individual's confidence in their capacity to manage entrepreneurial activities sustainably despite stress, technological ambiguity, and competitive uncertainty drawing simultaneously on digital tools and psychological hardiness (Bagis et al., 2024; Bagis et al., 2025). The Indonesia–Malaysia comparative design is theoretically motivated: both nations share Malay cultural roots, moderate collectivism, and ASEAN membership, yet differ meaningfully in digital readiness indices, incubation density, and entrepreneurship policy maturity (Mawardi et al., 2025; Ip, 2024). The study makes three contributions: (1) empirically testing an integrative model bridging digital, psychological, and institutional dimensions; (2) introducing and validating hardipreneurial self-efficacy as a novel mediating construct; and (3) generating evidence-based insights for sustainable entrepreneurship ecosystems in emerging ASEAN economies.

2. Theoretical Foundation and Hypothesis Development

2.1 Social Cognitive Theory as the Conceptual Anchor

Social Cognitive Theory posits that human behavior emerges from the dynamic interplay of personal cognition, enacted behaviors, and environmental conditions the mechanism Bandura (2023) terms triadic reciprocal determinism. At the centre of this architecture sits self-efficacy: an individual's conviction that they can marshal the cognitive, emotional, and behavioral repertoire necessary to execute a specific course of action (Bandura, 1997). Efficacy beliefs shape goal-setting ambition, persistence under setbacks, and the degree to which individuals interpret environmental challenges as threats or manageable growth opportunities. In the entrepreneurial domain, self-efficacy has been consistently established as one of the most reliable cognitive antecedents of entrepreneurial intention and subsequent behavior across diverse cultural and institutional settings (Selvan et al., 2025; Zhang & Chen, 2024; Barrera-Verdugo et al., 2025; Ip & Liang, 2023).

The present study extends Social Cognitive Theory to account for the distinctive demands of sustainable entrepreneurship. Sustainable ventures require entrepreneurs not merely to believe they can build a business, but to believe they can do so while simultaneously navigating digital complexity, managing ecological constraints, satisfying multiple stakeholders, and planning across extended time horizons (Usman et al., 2024; Talukder et al., 2025). This expanded efficacy demand justifies the introduction of hardipreneurial self-efficacy as a theoretically warranted and empirically distinct construct that integrates resilience-oriented psychological architecture with digital-era entrepreneurial confidence (Bagis et al., 2024; Bagis & Adawiyah, 2025).

2.2 Digital Capability and Hardipreneurial Self-Efficacy

Digital capability, operationalized as the proficiency to leverage digital technologies for opportunity identification, resource mobilization, and sustainable value co-creation, goes considerably beyond mere tool usage (Huong et al., 2024; MDPI, 2025). It encompasses adaptive and critical technological engagement the capacity to select, combine, and deploy digital platforms strategically in response to shifting market conditions and customer needs (Wang & Zhang, 2024). Empirical evidence documents a positive relationship between digital competence and self-regulatory beliefs in digital entrepreneurial contexts: individuals who command a broader and more sophisticated digital repertoire report stronger convictions that they can manage the uncertainties of digitally-mediated venturing (Duong et al., 2024; Li et al., 2025; Adam et al., 2025).

The mechanism operates through Bandura's (1997) concept of enactive mastery: each successful digital encounter resolving a technical challenge, generating leads through a digital marketing campaign, or executing a data-driven pricing decision constitutes a micro-mastery experience that accumulates into a more generalised belief that sustainable entrepreneurship is personally achievable (Bandura, 2023). Conversely, individuals with limited digital capability face greater cognitive friction in entrepreneurial tasks, interpreting technological demands as evidence of personal insufficiency rather than as ordinary challenges with learnable solutions (Dabbous et al., 2023; Kraus et al., 2020). Accordingly, as digital capability rises, so too does the confidence-generating substrate of hardipreneurial self-efficacy.

H1: *Digital capability positively influences hardipreneurial self-efficacy.*

2.3 Psychological Hardiness and Hardipreneurial Self-Efficacy

Psychological hardiness is a dispositional construct first conceptualised by Kobasa (1979) and extensively validated in occupational and entrepreneurial contexts (Ayala & Manzano, 2014; Luthans & Youssef-Morgan, 2023). It comprises three interrelated orientations: commitment, the tendency to invest fully in one's activities and find meaning in them; control, the belief that one can influence outcomes rather than being a passive recipient of circumstance; and challenge, the appraisal of change and uncertainty as inherent features of growth rather than threats to stability (Pennetta et al., 2025; Bergner et al., 2023; Esteban Curiel et al., 2024). Entrepreneurs high in hardiness demonstrate sustained effort under financial adversity, adaptive recovery from venture setbacks, and greater tolerance for the prolonged uncertainty characteristic of early-stage sustainable ventures (Santos et al., 2023; Han et al., 2025).

Within Social Cognitive Theory, mastery experiences and vicarious learning are primary sources of self-efficacy (Bandura, 1997), and psychological hardiness amplifies both (Bagis et al., 2024). Hardy entrepreneurs are more likely to interpret past struggles as competence-building experiences a cognitive reframing that converts adversity into efficacy evidence. They are also more receptive to role model observation: a hardy entrepreneur who witnesses another founder navigate a technological disruption is more likely to abstract a generalisable confidence lesson from that experience than a low-hardy observer who focuses on hardship rather than recovery (Luthans & Youssef-Morgan, 2023; Selvan et al., 2025). Together, these mechanisms mean that hardiness functions as an efficacy multiplier, steadily reinforcing the individual's belief in their capacity to sustain entrepreneurial action across the specific demands of digital and sustainability-oriented venturing.

H2: *Psychological hardiness positively influences hardipreneurial self-efficacy.*

2.4 Hardipreneurial Self-Efficacy and Sustainable Entrepreneurial Intention

Sustainable entrepreneurial intention is the motivational state that precedes and reliably predicts the actual pursuit of ventures explicitly oriented toward economic vitality, social equity, and environmental stewardship (Talukder et al., 2025; Usman et al., 2024; Mawardi et al., 2025). Unlike generic entrepreneurial intention, which focuses on any new venture, sustainable entrepreneurial intention requires individuals to hold commitments spanning multiple value dimensions simultaneously a cognitively demanding motivational configuration particularly sensitive to efficacy beliefs (Shepherd & Patzelt, 2011; Hockerts & Wüstenhagen, 2010). Individuals who doubt their capacity to manage triple-bottom-line complexity are more likely to retreat to conventional, purely profit-driven intentions or defer entrepreneurial action indefinitely (Gonzalez Tamayo et al., 2024; Chahal et al., 2025).

Hardipreneurial self-efficacy as a construct integrating resilience, digital competence, and sustainability orientation provides the precise motivational architecture required to sustain entrepreneurial commitment under these expanded demands (Bagis et al., 2024; Bagis & Adawiyah, 2025). When individuals possess robust hardipreneurial self-efficacy, they approach the complexity of sustainable venturing with confidence, set more ambitious sustainability-related entrepreneurial goals, and maintain effort when early ventures face structural resistance (Barrera-Verdugo et al., 2025; Zhang & Chen, 2024). Self-efficacy beliefs have been identified as among the strongest cognitive antecedents of intentional behavior across multiple domains (Selvan et al., 2025; Ip & Liang, 2023), and their role in sustainable entrepreneurship is particularly pronounced given the elevated cognitive demands of triple-bottom-line commitment.

H3: *Hardipreneurial self-efficacy positively influences sustainable entrepreneurial intention.*

2.5 Mediation by Hardipreneurial Self-Efficacy

The mediation hypotheses follow from the sequential cognitive logic established above. Digital capability generates enactive mastery experiences that accrue into hardipreneurial self-efficacy, which subsequently activates sustainable entrepreneurial intention (Bandura, 1997; 2023; Huong et al., 2024). Efficacy constitutes the cognitive channel through which digital competence acquires motivational potency: it is not mere possession of digital skills that drives entrepreneurial commitment, but the conviction built through capable digital practice that one can successfully deploy those skills in a sustainable venture (Duong et al., 2024; Adam et al., 2025; Li et al., 2025). An individual with strong digital capability but low hardipreneurial self-efficacy may recognise business opportunities without committing to pursue them; it is the efficacy belief that closes the gap between recognition and intentional commitment (Selvan et al., 2025; Barrera-Verdugo et al., 2025).

Analogously, psychological hardiness builds the resilience architecture necessary for entrepreneurial persistence, but this resilience shapes intention primarily through the cognitive pathway of efficacy enhancement rather than through a direct, unmediated attitudinal effect (Ayala & Manzano, 2014; Pennetta et al., 2025). Hardy individuals develop stronger efficacy beliefs precisely because their commitment, control, and challenge orientations generate more frequent mastery experiences and more productive interpretations of setbacks (Luthans & Youssef-Morgan, 2023; Santos et al., 2023) and it is these efficacy beliefs that subsequently mobilise sustainable entrepreneurial intention. The indirect pathways from both antecedents are therefore theoretically warranted and empirically tractable (Caputo et al., 2025; Hair et al., 2022).

H4: *Hardipreneurial self-efficacy mediates the relationship between digital capability and sustainable entrepreneurial intention.*

H5: *Hardipreneurial self-efficacy mediates the relationship between psychological hardiness and sustainable entrepreneurial intention.*

2.6 Moderating Role of Institutional Support

Institutional support encompassing university-embedded entrepreneurship programs, government startup incentives, business incubators, access to venture capital, and formal mentorship networks constitutes an enabling environmental condition that can substantially amplify or attenuate the efficacy-to-intention pathway (Gonzalez Tamayo et al., 2024; Bağış et

al., 2024; Chahal et al., 2025; Ip, 2024). Even individuals who harbour robust hardipreneurial self-efficacy may remain hesitant to commit to sustainable ventures if their institutional context offers few practical resources, limited market access channels, or inadequate mentorship (Narmaditya et al., 2023). The structural barriers of entrepreneurship regulatory complexity, access to funding, lack of incubation space, and policy uncertainty can override individual motivational architecture, producing what might be termed an efficacy-intention gap: high confidence without corresponding action.

Conversely, a richly supportive institutional environment converts efficacy beliefs into actionable intention by removing perceived structural barriers and providing concrete evidence that entrepreneurial commitment is feasible and rewarded (Bağış et al., 2024; Chahal et al., 2025). Institutional support signals to aspiring entrepreneurs that the ecosystem values their contribution and has invested tangible resources in making their ventures viable a message that amplifies rather than substitutes for individual self-efficacy (Gonzalez Tamayo et al., 2024). This moderation logic is consistent with ecological models of entrepreneurship that position institutional environments as necessary complements to individual psychological resources (Shepherd & Patzelt, 2011; Schaltegger & Wagner, 2016).

H6: *Institutional support moderates the relationship between hardipreneurial self-efficacy and sustainable entrepreneurial intention, such that the positive relationship is stronger when institutional support is high*

METHOD

3.1 Research Design and Sample

A quantitative explanatory research design was employed to test causal relationships among the study constructs, including direct effects, indirect mediation pathways, and a conditional moderation effect (Hair et al., 2022). This design is appropriate given the study's objective of establishing the directional and conditional nature of relationships that are theoretically predicted but empirically underspecified in the existing literature (Maheshwari et al., 2023; Usman et al., 2024). The population comprised final-year undergraduate students and recent university graduates in Indonesia and Malaysia who expressed active or latent interest in entrepreneurship (Mawardi et al., 2025). Purposive sampling was applied, requiring respondents to meet two inclusion criteria: enrollment in or graduation from a business-related degree program, and self-reported interest in entrepreneurship. A minimum of 150 respondents per country was targeted following PLS-SEM norms for cross-national multigroup analysis (Hair et al., 2022), yielding a total analytical sample of N = 300 (Indonesia: n = 150; Malaysia: n = 150). Data collection proceeded via structured online questionnaires distributed through university networks at Universitas Muhammadiyah Purwokerto and Universiti Pendidikan Sultan Idris, supplemented by snowball referrals through student entrepreneurship communities. Non-response bias was assessed by comparing early and late respondents on key demographic variables; no significant differences were found (Narmaditya et al., 2023; Ip, 2024).

3.2 Measurement Instruments

All constructs were operationalised using multi-item reflective scales adapted from validated instruments in the literature (Hair et al., 2022). Digital capability was assessed with six items adapted from Huong et al. (2024) and capturing proficiency across digital opportunity recognition, resource orchestration, and value creation domains. Psychological hardiness was measured with six items following Ayala and Manzano (2014) and Luthans & Youssef-Morgan (2023), reflecting the commitment, control, and challenge sub-dimensions. Hardipreneurial self-efficacy was assessed using five items synthesised from Bandura (1997; 2023) and the hardipreneurship construct of Bagis et al. (2024), evaluating respondents' confidence in sustaining resilient entrepreneurial action under uncertainty. Institutional support was measured with five items from Gonzalez Tamayo et al. (2024) and Bağış et al. (2024), covering university support, business incubator access, and government policy environment perceptions. Sustainable entrepreneurial intention was assessed using five items from Usman et al. (2024) and Talukder et al. (2025), reflecting intention to launch or sustain ventures with explicit economic, social, and environmental aims.

All items were rated on a five-point Likert scale anchored at 1 (strongly disagree) to 5 (strongly agree). A bilingual instrument was prepared through expert back-translation procedures, producing English–Bahasa Indonesia and English–Bahasa Melayu versions. Forward and back translations were reviewed by bilingual academics with expertise in entrepreneurship and management, and discrepancies were resolved through consensus discussion prior to pilot testing with 30 students per country (Mawardi et al., 2025; Narmaditya et al., 2023).

3.3 Data Analysis Strategy

Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4 was selected as the primary analytical method (Hair et al., 2022). PLS-SEM accommodates moderate sample sizes per subgroup, handles reflective constructs, and simultaneously tests direct, mediating, and moderating relationships within a single analytical framework a methodological advantage particularly relevant to complex integrative models (Hair et al., 2022; Caputo et al., 2025). The measurement model was evaluated using composite reliability (CR ≥ 0.70), average variance extracted (AVE ≥ 0.50), and Heterotrait-Monotrait (HTMT) ratios below 0.85 for discriminant validity. The structural model tested all six hypotheses using bootstrapping with 5,000 resamples and bias-corrected confidence intervals. Indirect (mediation) effects were assessed through bootstrapped confidence intervals, with non-overlapping zero intervals confirming significance (H4 and H5). The moderating effect (H6) was tested using the product indicator approach. Multigroup analysis (MGA-PLS) via the permutation test examined cross-national structural equivalence between Indonesian and Malaysian subsamples, preceded by compositional invariance testing.

RESULT AND DISCUSSION

4.1 Measurement Model Assessment

The measurement model demonstrated satisfactory psychometric properties across all five constructs, as reported in Table 1. Composite reliability (CR) values ranged from 0.896 to 0.921, substantially exceeding the 0.70 threshold recommended by Hair et al. (2022). Average variance extracted (AVE) values ranged from 0.631 to 0.695, confirming convergent validity at the AVE ≥ 0.50 benchmark. Cronbach's alpha coefficients ranged from 0.861 to 0.895, indicating strong internal consistency. All HTMT ratios fell below the conservative 0.85 threshold (Hair et al., 2022), confirming discriminant validity across all construct pairs. Factor loadings for all individual items exceeded 0.65, with a minimum loading of 0.671, further supporting the reflective measurement structure.

Table 1. Measurement Model Results

Construct	CR	AVE	**α**	HTMT
Digital Capability (DC)	0.913	0.631	0.887	0.782
Psychological Hardiness (PH)	0.921	0.649	0.895	0.791
Hardipreneurial Self-Efficacy (HSE)	0.908	0.664	0.876	0.812
Institutional Support (IS)	0.896	0.633	0.861	0.768
Sust. Entrep. Intention (SEI)	0.919	0.695	0.892	0.803

Note: CR = Composite Reliability; AVE = Average Variance Extracted; α = Cronbach's Alpha; HTMT = Heterotrait-Monotrait Ratio. All item loadings > 0.65 (Hair et al., 2022).

4.2 Structural Model and Hypothesis Testing

Table 2 presents the complete structural model results. The model explains 54.3% of variance in hardipreneurial self-efficacy ($R^2 = 0.543$) and 61.7% of variance in sustainable entrepreneurial intention ($R^2 = 0.617$), reflecting strong explanatory power by PLS-SEM benchmarks (Hair et al., 2022). Effect sizes (f^2) for the supported direct paths range from 0.12 (medium) to 0.38 (large), confirming meaningful practical significance beyond statistical thresholds. Predictive relevance (Q^2, via blindfolding) was 0.347 for SEI, confirming the model's out-of-sample predictive accuracy. H1 received strong support: digital capability exerted a significant positive effect on hardipreneurial self-efficacy ($\beta = 0.384$, $t = 7.98$, $p < .001$), confirming that individuals equipped with more sophisticated digital competence construct more confident beliefs about their

capacity to sustain digitally-mediated entrepreneurial activities (Huong et al., 2024; Duong et al., 2024). H2 was similarly well-supported: psychological hardiness positively predicted hardipreneurial self-efficacy (β = 0.362, t = 7.13, p < .001), affirming that the commitment-control-challenge dispositional structure generates a steady stream of mastery experiences that cumulatively consolidate entrepreneurial self-confidence (Ayala & Manzano, 2014; Pennetta et al., 2025).

H3 received the strongest structural support: hardipreneurial self-efficacy powerfully predicted sustainable entrepreneurial intention (β = 0.512, t = 11.60, p < .001), with this path accounting for the largest share of explained variance in the outcome construct (Selvan et al., 2025; Barrera-Verdugo et al., 2025). Both mediation hypotheses (H4 and H5) were supported through bootstrapped indirect effect estimates: the mediated effect of digital capability on SEI via HSE was β = 0.197 (t = 7.06, p < .001), and the mediated effect of psychological hardiness on SEI via HSE was β = 0.185 (t = 5.98, p < .001). No significant direct effects of digital capability or psychological hardiness on SEI remained once the mediator was included, confirming full mediation (Hair et al., 2022; Caputo et al., 2025). Finally, H6 was supported: the interaction of institutional support and hardipreneurial self-efficacy significantly amplified the efficacy-intention pathway (β = 0.143, t = 4.20, p < .001) (Gonzalez Tamayo et al., 2024; Bağış et al., 2024).

Table 2. Structural Model Results (N = 300; 5,000 bootstrap resamples)

H	Path	β	SE	t	p	Decision
H1	DC → HSE	0.384	0.048	7.98	<.001	**Supported**
H2	PH → HSE	0.362	0.051	7.13	<.001	**Supported**
H3	HSE → SEI	0.512	0.044	11.60	<.001	**Supported**
H4	DC→HSE→SEI	0.197	0.028	7.06	<.001	**Supported**
H5	PH→HSE→SEI	0.185	0.031	5.98	<.001	**Supported**
H6	IS×HSE→SEI	0.143	0.034	4.20	<.001	**Supported**

Note. β = standardized path coefficient; SE = standard error; t = t-statistic; R^2(HSE) = 0.543; R^2(SEI) = 0.617. DC = Digital Capability; PH = Psychological Hardiness; HSE = Hardipreneurial Self-Efficacy; IS = Institutional Support; SEI = Sustainable Entrepreneurial Intention (Hair et al., 2022).

4.3 Cross-National Invariance and Multigroup Analysis

Multigroup analysis confirmed partial metric invariance across the Indonesian and Malaysian subsamples: compositional invariance held for all five constructs, satisfying the prerequisite for meaningful path coefficient comparison (Hair et al., 2022). The majority of structural paths showed no significant cross-national difference, confirming that the core model architecture replicates across both national contexts. A notable exception emerged for the institutional support moderation effect (H6), which was somewhat stronger in the Indonesian subsample (β = 0.168) than in the Malaysian subsample (β = 0.119), consistent with Malaysia's comparatively more developed entrepreneurial ecosystem (Mawardi et al., 2025; Bağış et al., 2024). This pattern suggests that the marginal motivational value of incremental institutional support is reduced where institutional scaffolding is already comparatively rich (Gonzalez Tamayo et al., 2024; Chahal et al., 2025).

5. Discussion

5.1 The Digital-Efficacy Pathway

The robust support for H1 (β = 0.384) enriches the growing body of scholarship documenting digital capability's role in shaping entrepreneurial cognition (Huong et al., 2024; Adam et al., 2025; Li et al., 2025; Wang & Zhang, 2024). The mechanism is not a simple skills-to-intention chain. Rather, digital competence reshapes individuals' cognitive self-assessment in domain-specific ways, generating heightened confidence that the complexities of sustainable venturing are personally navigable with available technological tools. This is consistent with Social Cognitive Theory's emphasis on enactive mastery (Bandura, 1997; 2023): each successful digital encounter functions as an efficacy-building micro-experience that cumulatively solidifies a

generalised conviction that sustainable entrepreneurship is personally achievable (Duong et al., 2024; Dabbous et al., 2023).

This finding carries a practical implication frequently overlooked in the entrepreneurship education literature: digital skills training cannot be decoupled from psychological development (Selvan et al., 2025; Barrera-Verdugo et al., 2025). Programs that invest exclusively in building technical digital proficiency coding bootcamps, digital marketing workshops, e-commerce platform tutorials without simultaneously cultivating the efficacy beliefs that connect digital capability to entrepreneurial motivation risk producing graduates who are technically competent but motivationally adrift (Kraus et al., 2020)The evidence suggests that pedagogical sequencing matters: digital capability training should be designed to generate mastery experiences, not merely knowledge transfer, with reflective debriefs that explicitly connect digital achievements to students' emerging self-conceptions as capable sustainable entrepreneurs (Narmaditya et al., 2023).

5.2 Hardiness as an Efficacy-Building Resource

The confirmation of H2 ($\beta = 0.362$) affirms the theoretical complementarity of psychological hardiness and self-efficacy within sustainable entrepreneurship (Ayala & Manzano, 2014; Pennetta et al., 2025; Luthans & Youssef-Morgan, 2023). Prior scholarship has largely positioned hardiness as a direct determinant of entrepreneurial resilience and venture survival, particularly in longitudinal studies tracking established entrepreneurs through market downturns (Santos et al., 2023; Esteban Curiel et al., 2024). The present findings offer a more nuanced mechanistic account: hardiness operates on sustainable entrepreneurial intention primarily through the cognitive pathway of efficacy enhancement rather than as an independent motivational force (Bagis et al., 2024; Bagis & Adawiyah, 2025).

This distinction has meaningful theoretical implications for the hardipreneurship literature pioneered by Bagis et al. (2024; 2025). The hardipreneurial self-efficacy construct is not simply the additive combination of hardiness and efficacy as parallel traits. It captures the specific cognitive mechanism through which a hardy dispositional architecture the systematic reinterpretation of adversity as developmental challenge, the maintenance of purposive control, and the sustained investment of meaning translates resilience resources into motivational confidence required for sustainable entrepreneurial commitment (Bandura, 1997; 2023; Bergner et al., 2023; Han et al., 2025). Students who score high on psychological hardiness are not merely more resilient; they are progressively more confident that they can sustain entrepreneurial action precisely because their hardiness generates a continual supply of efficacy-confirming experiences from everyday challenges (Luthans & Youssef-Morgan, 2023).

5.3 Self-Efficacy as the Motivational Gateway

The strongest structural effect in the model hardipreneurial self-efficacy predicting sustainable entrepreneurial intention at $\beta = 0.512$ corroborates the centrality of efficacy beliefs as proximal cognitive determinants of intentional behavior (Bandura, 1997; Selvan et al., 2025; Barrera-Verdugo et al., 2025; Ip & Liang, 2023). The finding of full mediation through hardipreneurial self-efficacy for both antecedent pathways (H4 and H5) reveals that neither digital capability nor psychological hardiness operates directly on sustainable intentionality; both must first be metabolised through the self-referential evaluative process that produces efficacy beliefs before their motivational potential is realised (Hair et al., 2022; Caputo et al., 2025).

This full mediation pattern distinguishes sustainable entrepreneurship from conventional entrepreneurship in an important way. Studies examining general entrepreneurial intention frequently report partial mediation, suggesting that digital competence or resilience can directly shape venture intentions alongside their efficacy-mediated effects (Caputo et al., 2025; Zhang & Chen, 2024). The full mediation observed here suggests that the evaluative demands of sustainable entrepreneurship where aspiring founders must believe they can manage ecological accountability, social responsibility, and financial viability simultaneously (Shepherd & Patzelt, 2011; Usman et al., 2024) create a more stringent efficacy gateway that entirely channels the motivational influence of upstream resources. Sustainable entrepreneurship, in short, demands a more complete and confident cognitive commitment than conventional venturing (Talukder et al., 2025; Hockerts & Wüstenhagen, 2010).

5.4 Institutional Support as an Amplifying Ecology

The confirmed moderation by institutional support (H6, β = 0.143) enriches established scholarship on entrepreneurial ecosystems (Bağış et al., 2024; Chahal et al., 2025) by offering a precise functional specification: institutional support amplifies the translation of efficacy beliefs into sustainable entrepreneurial intention rather than generating intentions autonomously. This distinction matters enormously for policy. It implies that institutional investment in incubators, policy incentives, mentorship networks, and entrepreneurship curricula is not a substitute for individual-level psychological development but a complement that converts latent efficacy into manifest commitment (Gonzalez Tamayo et al., 2024; Ip, 2024). Entrepreneurship programs that invest in institutional scaffolding without also building students' hardipreneurial self-efficacy are likely to find their resources underutilised (Narmaditya et al., 2023; Mawardi et al., 2025).

The cross-national variation in moderation strength provides an additional layer of policy insight. The stronger moderating effect observed in Indonesia (β = 0.168 vs. β = 0.119 in Malaysia) is consistent with the structural characteristics of each country's entrepreneurial ecosystem (Mawardi et al., 2025; OECD, 2023). Malaysia's comparatively mature ecosystem encompassing established digital economy blueprints, higher density of registered business incubators, and more formalised university-industry entrepreneurship partnerships (Ip, 2024; Bağış et al., 2024) means that incremental institutional additions generate diminishing motivational returns for Malaysian students whose baseline institutional environment is already supportive. Indonesian students, navigating a more nascent ecosystem, derive proportionally greater motivational benefit from each additional unit of institutional scaffolding (Chahal et al., 2025; Gonzalez Tamayo et al., 2024), making institutional investment a particularly high-return intervention in the Indonesian policy context.

CONCLUSION

6.1 Theoretical Contributions

This study makes three principal theoretical contributions to the entrepreneurship literature. First, it introduces hardipreneurial self-efficacy as a theoretically grounded and empirically validated mediating construct that bridges digital capability and psychological hardiness with sustainable entrepreneurial intention (Bagis et al., 2024; Bagis & Adawiyah, 2025; Bandura, 1997; 2023). This construct extends Social Cognitive Theory into the domain of sustainable entrepreneurship by articulating a resilience-oriented efficacy mechanism specific to the dual demands of digital competence and sustainability-oriented venturing filling a conceptual gap that prior frameworks, which treat technological and psychological resources as parallel rather than integrated predictors, have not addressed (Maheshwari et al., 2023; Usman et al., 2024). Second, the integrative model advances sustainable entrepreneurship scholarship by positioning technological, psychological, and institutional factors within a unified explanatory architecture, producing a more complete account of how aspiring entrepreneurs arrive at the motivational commitment to pursue sustainable ventures (Shepherd & Patzelt, 2011; Schaltegger & Wagner, 2016; Talukder et al., 2025). Third, the cross-national Indonesia–Malaysia design contributes to comparative ASEAN entrepreneurship research by providing the first empirical test of this integrative model across two culturally proximate but institutionally differentiated national contexts (Mawardi et al., 2025; OECD, 2023), demonstrating both cross-national structural equivalence and meaningful contextual variation in institutional boundary conditions.

6.2 Practical Implications

For university entrepreneurship program designers, the full mediation findings advocate a sequential pedagogical architecture: digital capability development must be paired with active efficacy cultivation through mastery-experience design, and both must be scaffolded by institutional support structures that convert confident intentions into actionable venture commitments (Narmaditya et al., 2023; Selvan et al., 2025). Curriculum designers should move beyond passive skill transmission toward experiential learning sequences hackathons, incubation sprint programs, peer mentorship communities, and failure-reflection workshops that simultaneously build digital competence and strengthen students' self-conceptions as

capable, resilient, sustainable entrepreneurs (Huong et al., 2024; Li et al., 2025; Adam et al., 2025). Programs achieving this dual cultivation will produce graduates whose sustainable entrepreneurial intention is both stronger and more durable than those emerging from single-track digital or resilience-only interventions (Bagis et al., 2024; Barrera-Verdugo et al., 2025).

For policymakers in Indonesia and Malaysia, the moderation findings prescribe differentiated investment strategies. Indonesian entrepreneurship policy should prioritise the expansion and quality improvement of institutional support infrastructure incubator density, mentorship network reach, regulatory simplification, and university-industry partnership formalisation given the high motivational returns demonstrated by institutional support in that context (Chahal et al., 2025; Gonzalez Tamayo et al., 2024; OECD, 2023). Malaysian policy should focus on deepening the quality and integration of existing institutional support with efficacy-building developmental programming, rather than simply expanding an already relatively rich support landscape (Mawardi et al., 2025; Ip, 2024; Bağış et al., 2024). Both countries stand to benefit from bilateral knowledge exchange on sustainable entrepreneurship ecosystem design.

6.3 Limitations and Future Research Directions

Several limitations frame productive directions for subsequent inquiry. The cross-sectional design captures a motivational snapshot but cannot address how hardipreneurial self-efficacy evolves longitudinally from initial entrepreneurial consideration through intention crystallisation to actual venture launch (Hair et al., 2022; Caputo et al., 2025). Longitudinal or experience-sampling designs tracking students across the entrepreneurial entry transition would substantially strengthen causal inference. The sample's restriction to business-program students and recent graduates limits the generalisability of findings to technical students, vocational learners, and established MSMEs, each of whom may exhibit qualitatively different digital capability-hardiness-efficacy dynamics (Mawardi et al., 2025; Maheshwari et al., 2023). Future studies extending this model to established micro-entrepreneurs would be particularly valuable for policy. The specific mechanisms through which institutional support operates most powerfully whether through financial resources, mentorship relationships, regulatory environments, or social legitimation (Gonzalez Tamayo et al., 2024) remain unexamined and warrant mixed-methods investigation. Finally, expanding the cross-national base to include Vietnam, Thailand, the Philippines, and other ASEAN members at varying levels of digital and institutional development (OECD, 2023; Hockerts & Wüstenhagen, 2010) would enrich the comparative evidence and strengthen the model's claim to generalisability across the region's diverse entrepreneurial landscapes.

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