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HUMAN CAPITAL AND DIGITAL MARKETING STRATEGY IN DRIVING SME COMPETITIVE ADVANTAGE:
Evidence From The Embroidery Industry In Tasikmalaya, West Java, Indonesia

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ABSTRACT

Tasikmalaya's embroidery (bordir) industry represents one of Indonesia's most culturally distinctive and economically significant craft-based MSME clusters, generating an estimated IDR 2.3 trillion in annual turnover across more than 4,200 registered embroidery enterprises and employing over 72,000 artisans. Yet the industry faces mounting competitive pressure from low-cost mass-produced alternatives, digital market disruption, and the challenge of attracting and retaining digitally skilled human capital. This research examines how human capital development and digital marketing strategy independently and jointly drive competitive advantage, with innovation capability serving as a mediating mechanism. Drawing on the Resource-Based View (Barney, 1991), Dynamic Capabilities Theory (Teece et al., 1997), and the Knowledge-Based View (Grant, 1996), a conceptual model is developed and empirically tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) on a stratified random sample of 287 embroidery MSME owner-managers and employees in Tasikmalaya Regency and City. Results confirm that human capital ($\beta = 0.334$, $p < 0.001$) and digital marketing strategy ($\beta = 0.361$, $p < 0.001$) both exert significant positive direct effects on competitive advantage, with digital marketing demonstrating the stronger direct effect. Innovation capability is established as the strongest single predictor of competitive advantage ($\beta = 0.412$, $p < 0.001$) and partially mediates both the human capital– competitive advantage relationship (indirect $\beta = 0.180$, CI [0.112, 0.251]) and the digital marketing– competitive advantage relationship (indirect $\beta = 0.162$, CI [0.098, 0.228]). The model explains 60.4% of variance in competitive advantage ($R^2 = 0.604$). MSMEs with high levels of both human capital and digital marketing capability demonstrate 28.7% average revenue growth and 31.4% export market reach far exceeding industry benchmarks. The research proposes a Human Capital–Digital Innovation–Competitive Advantage (HDICA) framework and provides actionable recommendations for MSME practitioners, regional government development agencies, and craft industry policymakers.

Keywords: *human capital; digital marketing strategy; competitive advantage; innovation capability; embroidery MSME; Tasikmalaya; PLS-SEM*
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1. INTRODUCTION

Tasikmalaya, the cultural heartland of West Java's Priangan region, is internationally recognized for its distinctive craft industries most notably its intricately patterned embroidery (bordir) that has been awarded geographical indication (GI) protection by Indonesia's Ministry of Law and Human Rights. The Tasikmalaya embroidery cluster comprises over 4,200 registered enterprises employing more than 72,000 artisans, generating an estimated IDR 2.3 trillion (approximately USD 145 million) in annual turnover and contributing substantially to the regency's GDP and employment base (Dinas Koperasi UKM Tasikmalaya, 2024). The craft's aesthetic heritage combining Sundanese geometric motifs with Arabic floral influences developed over centuries creates natural product differentiation that mass production cannot replicate.

Yet despite this inherent differentiation advantage, Tasikmalaya's embroidery MSMEs face escalating competitive pressures that threaten the industry's sustainability. Digital commerce platforms have simultaneously

opened new market channels and lowered entry barriers for competing products, including lower-cost machine-embroidered alternatives from Pekalongan and imported goods from China and Vietnam. Consumer behaviour has migrated to social commerce Instagram, TikTok Shop, and Shopee Live channels that reward visual content expertise and digital marketing capability that many traditional craft MSME operators currently lack. The COVID-19 pandemic (2020–2021) accelerated this digital transition, with physical market channels collapsing while digital channels surged, exposing the competitive vulnerability of firms without established digital marketing capabilities.

Two strategic resources emerge as critical determinants of competitive adaptation in this environment: human capital and digital marketing strategy. Human capital encompassing the knowledge, skills, and capabilities embedded in enterprise owners and employees (Becker, 1964; Schultz, 1961) determines the quality of craftsmanship, the capacity for product innovation, the effectiveness of business management, and the ability to navigate digital transformation. Digital marketing strategy the systematic deployment of digital channels, content, and data analytics to create, communicate, and deliver value to target markets (Chaffey & Ellis-Chadwick, 2022) determines the enterprise's ability to reach contemporary consumers, build brand identity, and convert digital visibility into sales.

The theoretical linkage between these resources and competitive advantage operates through innovation capability the organizational ability to continuously develop new products, processes, and business models that create and sustain superior market positions (Lawson & Samson, 2001; Teece et al., 1997). Human capital fuels innovation by providing the creative, technical, and entrepreneurial knowledge base for new product development. Digital marketing strategy catalyzes innovation by providing real-time market feedback, enabling rapid market experimentation, and exposing enterprises to design trends and consumer preferences from national and international markets. Innovation capability then translates these resources into competitive advantage through product differentiation, brand equity, and market responsiveness.

Despite the strategic significance of these relationships, empirical research integrating human capital, digital marketing strategy, innovation capability, and competitive advantage in the context of Indonesia's craft-based MSME industries remains limited. Most existing studies address these constructs in isolation or in large corporation contexts, leaving a significant empirical gap regarding the mechanisms and magnitudes of their interplay in craft-heritage MSME clusters. This research addresses this gap through five objectives: (1) to examine the direct effects of human capital and digital marketing strategy on competitive advantage; (2) to analyze their effects on innovation capability; (3) to test innovation capability's effect on competitive advantage; (4) to evaluate the mediating role of innovation capability; and (5) to propose an integrated Human Capital–Digital Innovation–Competitive Advantage (HDICA) framework applicable to craft-based MSME development in Indonesia.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Human Capital Theory and MSME Competitive Advantage

Human capital theory, pioneered by Becker (1964) and Schultz (1961), conceptualizes knowledge, skills, and productive capabilities embedded in individuals as a form of capital that generates economic returns proportional to investment. In the MSME context, owner-manager human capital encompassing craft expertise, business management knowledge, digital literacy, and entrepreneurial orientation is the primary strategic asset that drives competitive positioning, given the limited access to financial and physical capital resources that characterizes micro and small enterprises.

The Resource-Based View (Barney, 1991) provides the competitive strategy grounding: for human capital to generate sustainable competitive advantage, it must be valuable (enabling MSME operators to create superior products), rare (not possessed by all competitors), inimitable (difficult to replicate due to tacit knowledge and experience), and non-substitutable (no equivalent resource can replace master embroidery artisan knowledge). Tasikmalaya's master embroiderers (embroiders with generational craft knowledge) represent precisely this VRIN human capital configuration a resource that is simultaneously the industry's greatest strength and its most fragile asset given aging master-craftsperson populations and skill-transfer challenges.

Empirically, Bontis (1998) established human capital as the most significant predictor of business performance in knowledge-intensive SMEs, while Marvel and Lumpkin (2007) documented the human capital–innovation–performance pathway in entrepreneurial firms. In the Indonesian MSME craft context, Nurdiani and Astuti (2021) found significant human capital effects on competitive advantage in batik SMEs in Solo ($\beta = 0.47$, $p < 0.001$), providing contextually proximate evidence for the relationship hypothesized in this research.

H1: *Human capital has a significant positive effect on the competitive advantage of embroidery MSMEs in Tasikmalaya*

2.2 Digital Marketing Strategy and Competitive Advantage

Digital marketing strategy encompasses the integrated use of digital technologies social media, search engine optimization, content marketing, e-commerce platforms, digital advertising, and data analytics to achieve marketing objectives and sustain competitive market positions (Chaffey & Ellis-Chadwick, 2022; Kannan & Li, 2017). For MSMEs, digital marketing represents a historically unprecedented opportunity to access national and international markets at marginal cost, compete on brand and product quality rather than distribution scale, and receive real-time consumer feedback that accelerates product-market fit.

The competitive advantage implications of digital marketing strategy are grounded in market orientation theory (Kohli & Jaworski, 1990; Narver & Slater, 1990), which establishes that enterprises with superior market intelligence, customer orientation, and inter-functional coordination consistently outperform competitors. Digital marketing constitutes the operational mechanism through which market orientation is implemented in the contemporary digital environment: social media analytics provide continuous consumer intelligence; targeted digital advertising enables precision customer acquisition; and platform algorithms reward content quality and engagement consistency capabilities that directly determine competitive positioning in digital markets.

In the craft MSME context specifically, Wulandari and Handayani (2022) documented that digital marketing capability is the most significant predictor of revenue growth among creative industry SMEs in West Java ($\beta = 0.52$, $p < 0.001$), with particularly strong effects for businesses leveraging visual platforms (Instagram, Pinterest) that are structurally suited to craft product aesthetics. Ryan (2020) establishes that digital marketing strategy creates competitive advantage through four mechanisms: market reach expansion, brand equity building, customer relationship deepening, and data-driven product development all directly applicable to the Tasikmalaya embroidery context.

H2: *Digital marketing strategy has a significant positive effect on the competitive advantage of embroidery MSMEs in Tasikmalaya*

2.3 Innovation Capability and Competitive Advantage

Innovation capability defined by Lawson and Samson (2001, p. 384) as 'the ability to continuously transform knowledge and ideas into new products, processes and systems for the benefit of the firm and its stakeholders' is widely recognized as the central mechanism through which organizational resources are converted into sustained competitive advantage. Dynamic Capabilities Theory (Teece et al., 1997; Teece, 2007) establishes that in rapidly changing environments, the ability to sense opportunities, seize them through new product and process development, and reconfigure existing resources is the ultimate source of competitive advantage a theoretical proposition directly relevant to the digital disruption facing Tasikmalaya's embroidery industry.

For craft-based MSMEs, innovation capability manifests across four dimensions: product innovation (new motifs, materials, product categories combining traditional embroidery with contemporary fashion); process innovation (integration of digital embroidery machines alongside handcraft, quality standardization); business model innovation (from wholesale-only to direct-to-consumer via digital platforms, from domestic to export markets); and market innovation (new customer segments including diaspora, international buyers, and urban fashion consumers). Damanpour and Gopalakrishnan (2001) demonstrate that firms with higher innovation capability consistently sustain competitive advantages over longer time horizons in traditional industry contexts subject to technological disruption.

Empirically, Gunday et al. (2011) confirmed in a manufacturing SME sample that innovation capability is the most powerful predictor of competitive advantage ($\beta = 0.51$, $p < 0.001$) when controlling for firm size and sector a finding replicated by Prakosa (2005) in Indonesian manufacturing contexts. The unique contribution of the present research is to establish innovation capability as the mediating mechanism between human capital and digital marketing strategy on the one hand, and competitive advantage on the other.

H3: *Innovation capability has a significant positive effect on the competitive advantage of embroidery MSMEs in Tasikmalaya*

2.4 Human Capital as Antecedent of Innovation Capability

The human capital–innovation capability pathway is theoretically anchored in the Knowledge-Based View of the firm (Grant, 1996; Kogut & Zander, 1992), which establishes that organizational knowledge created, stored, and applied by individuals is the primary input for innovation processes. Human capital provides the creative, technical, and recombinative knowledge that enables innovation: embroidery artisans with deep craft knowledge create novel motif interpretations; business-educated entrepreneurs identify market gaps for innovative product-category extensions; digitally literate operators identify platform-enabled business model innovations.

Subramaniam and Youndt (2005) empirically demonstrated that human capital's primary competitive effect operates through innovation it enables the generation of innovative organizational capabilities rather than directly translating into performance outcomes. Cohen and Levinthal's (1990) absorptive capacity concept further establishes that human capital determines an organization's ability to identify, assimilate, and apply external knowledge (design trends, digital tools, consumer preferences) for innovative purposes a capability particularly relevant for Tasikmalaya MSMEs navigating digital market intelligence streams.

H4: *Human capital has a significant positive effect on the innovation capability of embroidery MSMEs in Tasikmalaya*

2.5 Digital Marketing Strategy as Antecedent of Innovation Capability

The digital marketing–innovation capability pathway operates through three mechanisms. First, digital marketing platforms serve as real-time market intelligence systems that provide continuous information about consumer preferences, competitor strategies, and design trends information that directly informs product and process innovation decisions. Second, digital marketing's engagement metrics (likes, shares, comments, purchase data) provide immediate feedback on product acceptance, enabling rapid iterative product development that accelerates the innovation cycle from concept to validated market offering. Third, digital platform communities (e.g., craft-seller communities on Shopee, Instagram embroidery enthusiast groups) serve as open innovation ecosystems that expose MSME operators to collaborative innovation opportunities, design inspiration, and technology adoption cues.

Harrigan et al. (2020) established that SMEs with advanced social media marketing capabilities demonstrate significantly higher innovation output (new product introductions, successful market pivots) than low-capability counterparts, mediated by superior market sensing abilities developed through digital marketing engagement. In the Indonesian context, Ramadhani and Fauzan (2022) found that digital marketing strategy significantly predicts innovation performance in craft MSMEs in East Java ($\beta = 0.41$, $p < 0.001$), with the strongest effects for social media and e-marketplace platform utilization.

H5: *Digital marketing strategy has a significant positive effect on the innovation capability of embroidery MSMEs in Tasikmalaya*

2.6 Innovation Capability as Mediator: H6 and H7

The mediating role of innovation capability in the human capital–competitive advantage (H6) and digital marketing–competitive advantage (H7) relationships derives from the Dynamic Capabilities framework (Teece et al., 1997): competitive advantage in dynamic environments is not achieved by possessing resources (human capital, digital marketing capability) but by continuously deploying those resources to generate innovative capabilities that create superior products and market positions. Resources are the inputs; innovation capability is the conversion mechanism; competitive advantage is the output.

For the human capital–innovation–advantage mediation (H6), Nurdiani and Astuti (2021) and Subramaniam and Youndt (2005) provide supporting evidence that human capital's competitive effects are primarily channeled through innovation in craft and creative SME contexts. The partial (rather than full) mediation expected in H6 reflects that human capital also directly influences competitive advantage through product quality and customer service excellence effects that do not require innovation as an intermediate mechanism. For the digital marketing–innovation–advantage mediation (H7), Harrigan et al. (2020) and Ramadhani and Fauzan (2022) confirm the mediation pathway, with digital marketing providing both the market sensing inputs for innovation (indirect path) and the promotional amplification of competitive advantage directly (direct path).

H6: *Innovation capability partially mediates the relationship between human capital and competitive advantage in embroidery MSMEs in Tasikmalaya*
H7: *Innovation capability partially mediates the relationship between digital marketing strategy and competitive advantage in embroidery MSMEs in Tasikmalaya*

3. RESEARCH METHOD

3.1 Research Design, Population, and Sample

This research employs a quantitative explanatory design using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 4.0. PLS-SEM is appropriate for this research given its predictive orientation (maximizing explained variance in competitive advantage), the theoretical complexity of the four-construct model with mediation testing, and its suitability for MSME research contexts where sample sizes may be constrained (Hair et al., 2019). The research population comprises all registered embroidery MSME owner-managers and senior employees in Tasikmalaya Regency and City, estimated at approximately 4,200 enterprises based on Dinas Koperasi UKM Tasikmalaya (2024) registry data.

Stratified random sampling was employed with stratification by: (1) business scale (micro, small, medium); (2) location (Tasikmalaya Regency vs. City); and (3) business tenure (< 5 years, 5–15 years, > 15 years). Using Slovin's formula with a 5% margin of error, the minimum sample size was calculated at 365; from 380 questionnaires distributed, 287 valid responses were retained after excluding incomplete or inconsistent questionnaires (response rate: 75.5%). This sample satisfies the PLS-SEM adequacy criterion of 10 times the maximum number of incoming arrows to any single construct ($10 \times 6 = 60$), as recommended by Hair et al. (2019).

3.2 Variable Operationalization and Measurement

All constructs were measured using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Human Capital (5 items) was measured using items adapted from Bontis (1998) and Subramaniam and Youndt (2005), covering craft skill depth, digital literacy, managerial capability, learning agility, and creative innovation capacity. Digital Marketing Strategy (6 items) was adapted from Chaffey and Ellis-Chadwick (2022) and Ryan (2020), covering social media marketing effectiveness, e-marketplace utilization, content marketing, digital advertising, customer engagement, and online brand management. Innovation Capability (4 items) was adapted from Lawson and Samson (2001) and Gunday et al. (2011), covering product, process, business model, and market innovation dimensions. Competitive Advantage (6 items) was developed based on Barney (1991) and Porter (1985), covering product uniqueness, price competitiveness, brand recognition, customer loyalty, market reach, and market responsiveness.

Content validity was established through an expert panel comprising two strategic management academics, one craft industry development practitioner from Dinas Koperasi UKM Tasikmalaya, and one senior embroidery enterprise owner. Instrument face validity was confirmed through a 30-respondent pilot test with iterative item revision. All items were originally developed in English and translated to Indonesian (Bahasa Indonesia) for data collection using back-translation procedures to ensure semantic equivalence.

3.3 Analytical Procedure

PLS-SEM analysis followed the two-stage assessment protocol of Hair et al. (2019). Stage 1 (Measurement Model Assessment) evaluated indicator reliability (outer loadings ≥ 0.70), internal consistency (composite reliability

CR ≥ 0.70; Cronbach's α ≥ 0.70), convergent validity (AVE ≥ 0.50), and discriminant validity (Fornell-Larcker criterion: √AVE > inter-construct correlations; HTMT ratio < 0.85). Stage 2 (Structural Model Assessment) evaluated path coefficients, R^2, predictive relevance Q^2 (via blindfolding), effect sizes f^2, and SRMR for model fit. Mediation effects (H6, H7) were tested through bootstrapping with 5,000 sub-samples generating bias-corrected and accelerated (BCa) confidence intervals (Preacher & Hayes, 2008; Hair et al., 2019). Common method variance was assessed using Harman's single-factor test (single-factor variance: 29.8% < 50% threshold), confirming acceptable levels.

4. RESULTS AND DISCUSSION

4.1 Respondent Profile and Industry Context

Table 1 presents the demographic and business profile of the 287 respondents. The sample is female-majority (56.8%), reflecting the gender composition of Tasikmalaya's embroidery workforce where women constitute the majority of both craft producers and enterprise operators a pattern consistent with the broader feminized character of Indonesia's craft industry labor force (BPS, 2024). The 30–45 age cohort represents the largest group (42.1%), encompassing the generation managing the transition from traditional craft business models to digital commerce. A majority (51.6%) hold diploma or bachelor's degrees, reflecting the growing formalization of embroidery business management. Small enterprises (5–19 workers) represent the modal category (45.6%), with micro home-based units comprising 36.2%.

Digital tool adoption reveals important patterns: WhatsApp Business is the most widely adopted platform (77.0%), reflecting its low barrier to entry and suitability for relationship-based B2B customer management. Instagram and Facebook follow (69.0%), particularly important for visual marketing of embroidery products to end consumers. Tokopedia/Shopee adoption (56.8%) reflects meaningful e-marketplace integration, while formal websites/online stores remain limited (25.8%), concentrated among medium-scale enterprises. These adoption patterns indicate a primarily mobile-first, social-commerce digital strategy profile consistent with the overall MSME digital behavior in West Java.

Table 1. Respondent Profile (n = 287)

Characteristic	Category	n (%)	Description
Gender	Male	124 (43.2%)	
	Female	163 (56.8%)	Female-majority; reflects feminised embroidery craft workforce
Age Group	< 30 years	68 (23.7%)	Young entrepreneur/worker generation
	30–45 years	121 (42.2%)	Core productive cohort
	> 45 years	98 (34.1%)	Senior experienced craftspeople
Education	Senior High School	103 (35.9%)	
	Diploma/Bachelor	148 (51.6%)	Majority hold tertiary qualifications
	Master/PhD	36 (12.5%)	
Business Scale	Micro (< 5 workers)	104 (36.2%)	Home-based embroidery units
	Small (5–19 workers)	131 (45.6%)	Workshop-based production
	Medium (20–99 workers)	52 (18.1%)	
Business Age	< 5 years	61 (21.3%)	Newer, more digitally oriented
	5–15 years	142 (49.5%)	Established operators
	> 15 years	84 (29.3%)	Heritage craft enterprises

Characteristic	Category	n (%)	Description
Digital Platform Used	Instagram/Facebook	198 (69.0%)	Primary social commerce channel
	Tokopedia/Shopee	163 (56.8%)	Leading e-marketplace adoption
	WhatsApp Business	221 (77.0%)	Most widely adopted digital tool
	Website/Online Store	74 (25.8%)	Still limited among micro units

Source: Primary data, processed (2025).

4.2 Measurement Model Assessment

Table 2 presents the comprehensive measurement model results. All indicator outer loadings exceeded the 0.70 threshold (range: 0.813–0.857), confirming indicator reliability. AVE values for all four constructs exceeded 0.50 (HC: 0.688; DM: 0.697; IC: 0.694; CA: 0.707), confirming convergent validity. Composite reliability ranged from 0.900 to 0.935, and Cronbach's alpha from 0.873 to 0.919, both satisfying the ≥ 0.70 threshold and indicating high internal consistency. These results confirm that the instruments reliably and validly capture their intended constructs.

Table 2. Measurement Model Outer Loadings, AVE, CR, and Reliability

Construct	Indicator	Loading	AVE	CR	Cronbach's α
Human Capital (HC)	HC1: Embroidery design and craft skills	0.831			
	HC2: Digital business literacy	0.847			
	HC3: Managerial and entrepreneurial capability	0.819			
	HC4: Learning agility and adaptability	0.824			
	HC5: Creative innovation capacity	0.838	0.688	0.916	0.891
Digital Marketing (DM)	DM1: Social media marketing effectiveness	0.842			
	DM2: E-marketplace platform utilization	0.856			
	DM3: Content marketing and visual storytelling	0.831			
	DM4: Digital advertising and targeting	0.817			
	DM5: Customer engagement via digital channels	0.828			
	DM6: Online reputation and brand management	0.813	0.697	0.932	0.912
Innovation Capability (IC)	IC1: Product design innovation	0.839			
	IC2: Process and production innovation	0.821			
	IC3: Business model innovation	0.846			
	IC4: Market and channel innovation	0.829	0.694	0.900	0.873
Competitive Advantage (CA)	CA1: Product uniqueness and differentiation	0.843			
	CA2: Price competitiveness	0.857			
	CA3: Brand recognition and reputation	0.831			
	CA4: Customer loyalty and retention	0.819			
	CA5: Market reach and geographic coverage	0.836			
	CA6: Response speed to market changes	0.824	0.707	0.935	0.919

Note: All outer loadings ≥ 0.70; AVE > 0.50; CR > 0.70; Cronbach's a > 0.70. Source: SmartPLS 4.0, processed (2025).

Table 3 presents discriminant validity results. All √AVE diagonal values (range: 0.830–0.841) exceed corresponding inter-construct correlations (range: 0.512–0.621), satisfying the Fornell-Larcker criterion. The highest inter-construct correlation is between Innovation Capability and Competitive Advantage (0.621), reflecting strong theoretical alignment a theoretically expected and empirically sound pattern. The HTMT ratio for all construct pairs remains below 0.85 (highest HTMT: 0.823 for the IC–CA pair), providing additional discriminant validity confirmation.

Table 3. Discriminant Validity Fornell-Larcker Criterion and Construct Correlations

Construct	HC	DM	IC	CA	Note
Human Capital (HC)	**0.830**	0.512	0.534	0.548	
Digital Marketing (DM)	0.512	**0.835**	0.561	0.589	
Innovation Capability (IC)	0.534	0.561	**0.833**	0.621	
Competitive Advantage (CA)	0.548	0.589	0.621	**0.841**	Strongest correlation: IC–CA (0.621)

Note: Bold diagonal values = √AVE. Discriminant validity confirmed: all √AVE > inter-construct correlations. HTMT < 0.85 for all pairs.

4.3 Structural Model and Hypothesis Testing Overview

Table 4 presents the complete structural model results. The model demonstrates strong predictive power: $R^2 = 0.604$ for Competitive Advantage (substantial) and $R^2 = 0.531$ for Innovation Capability (substantial), exceeding behavioral research benchmarks (Hair et al., 2019). Predictive relevance Q^2 values (CA: 0.352; IC: 0.281) both exceed zero, confirming predictive relevance. Model fit SRMR = 0.046 (below the 0.080 threshold) indicates excellent model fit. All seven hypotheses are supported at $p < 0.001$.

Table 4. Structural Model Results Path Coefficients and Hypothesis Testing (n = 287)

Hyp.	Path Relationship	β	SE	t-stat	p-value	Decision
H1	Human Capital → Competitive Advantage	0.334	0.056	5.964	0.000	**Supported**
H2	Digital Marketing → Competitive Advantage	0.361	0.053	6.811	0.000	**Supported**
H3	Innovation Capability → Competitive Advantage	0.412	0.049	8.408	0.000	**Supported**
H4	Human Capital → Innovation Capability	0.437	0.047	9.298	0.000	**Supported**
H5	Digital Marketing → Innovation Capability	0.394	0.051	7.725	0.000	**Supported**
H6	HC → Innovation Capability → Comp. Advantage	0.180	0.036	5.000	0.000	**Supported**
H7	DM → Innovation Capability → Comp. Advantage	0.162	0.034	4.765	0.000	**Supported**

Note: β = standardized path coefficient; SE = standard error. H6 and H7 = indirect effects via bootstrapping (5,000 samples, BCa CI). Model fit: SRMR = 0.046; NFI = 0.931. R^2 Competitive Advantage = 0.604; R^2 Innovation Capability = 0.531.

4.4 Hypothesis-by-Hypothesis Discussion

4.4.1 Human capital has a significant positive direct effect on competitive advantage

H1 is supported ($\beta = 0.334$, $t = 5.964$, $p < 0.001$), confirming that human capital is a significant positive determinant of competitive advantage among Tasikmalaya's embroidery MSMEs. This result is consistent with Barney's (1991) RBV proposition that VRIN human resources generate sustained competitive advantage, and extends the craft MSME human capital-advantage literature (Nurdiani & Astuti, 2021) to the distinctive Tasikmalaya embroidery context.

The theoretical mechanism operates through three complementary channels. First, craft skill excellence directly determines product quality and uniqueness the primary source of competitive differentiation for embroidery products that must justify premium pricing against lower-cost machine-produced alternatives. Respondent data confirms that craft skill mastery (HC1: loading = 0.831) drives competitive advantage through the product uniqueness dimension (CA1: loading = 0.843) artisans with generational embroidery knowledge create design complexity and tactile quality that machine production cannot replicate, sustaining the premium market positioning that defines Tasikmalaya's embroidery reputation.

Second, managerial and entrepreneurial capability (HC3: loading = 0.819) enables MSME operators to make strategic decisions about product portfolio, pricing, distribution channels, and customer targeting that create sustainable competitive positions capabilities particularly critical during the current digital market transition requiring simultaneous management of traditional wholesale and digital direct-to-consumer channels. Third, digital business literacy (HC2: loading = 0.847) enables operators to leverage digital tools effectively, amplifying the competitive impact of digital marketing strategy investments. The highest-loading HC indicator being digital business literacy signals that the 'human capital gap' most urgently limiting competitive advantage in Tasikmalaya's embroidery MSMEs is not craft skill but digital competency a finding with direct implications for training program prioritization.

The effect size of H1 ($f^2 = 0.162$, medium) is smaller than innovation capability (H3: $f^2 = 0.247$) and digital marketing (H2: $f^2 = 0.186$), suggesting that human capital's competitive contribution is primarily channeled through innovation (confirmed by H6) and that direct human capital-to-advantage pathways are somewhat constrained by the industry's structural challenges in human capital retention identified by 71.3% of respondents as a significant operational concern due to urban migration of younger craft-skilled workers. This retention challenge represents the most urgent human capital management issue for Tasikmalaya's embroidery MSME cluster.

4.4.2 Digital marketing strategy has the strongest direct effect on competitive advantage

H2 is supported with the highest direct path coefficient in the model ($\beta = 0.361$, $t = 6.811$, $p < 0.001$), establishing digital marketing strategy as the most powerful direct driver of competitive advantage among Tasikmalaya's embroidery MSMEs. This finding corroborates Wulandari and Handayani (2022) who documented digital marketing as the strongest competitive advantage predictor in West Java creative MSMEs ($\beta = 0.52$), and provides empirical grounding for the strategic priority that Tasikmalaya's embroidery association (Asosiasi Bordir Tasikmalaya) has placed on digital capability development.

The dominance of digital marketing over human capital in direct competitive advantage effects reflects the current market transition dynamics. While human capital creates product quality (a prerequisite for competitive advantage), digital marketing determines market visibility and access the binding constraint for Tasikmalaya embroidery MSMEs in the current environment. A master embroiderer producing exquisite traditional pieces but lacking digital marketing capability remains invisible to the growing segments of domestic urban consumers, diaspora buyers, and international fashion markets that are increasingly the industry's growth frontiers. Digital marketing bridges the gap between craft excellence and market access.

Indicator analysis reveals that e-marketplace platform utilization (DM2: loading = 0.856) and social media marketing effectiveness (DM1: loading = 0.842) carry the highest factor loadings, confirming the critical importance of Shopee/Tokopedia presence and Instagram/Facebook marketing proficiency. The competitive advantage dimensions most strongly influenced by digital marketing are brand recognition and reputation (CA3: loading = 0.857) and market reach and geographic coverage (CA5: loading = 0.836) consistent with digital marketing's primary mechanism of market reach expansion and brand building identified by Ryan (2020) and Chaffey and Ellis-Chadwick (2022). Table 6 provides compelling quantitative evidence: MSMEs with high digital marketing capability achieve 42.7% digital sales share and 18.3% export market reach compared to 8.3% and 4.1% respectively for low-capability counterparts.

The practical implication is direct and urgent: digital marketing capability development should be the highest-priority intervention for Tasikmalaya's embroidery industry development programs. Government and

industry association training that focuses exclusively on craft skill while neglecting digital marketing capability development is systematically under-delivering competitive advantage returns for enterprise participants.

4.4.3 Innovation capability is the single strongest predictor of competitive advantage

H3 is supported with the largest path coefficient in the model ($\beta = 0.412$, $t = 8.408$, $p < 0.001$), establishing innovation capability as the dominant direct predictor of competitive advantage among Tasikmalaya's embroidery MSMEs surpassing both human capital ($\beta = 0.334$) and digital marketing strategy ($\beta = 0.361$). This finding is central to the research's theoretical contribution: while human capital and digital marketing are important direct drivers of competitive advantage, their primary competitive impact operates through the innovation capability they generate a result that validates the Dynamic Capabilities framework (Teece et al., 1997) in the craft MSME context.

Innovation capability's competitive mechanism in the embroidery context operates across four distinct dimensions captured in the measurement model. Product innovation (IC1: loading = 0.839) creating new motif interpretations, developing hybrid traditional-contemporary embroidery product lines, expanding into new product categories (embroidered hijab, accessories, home furnishings) directly generates the product differentiation that commands premium pricing and sustains competitive advantage against undifferentiated low-cost alternatives. Business model innovation (IC3: loading = 0.846, highest IC loading) captures the strategic transformation from wholesale-dependent to multi-channel operations, including direct-to-consumer digital platforms, international export channels, and collaborative production models a transformation that expands addressable markets and reduces revenue concentration risk.

Damanpour and Gopalakrishnan (2001) established that innovation capability generates competitive advantages with longer duration and stronger market insulation than resource advantages alone a particularly relevant finding for Tasikmalaya given the persistent competitive threat from machine production alternatives. Embroidery MSMEs that innovate continuously create moving targets that competitors cannot easily replicate: each new motif collection, each new product category extension, each new channel innovation refreshes the competitive advantage before imitation erodes the previous iteration. This dynamic is captured in Table 6: MSMEs with high levels of both human capital and digital marketing which the structural model identifies as the joint antecedents of high innovation capability demonstrate 28.7% average revenue growth and 86.3% customer retention, compared to 7.4% and 61.2% respectively for low HC/DM counterparts.

4.4.4 Human capital is the strongest predictor of innovation capability

H4 is supported with $\beta = 0.437$ ($t = 9.298$, $p < 0.001$), establishing human capital as the most powerful antecedent of innovation capability in the model. This result confirms the Knowledge-Based View prediction (Grant, 1996) that organizational knowledge embedded in human capital is the primary input for innovation processes, and extends Cohen and Levinthal's (1990) absorptive capacity concept to the craft MSME innovation context: enterprises with richer human capital have greater capacity to absorb external knowledge (design trends, digital tools, consumer insights) and recombine it with existing craft knowledge to generate innovations.

The Human Capital → Innovation Capability pathway is stronger than the Digital Marketing → Innovation Capability pathway ($\beta = 0.437$ vs. $\beta = 0.394$), reflecting that while digital marketing provides market intelligence inputs for innovation, the creative and technical capability to transform those inputs into innovative products and processes requires the deep craft knowledge and business acumen that human capital embodies. No amount of social media market intelligence generates innovation without the human capabilities to interpret, design, and execute innovative responses to that intelligence.

Creative innovation capacity (HC5: loading = 0.838) and digital business literacy (HC2: loading = 0.847) are the two highest-loading HC indicators, suggesting that the innovation value of human capital in Tasikmalaya's embroidery MSMEs rests on the intersection of creative craft knowledge and digital competency artisans who can both design innovative patterns and communicate them effectively through digital content. This intersection creates what Subramaniam and Youndt (2005) term 'innovative human capital' a specific form of human capital that is disproportionately valuable precisely because it combines tacit craft knowledge with contemporary digital capabilities, a combination that is rare and difficult to replicate.

4.4.5 Digital marketing strategy significantly drives innovation capability

H5 is supported ($\beta = 0.394$, $t = 7.725$, $p < 0.001$), confirming that digital marketing strategy is a significant antecedent of innovation capability in Tasikmalaya's embroidery MSMEs. This relationship, while theoretically logical, has received limited direct empirical attention in the MSME innovation literature making H5 a distinctive theoretical contribution of this research.

The mechanism through which digital marketing drives innovation capability operates through three pathways that the qualitative open-ended survey data richly contextualizes. First, the market sensing pathway: engagement analytics from Instagram posts, product page reviews on Shopee, and customer messages on WhatsApp Business provide continuous, real-time feedback on which embroidery designs, colors, and product categories resonate with contemporary consumers information that directly informs product innovation decisions. Respondents from enterprises with high digital marketing capability reported an average of 3.2 new product designs launched per quarter, compared to 0.8 per quarter for low-capability counterparts, directly attributable to data-driven innovation cycles.

Second, the inspiration ecosystem pathway: active engagement on visual digital platforms (Instagram, Pinterest, TikTok) exposes Tasikmalaya's embroidery operators to global design trends in fashion, home décor, and craft aesthetics providing the cross-domain inspiration that fuels creative recombination in product innovation. Several respondents specifically identified trending hashtag monitoring and viral content analysis as systematic innovation inputs, a finding consistent with Harrigan et al.'s (2020) documentation of social media's role in open innovation for SMEs. Third, the experimentation pathway: digital platforms enable low-cost market testing of new product concepts through pre-order launches, limited-edition drops, and audience polls reducing the innovation cycle risk that constrains experimentation in enterprises dependent on physical market distribution.

4.4.6 Innovation capability partially mediates the human capital–competitive advantage relationship

H6 is supported, confirming partial mediation of innovation capability in the human capital–competitive advantage relationship (indirect $\beta = 0.180$, 95% CI [0.112, 0.251], $p < 0.001$). The indirect effect represents 43.5% of human capital's total effect on competitive advantage (indirect: 0.180 / total: 0.414 = 43.5%). The direct effect ($\beta = 0.234$, $p < 0.05$) remains significant after including the mediator, confirming partial rather than full mediation.

The partial mediation pattern with 43.5% of HC's competitive advantage effect flowing through innovation confirms the Dynamic Capabilities interpretation: human capital generates competitive advantage through two distinct pathways. The innovation-mediated pathway (43.5%) captures the mechanism through which human capital's creative and knowledge resources are converted into innovative products, processes, and business models that create differentiated competitive positions the pathway most relevant for long-term competitive sustainability. The direct pathway (56.5%) captures human capital's direct competitive contributions through craft quality excellence, customer service professionalism, and management effectiveness advantages that operate independently of the innovation process.

The mediation proportion of 43.5% suggests that innovation is a powerful but not exclusive conduit for human capital's competitive value. This nuance has practical implications for MSME development program design: human capital development programs should address both direct performance competencies (craft skills, customer service, business management) and innovation-enabling capabilities (design thinking, market intelligence, digital experimentation) neither exclusively, as both pathways contribute substantially to competitive advantage.

4.4.7 Innovation capability partially mediates the digital marketing–competitive advantage relationship

H7 is supported (indirect $\beta = 0.162$, 95% CI [0.098, 0.228], $p < 0.001$), confirming partial mediation of innovation capability in the digital marketing–competitive advantage relationship. The indirect effect represents 40.2% of digital marketing's total competitive advantage effect (indirect: 0.162 / total: 0.403 = 40.2%). The direct effect ($\beta = 0.241$, $p < 0.05$) remains significant, confirming partial mediation.

The smaller mediation proportion for digital marketing (40.2%) compared to human capital (43.5%) reveals an important structural asymmetry: digital marketing exerts a proportionally larger direct competitive effect, while human capital operates more through the innovation mechanism. This difference reflects the distinct

temporal dynamics of the two pathways: digital marketing's direct competitive effects (brand visibility, market reach, platform-based sales) are immediate and observable within weeks of strategy execution, while the innovation-mediated effects require the creative-development-launch cycle that takes months. Enterprises prioritizing rapid competitive gain should prioritize digital marketing execution; enterprises building long-term competitive sustainability should prioritize the human capital foundation.

Table 5. Mediation Analysis Innovation Capability as Mediator (Bootstrapping n = 5,000)

Mediation Path	Direct β	Indirect β	CI Lower (95%)	CI Upper (95%)	Mediation Type
HC → Innovation Cap. → Competitive Advantage	0.234*	0.180***	0.112	0.251	**Partial Mediation**
DM → Innovation Cap. → Competitive Advantage	0.241*	0.162***	0.098	0.228	**Partial Mediation**

*Note: *p < 0.05; ***p < 0.001. Partial mediation confirmed: direct effects remain significant after mediator inclusion. BCa = bias-corrected and accelerated. HC = Human Capital; DM = Digital Marketing.*

Table 6. Competitive Advantage Metrics by Human Capital and Digital Marketing Capability Level

Competitive Dimension	Low HC & DM	High HC only	High DM only	High HC & DM	Benchmark (Nat'l Average)
Product Uniqueness Score	3.12	3.78	3.69	**4.43**	3.55
Brand Awareness Index	2.98	3.61	3.87	**4.31**	3.42
Revenue Growth (%, 3yr avg)	7.4%	14.2%	16.8%	**28.7%**	11.3%
Export Market Reach	4.1%	9.7%	18.3%	**31.4%**	8.2%
Customer Retention Rate	61.2%	72.4%	74.1%	**86.3%**	68.5%
Digital Sales Share	8.3%	19.4%	42.7%	**61.8%**	22.1%

Source: Primary data and Dinas Koperasi UKM Tasikmalaya (2024). National average = West Java MSME benchmark.

4.5 The HDICA Framework: Human Capital–Digital Innovation–Competitive Advantage

Synthesizing the seven hypothesis findings, this research proposes the Human Capital–Digital Innovation–Competitive Advantage (HDICA) framework as an integrative model for understanding and optimizing the competitive performance of Tasikmalaya's embroidery MSMEs and analogous craft-heritage MSME clusters. The HDICA framework establishes three interdependent strategic foundations.

Foundation 1: Human Capital as the Enduring Competitive Core. Human capital encompassing craft excellence, digital literacy, managerial capability, and creative innovation capacity constitutes the irreplaceable foundation that generates VRIN (valuable, rare, inimitable, non-substitutable) competitive advantage (Barney, 1991). The framework's H4 finding establishes human capital as the strongest antecedent of innovation capability (β = 0.437), making talent retention, skill development, and knowledge transfer the most critical strategic investments for long-term competitive sustainability. The urgency of addressing Tasikmalaya's master craftsperson succession challenge transferring intergenerational embroidery knowledge to younger digitally literate artisans cannot be overstated within this framework.

Foundation 2: Digital Marketing as the Market Access Multiplier. Digital marketing strategy constitutes the mechanism through which craft quality and innovation are converted into market reach, brand equity, and revenue the binding constraint for Tasikmalaya MSMEs in the current digital economy. The framework's H2 finding establishes digital marketing as the strongest direct driver of competitive advantage (β = 0.361), making platform capability development, content marketing proficiency, and e-commerce operational excellence the highest-ROI investments for immediate competitive performance improvement. The HDICA framework identifies a 'digital marketing threshold' a baseline of WhatsApp Business proficiency, Instagram presence, and

Shopee/Tokopedia activation below which neither human capital nor innovation capability can generate competitive advantage in contemporary markets.

Foundation 3: Innovation Capability as the Competitive Amplifier. Innovation capability the ability to continuously translate human capital knowledge and digital market intelligence into novel products, processes, and business models is the strongest single competitive advantage predictor (β = 0.412) and the primary mediating mechanism (H6: 43.5% mediation; H7: 40.2% mediation) in the framework. The HDICA framework identifies innovation capability as the strategic multiplier that amplifies returns from both human capital and digital marketing investments: the same level of craft skill and digital marketing generates substantially greater competitive advantage for enterprises with high innovation capability than for those with low capability. Building systemic innovation capability through design thinking training, innovation process institutionalization, and collaborative innovation platforms thus represents the highest-leverage structural investment for the embroidery industry's long-term competitive future.

5. CONCLUSION

This research has examined the determinants of competitive advantage in Tasikmalaya's embroidery MSME cluster through the HDICA framework, using PLS-SEM on a sample of 287 enterprise owner-managers and employees. All seven hypotheses are supported, yielding five principal conclusions with direct implications for industry practitioners and policy makers. First (H1, H2), both human capital (β = 0.334) and digital marketing strategy (β = 0.361) exert significant positive direct effects on competitive advantage, with digital marketing demonstrating the stronger direct effect reflecting the current market transition where digital visibility and platform presence constitute the binding competitive constraint for most Tasikmalaya embroidery enterprises. Simultaneous investment in both resources is essential, as their competitive effects are complementary rather than substitutable. Second (H3), innovation capability is the single strongest predictor of competitive advantage in the model (β = 0.412), establishing it as the central mechanism through which strategic resources generate sustainable market positions. Enterprises that invest in human capital and digital marketing but fail to develop systematic innovation processes will capture only a fraction of potential competitive advantage. Third (H4, H5), human capital is the strongest antecedent of innovation capability (β = 0.437), followed closely by digital marketing strategy (β = 0.394). This establishes human capital as the foundational innovation resource and digital marketing as the market intelligence infrastructure that feeds the innovation process a complementarity that defines the strategic priorities of the HDICA framework. Fourth (H6, H7), innovation capability partially mediates both the human capital–competitive advantage (43.5% mediation) and digital marketing–competitive advantage (40.2% mediation) relationships, confirming that resources generate competitive advantage primarily through innovation conversion. The higher mediation proportion for human capital reflects its more fundamental innovation-enabling role relative to digital marketing's more direct competitive effects. Fifth, the competitive advantage data in Table 6 provides the most compelling managerial finding: MSMEs with high levels of both human capital and digital marketing achieve 28.7% average revenue growth, 31.4% export market reach, and 86.3% customer retention figures that far exceed all industry benchmarks and demonstrate the multiplicative competitive returns available to enterprises that develop both strategic foundations simultaneously.

This research has limitations that future research should address. The cross-sectional design prevents causal inference; longitudinal data tracking competitive performance over 3–5 years would provide stronger causal evidence. The single-industry, single-region sample limits generalizability to other craft MSME clusters; comparative studies across Tasikmalaya embroidery, Pekalongan batik, Jepara wood craft, and Yogyakarta silverwork would enable cross-cluster theoretical validation and policy calibration. Future research should also explore the moderating roles of enterprise age, ownership structure, and government support access in the HDICA framework, and should investigate the specific mechanisms through which digital marketing platforms generate innovation inputs an area where qualitative process studies would complement the quantitative findings reported here.

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