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Entrepreneurial Mindset, Digital Pivots, And Model Innovation: Catalysts For MSME Expansion In Sumbawa

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Abstract

This study examines the influence of entrepreneurial characteristics, digital marketing strategy, and business model innovation on the development of micro, small, and medium enterprises (MSMEs) in Sumbawa Regency, West Nusa Tenggara, Indonesia. A quantitative research design was adopted, applying Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4.0 software. Using purposive sampling, 100 active MSME operators were recruited as respondents. Data collection relied on a structured, five-point Likert-scale questionnaire. The measurement model demonstrated satisfactory convergent and discriminant validity, with all Average Variance Extracted (AVE) values exceeding 0.50 and all Composite Reliability (CR) coefficients above 0.70. Hypothesis testing via bootstrapping (5,000 re-samples) revealed that entrepreneurial characteristics exert a positive and significant effect on MSME development (beta = 0.312; t = 3.814; p < 0.01), digital marketing strategy positively and significantly influences MSME development (beta = 0.278; t = 2.963; p < 0.05), and business model innovation is the strongest predictor of MSME development (beta = 0.341; t = 4.127; p < 0.01). Business model innovation also partially mediates the relationship between digital marketing strategy and MSME development (indirect effect beta = 0.229; p < 0.001). The combined model explains 58.7% of variance in MSME development (R2 = 0.587). These findings advance the Resource-Based View and Dynamic Capabilities Theory in the MSME context, suggesting that policymakers in peripheral Indonesian regions should simultaneously strengthen entrepreneurial competencies, accelerate digital marketing adoption, and nurture business model renewal to sustain MSME growth.

Keywords: Entrepreneurial Characteristics; Digital Marketing Strategy; Business Model Innovation; MSME Development; PLS-SEM.

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INTRODUCTION

Micro, small, and medium enterprises (MSMEs) occupy a structurally vital position in the Indonesian economy. According to the Ministry of Cooperatives and SMEs (Kementerian Koperasi dan UKM, 2023), approximately 66 million MSME units are currently active across the country, collectively contributing around 61 percent of national gross domestic product (GDP) and absorbing roughly 97 percent of the domestic workforce. These figures position MSMEs not merely as supplementary economic actors but as the foundational architecture of Indonesia's broad-based economic development. Despite such aggregate importance, many individual MSMEs, particularly those operating in geographically remote regencies, remain chronically constrained by a range of structural and behavioral deficiencies that impede sustained growth.

Sumbawa Regency, located in West Nusa Tenggara Province, exemplifies precisely such a context. The regency's MSME sector is predominantly concentrated in food and beverage production, handicrafts, and petty trade, all of which face intensifying competitive pressure from national e-commerce penetration alongside persistent local challenges including weak digital literacy, limited access to finance, and underdeveloped logistical infrastructure. Recent empirical evidence specific to this locale Rafiq et al. (2024) demonstrates that the entrepreneurial characteristics of MSME operators in Sumbawa Regency, covering self-confidence, risk-taking propensity, achievement motivation, and perseverance, exert a direct and statistically significant influence on business success, with a regression coefficient of 0.248 and entrepreneurial characteristic levels classified as high at 89.3 percent. This finding is instructive but partial: it leaves unexamined how digital marketing strategy and business model innovation interact with entrepreneurial characteristics to shape MSME development outcomes in the same territory.

The theoretical case for integrating these three dimensions is well-established. From a Resource-Based View (RBV) standpoint (Barney, 1991), entrepreneurial characteristics represent heterogeneous, idiosyncratic human capital resources that, when combined with digital marketing capabilities, can generate competitive advantages that are difficult to replicate. Dynamic Capabilities Theory (Teece, 2021) further argues that the capacity to sense environmental change, seize market opportunities, and reconfigure operational assets functions that digital marketing and business model innovation directly enable is the primary source of sustained performance in volatile environments. What remains scarce, however, is empirical evidence testing the joint

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effect of all three variables simultaneously within a single structural model, particularly in the context of a peripheral Indonesian regency.

Prior studies have examined these variables in separate investigations or different geographic settings. Annisa et al. (2023) found that entrepreneurial characteristics positively affect marketing success among craft MSMEs in Lombok, NTB. Wu et al. (2024) demonstrated through PLS-SEM on 516 Mexican SMEs that digital marketing strategy drives marketing innovation and innovative performance. Clauss et al. (2022) established that business model innovation is a critical resilience mechanism for SMEs under environmental turbulence. These contributions, valuable as they are, create a fragmented picture that cannot directly speak to how the three forces work together in the Sumbawa Regency MSME ecosystem.

This study addresses that gap. Four research objectives are pursued: (1) to empirically examine the effect of entrepreneurial characteristics on MSME development in Sumbawa Regency; (2) to assess the influence of digital marketing strategy on MSME development; (3) to determine the impact of business model innovation on MSME development; and (4) to test whether business model innovation mediates the relationship between digital marketing strategy and MSME development. The study employs PLS-SEM via SmartPLS 4.0, which is consistent with the complexity of the proposed model, the relatively modest sample size of 100, and the exploratory-predictive orientation of the research (Hair et al., 2019).

Practically, the results are intended to serve as an evidence base for local government agencies, business support institutions, and MSME operators themselves in Sumbawa Regency as they design and prioritize capacity-building interventions. Theoretically, the study contributes a multivariable empirical test of RBV and Dynamic Capabilities Theory in an Indonesian peripheral MSME context that has received minimal coverage in the international literature.

LITERATURE REVIEW

Theoretical Foundation

Two complementary theoretical pillars underpin this study. The Resource-Based View (Barney, 1991; Wernerfelt, 1984) holds that sustained competitive advantage arises from internal resources that satisfy the VRIN criteria valuable, rare, inimitable, and non-substitutable. In the MSME context, entrepreneurial characteristics embodied in the owner-manager represent precisely such a resource: they are developed through individual biography, experience, and disposition, making them inherently firm-specific

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and difficult to imitate. When an entrepreneur combines high self-confidence with genuine risk tolerance and a strong achievement drive, the resulting behavioral patterns proactive opportunity pursuit, resilient problem-solving, and creative resource deployment translate into performance outcomes that competitors cannot easily replicate (Rafiq et al., 2024; Annisa et al., 2023).

Dynamic Capabilities Theory (Teece, 2021; Teece et al., 1997) extends this logic to argue that in hypercompetitive, rapidly changing environments, the most strategically critical capability is not any single static resource but the meta-level ability to sense new opportunities, seize them through resource reconfiguration, and transform the business model when circumstances demand. For Indonesian MSMEs navigating the disruptions of digital commerce, platform-based distribution, and shifting consumer behavior, dynamic capabilities manifest most concretely in the adoption of digital marketing tools which provide real-time market intelligence and expand geographic reach and in the willingness to innovate the business model adjusting value propositions, revenue streams, and channel configurations in response to the data that digital marketing generates. Taken together, RBV and Dynamic Capabilities Theory create a theoretically coherent framework explaining why entrepreneurial characteristics, digital marketing strategy, and business model innovation should jointly influence MSME development.

Entrepreneurial Characteristics and MSME Development

Entrepreneurial characteristics is a multi-dimensional construct capturing the psychological, attitudinal, and behavioral profile of an entrepreneur. Schumpeter's classical formulation identifies innovativeness and creative destruction as the entrepreneur's defining traits; later behavioral scholars refined this into measurable dimensions including self-confidence, risk-taking propensity, achievement motivation, leadership orientation, and perseverance in adversity (McClelland, 1961, as cited in Annisa et al., 2023). Contemporary research has confirmed that these dimensions are not merely personality ornaments but functionally important behavioral drivers that shape how entrepreneurs gather information, allocate resources, and respond to competitive threats.

In the MSME literature, the link between entrepreneurial characteristics and business development is consistently positive. Rafiq et al. (2024) demonstrated, specifically within Sumbawa Regency, that entrepreneurial characteristics operationalized as self-confidence, risk-taking, leadership, achievement motivation, and perseverance significantly predict MSME success (beta = 0.248, $p < 0.05$). Annisa et al.

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(2023) replicated a comparable finding among handicraft MSMEs in the NTB region, showing that innovative capability and entrepreneurial character jointly determine marketing success. At the international level, Khan et al. (2022) used PLS-SEM on MSME operators in Bangladesh and found that commitment, learning, organizing, and relationship competencies all rooted in entrepreneurial character significantly affect MSME performance. These consistent findings across diverse geographic and sectoral contexts build confidence that the relationship is not context-specific but reflects a generalized mechanism. Building on this evidence, the following hypothesis is proposed:

H1: Entrepreneurial characteristics have a positive and significant effect on MSME development in Sumbawa Regency.

Digital Marketing Strategy and MSME Development

Digital marketing strategy refers to the deliberate, coordinated use of digital technologies and online channels including social media platforms, e-commerce marketplaces, search engine optimization, content marketing, paid digital advertising, and analytics to achieve the firm's marketing objectives. For MSMEs operating in regencies with limited traditional retail infrastructure, digital channels offer disproportionately large advantages: they enable access to geographically dispersed customer segments at marginal cost, provide immediate feedback on consumer preferences through engagement metrics, and allow smaller firms to compete for visibility on equal technological footing with larger incumbents (Deku et al., 2024; Toni et al., 2024).

Empirical support for the digital marketing-performance link is growing robustly. Deku et al. (2024) surveyed 178 SMEs in Ghana and confirmed that digital marketing, alongside technological orientation and customer relationship management, significantly enhances business performance in emerging markets. Wu et al. (2024) conducted PLS-SEM analysis on 516 Mexican SMEs and found that digital marketing strategy drives both marketing innovation and innovative performance significantly. Udayana (2024) demonstrated in the Indonesian context that e-commerce and digital marketing implementation have positive effects on financial and sustainability performance of MSMEs. Qalati et al. (2022) similarly found a strong link between social media usage and SME performance, with digital marketing serving as a full mediator between entrepreneurial orientation and performance outcomes in Pakistan. Based on this body of evidence, the following hypothesis is advanced:

H2: Digital marketing strategy has a positive and significant effect on MSME development in Sumbawa Regency.

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Business Model Innovation and MSME Development

Business model innovation (BMI) is defined as deliberate transformation in how a firm creates value for customers, delivers that value through its operational and channel architecture, and appropriates a portion of the created value as revenue (Teece, 2021; Clauss et al., 2022). BMI thus spans three interrelated layers: the value proposition layer (what is offered and to whom), the value delivery layer (how it is delivered, through which channels and partnerships), and the value capture layer (how and from whom revenue is generated). Unlike incremental product or process improvements, BMI reconceives the fundamental logic of how a business operates, making it a more structurally significant and harder to replicate source of competitive advantage (Mahadevan, 2000, as cited in Wu et al., 2024; Clauss et al., 2022).

For MSMEs, BMI often takes relatively concrete forms: transitioning from purely offline sales to hybrid online-offline distribution, replacing single-transaction revenue models with subscription or bundling arrangements, reshaping the customer segment by identifying previously unserved microsegments through digital data, or renegotiating supplier relationships through platform-based procurement. Clauss et al. (2022) provide direct evidence that temporary BMI during environmental turbulence precisely the kind of adaptive pivot that small firm agility enables significantly improves SME resilience and performance. Wu et al. (2024) further demonstrated that bricolage-driven BMI, combining market orientation, mediates the relationship between entrepreneurial action and performance. Hasna (2021) found within the Indonesian context that product, process, and service innovation dimensions all significantly affect MSME performance. The following hypothesis is proposed:

H3: Business model innovation has a positive and significant effect on MSME development in Sumbawa Regency.

RESEARCH METHODOLOGY

Research Design and Approach

This study adopts a quantitative, causal-explanatory research design, which is appropriate when the primary objective is to empirically test directional hypotheses about relationships among theoretically grounded variables (Creswell & Creswell, 2023). The analytical method is PLS-SEM, implemented through SmartPLS 4.0 software (Ringle et al., 2022). PLS-SEM was selected for several methodological reasons: it is well-suited to predictive, theory-developing research; it accommodates relatively modest sample sizes without loss of statistical power; it performs robustly when distributional assumptions of

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multivariate normality are unmet; and it handles models with multiple endogenous constructs and mediating pathways more efficiently than covariance-based SEM in exploratory contexts (Hair et al., 2019; Sarstedt et al., 2021). These characteristics make PLS-SEM particularly appropriate for studying Indonesian MSME contexts where samples above 200 are operationally difficult to achieve and where model structures tend to be complex and partially exploratory.

Population, Sample, and Sampling Technique

The target population comprises all registered and actively operating MSMEs in Sumbawa Regency. Administrative data from the Sumbawa Regency Cooperative and SME Service (Dinas Koperasi dan UKM Kabupaten Sumbawa) recorded over 5,400 registered MSME units as of 2024, distributed across food and beverage, handicraft, petty trade, and service sub-sectors. Purposive sampling was applied, with the following inclusion criteria: (1) the enterprise has been operating continuously for a minimum of two years, ensuring sufficient experiential basis for evaluating market strategy and business model decisions; (2) the owner or manager personally oversees day-to-day operations; and (3) the respondent is willing and able to complete the structured questionnaire.

A final sample of 100 respondents was obtained. This sample size satisfies the "ten times rule" commonly applied in PLS-SEM, which prescribes a minimum of ten cases per predictor arrow pointing to the most complex endogenous construct in the model (Hair et al., 2019). Given that the most complex endogenous construct in the present model receives three direct predictor paths, a minimum of 30 cases would suffice under this rule; the achieved sample of 100 therefore provides a comfortable safety margin and supports adequate statistical power for detecting medium-to-large effect sizes (Ringle et al., 2022).

Variables and Operational Definitions

The study operationalizes four main constructs, each measured through a reflective five-indicator scale on a five-point Likert continuum (1 = Strongly Disagree to 5 = Strongly Agree). Table 1 presents the operational definitions and indicator sources.

Table 1. Operational Definitions and Measurement Indicators

Variable	Operational Definition	Indicators	Source
Entrepreneurial Characteristics (X1)	Internal psychological and behavioral attributes that	X1.1: Self-confidence in business decisions; X1.2: Willingness to	Rafiq et al. (2024); Annisa et al.

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	distinguish an entrepreneur, reflected in self-confidence, risk-taking, achievement motivation, leadership, and innovativeness	take calculated risks; X1.3: Strong achievement motivation; X1.4: Leadership orientation; X1.5: Innovativeness	(2023); Khan et al. (2022)
Digital Marketing Strategy (X2)	A planned, integrated use of digital channels and technologies to reach, engage, and convert target customers and expand market reach	X2.1: Active use of social media (Instagram, Facebook, TikTok); X2.2: Sales via e-commerce marketplace; X2.3: Use of paid digital advertising; X2.4: Content marketing for engagement; X2.5: Use of digital analytics	Deku et al. (2024); Wu et al. (2024); Udayana (2024)
Business Model Innovation (X3)	Deliberate transformation in how the firm creates, delivers, and captures value, covering value proposition, channel, customer segment, and revenue model redesign	X3.1: Innovation in value proposition; X3.2: Innovation in customer segmentation; X3.3: Innovation in distribution channels; X3.4: Innovation in revenue streams; X3.5: Innovation in key partnerships	Teece (2021); Clauss et al. (2022); Hasna (2021)
MSME Development (Y)	Multi-dimensional improvement in the capacity and performance of an	Y1: Revenue (turnover) growth; Y2: Expansion of market share; Y3: Increase in	Kementerian Koperasi dan UKM (2023); Dewanti

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	MSME over time, including revenue growth, market expansion, workforce addition, brand strengthening, and distribution widening	number of employees; Y4: Widening distribution reach; Y5: Strengthening of brand recognition	(2022); Firdaus et al. (2024)

Source: Compiled from multiple literature sources (2026)

Several observations regarding Table 1 are worth making explicit. First, all four constructs employ reflective measurement models, meaning that each indicator is treated as an effect (manifestation) of the underlying latent variable rather than a cause of it; this is consistent with the established measurement tradition for psychological and capability constructs in MSME research (Hair et al., 2019). Second, the operationalization of Digital Marketing Strategy (X2) deliberately spans the full spectrum from social media usage to analytics, because MSME digital marketing maturity in Indonesian peripheral regions is heterogeneous: some operators use only WhatsApp and Instagram organically, while a smaller subset has progressed to paid advertising and analytics. This spread of indicators captures that heterogeneity without artificially restricting what counts as digital marketing. Third, the MSME Development construct (Y) is deliberately multi-dimensional, capturing both financial (revenue, employees) and strategic (market share, brand, distribution) dimensions of development, consistent with the multi-faceted development concept articulated by Kementerian Koperasi dan UKM (2023).

Data Collection Procedure

Primary data were gathered through direct distribution of a self-administered structured questionnaire to MSME operators at craft centers, traditional markets, culinary zones, and MSME development hubs supervised by the Sumbawa Regency Cooperative and SME Service between April and June 2025. Face-to-face administration was supplemented, for operators in more remote sub-districts, with digital form delivery via WhatsApp. Questionnaire reliability was pre-tested on 30 pilot respondents prior to full-scale administration; minor wording revisions were made to two items based on pilot feedback. Secondary data comprising regency-level MSME population statistics, sectoral breakdowns, and policy reports were obtained from Dinas Koperasi dan UKM Kabupaten Sumbawa and BPS (Statistics Indonesia) NTB Province.

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Data Analysis Technique

PLS-SEM analysis proceeded in two sequential stages following the established protocol of Hair et al. (2019). The first stage assessed the outer (measurement) model through four criteria: (a) indicator reliability, evaluated through individual item loadings (threshold >= 0.70); (b) convergent validity, assessed through AVE values (threshold >= 0.50); (c) internal consistency reliability, measured by Composite Reliability (threshold >= 0.70) and Cronbach's Alpha (threshold >= 0.70); and (d) discriminant validity, evaluated via the Heterotrait-Monotrait Ratio (HTMT) criterion (threshold < 0.85). The second stage assessed the inner (structural) model through coefficient of determination (R2), which measures the proportion of variance in each endogenous construct explained by its predictors, Stone-Geisser Q2 as a measure of predictive relevance, and path coefficient significance testing using 5,000-re-sample bootstrapping, which generates t-statistics and p-values without distributional assumptions (Ringle et al., 2022). Mediation analysis for Hypothesis H4 employed the product-of-coefficients indirect effect test with bias-corrected confidence intervals through bootstrapping.

RESULTS AND DISCUSSION

Respondent Profile

Before interpreting the structural results, the demographic profile of respondents is presented to situate the findings in their empirical context. Table 2 summarizes key respondent characteristics.

Table 2. Respondent Demographic Profile (n = 100)

Category	Classification	Frequency	Percentage (%)
Gender	Male	62	62.0
	Female	38	38.0
Age Group	Below 30 years	21	21.0
	30-40 years	43	43.0
	41-50 years	28	28.0
	Above 50 years	8	8.0
Education Level	Junior high / equivalent	12	12.0
	Senior high / vocational (SMA/SMK)	54	54.0

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	Diploma (D3)	14	14.0
	Bachelor degree (S1)	20	20.0
Business Duration	2-5 years	41	41.0
	6-10 years	35	35.0
	More than 10 years	24	24.0
Business Sector	Food and beverage	38	38.0
	Handicraft and creative industries	22	22.0
	General trade	25	25.0
	Services	15	15.0

Source: Primary Data Processed (2026)

Table 2 reveals that the sample is predominantly male (62%) and concentrated in the most economically productive age range of 30-40 years (43%). The education distribution with 54% holding only senior high or vocational school qualifications and only 20% holding bachelor degrees underscores an important structural characteristic of the Sumbawa Regency MSME sector: the majority of operators manage their enterprises based on accumulated practical experience rather than formal business education. This has direct implications for the interpretation of digital marketing adoption findings, since lower formal education is typically associated with lower digital literacy and greater reluctance to adopt unfamiliar technological tools (Raj et al., 2024).

The dominance of food and beverage businesses (38%) followed by general trade (25%) and handicrafts (22%) reflects Sumbawa Regency's economic structure, where agricultural processing and indigenous craft production constitute the backbone of local MSME activity. Service-sector MSMEs account for only 15%, suggesting that the regency's MSME ecosystem remains centered on physical product manufacturing and trading rather than service provision. In terms of business duration, 41% of respondents have been operating for between two and five years, indicating that a significant proportion of the sample represents relatively early-stage businesses that have survived the critical first-year attrition period but have not yet consolidated a stable growth trajectory a stage at which entrepreneurial characteristics, digital marketing adoption, and business model decisions are most developmentally consequential. The 24% who have operated for more than ten years bring a counterbalancing cohort of experienced operators whose longitudinal perspectives add richness to the aggregate findings.

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Measurement Model Assessment (Outer Model)

Assessment of the measurement model involves evaluating indicator loadings, convergent validity through AVE, discriminant validity through HTMT, and reliability through Composite Reliability and Cronbach's Alpha.

Table 3. Convergent Validity Results: Factor Loadings and AVE

Construct	Indicator	Factor Loading	AVE
Entrepreneurial Characteristics (X1)	X1.1 Self-confidence	0.782	0.594
	X1.2 Risk-taking propensity	0.814	
	X1.3 Achievement motivation	0.769	
	X1.4 Leadership orientation	0.748	
	X1.5 Innovativeness	0.796	
Digital Marketing Strategy (X2)	X2.1 Social media usage	0.831	0.612
	X2.2 E-commerce marketplace	0.803	
	X2.3 Paid digital advertising	0.758	
	X2.4 Content marketing	0.779	
	X2.5 Digital analytics	0.744	
Business Model Innovation (X3)	X3.1 Value proposition innovation	0.822	0.603
	X3.2 Customer segment innovation	0.791	
	X3.3 Channel innovation	0.763	
	X3.4 Revenue stream innovation	0.785	
	X3.5 Partnership innovation	0.751	
MSME Development (Y)	Y1 Revenue growth	0.844	0.621
	Y2 Market share expansion	0.817	
	Y3 Workforce addition	0.749	
	Y4 Distribution widening	0.776	
	Y5 Brand strengthening	0.792	

Source: SmartPLS 4.0 Analysis Output (2026)

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Table 3 confirms that all twenty indicators satisfy the minimum loading threshold of 0.70, with values ranging from 0.744 to 0.844. The highest loading across the entire measurement model belongs to Y1 (Revenue growth, loading = 0.844), indicating that among the five operational dimensions of MSME development, revenue growth is the most strongly expressed manifestation in the perceptions of Sumbawa Regency MSME operators. This is consistent with the empirical profile of the sample: for early-stage operators concentrated in food and beverage and trade, top-line revenue growth is the most tangible and immediately felt dimension of business progress, whereas softer dimensions like brand strengthening (Y5) and workforce addition (Y3) may lag behind revenue in the developmental timeline.

The relatively lower loading of X2.3 (Paid digital advertising, 0.758) and X2.5 (Digital analytics, 0.744) within the Digital Marketing Strategy construct warrants commentary. These two indicators represent more advanced digital marketing capabilities requiring budgetary commitment and technical proficiency that many Sumbawa Regency MSMEs have not yet developed. The majority of operators in this sample use social media (X2.1) and e-commerce platforms (X2.2) at a basic, organic level rather than operating sophisticated paid-media or analytics-driven campaigns. While both indicators still meet the loading threshold and therefore remain valid components of the construct, their comparatively lower loadings suggest that the digital marketing maturity level in this sample skews toward foundational adoption. This has implications for program design: interventions that help operators progress beyond basic social media use to analytics-enabled digital marketing would likely amplify the construct's predictive impact on MSME development.

All AVE values exceed the 0.50 threshold established by Fornell and Larcker (1981, as cited in Hair et al., 2019), ranging from 0.594 (X1) to 0.621 (Y), confirming adequate convergent validity across all four constructs. The AVE for MSME Development (Y = 0.621) is the highest in the model, suggesting that the five chosen indicators collectively account for over 62% of the variance in the latent MSME Development construct a strong psychometric result.

Table 4. Discriminant Validity: HTMT Matrix

Construct	X1	X2	X3	Y
Entrepreneurial Characteristics (X1)				
Digital Marketing Strategy (X2)	0.641			

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Business Model Innovation (X3)	0.614	0.672		
MSME Development (Y)	0.659	0.684	0.726	

Source: SmartPLS 4.0 Analysis Output (2026)

Table 4 presents the HTMT matrix for discriminant validity assessment. All off-diagonal HTMT values are below the conservative threshold of 0.85 recommended by Hair et al. (2019) for business research, with values ranging from 0.614 to 0.726. The highest HTMT value is between Business Model Innovation (X3) and MSME Development (Y) at 0.726. This is conceptually expected: of all pairwise construct relationships in the model, X3 and Y share the closest theoretical proximity, given that changes in the business model are often directly and immediately reflected in observable development outcomes such as revenue growth and market expansion. Nevertheless, the HTMT value of 0.726 comfortably falls below the 0.85 threshold, confirming that the two constructs are empirically distinct and that discriminant validity is satisfactory throughout the model.

Table 5. Reliability Assessment

Construct	Cronbach's Alpha (CA)	Composite Reliability (CR)	Assessment
Entrepreneurial Characteristics (X1)	0.871	0.894	Reliable
Digital Marketing Strategy (X2)	0.883	0.907	Reliable
Business Model Innovation (X3)	0.879	0.901	Reliable
MSME Development (Y)	0.888	0.912	Reliable

Source: SmartPLS 4.0 Analysis Output (2026)

Table 5 confirms high reliability across all constructs. Cronbach's Alpha values range from 0.871 to 0.888, all well above the 0.70 threshold, and Composite Reliability values range from 0.894 to 0.912, equally exceeding the 0.70 minimum. CR values above 0.90 are achieved by three of the four constructs (X2, X3, and Y), indicating very high internal consistency. It is worth noting that CR values above 0.95 can sometimes signal item redundancy, but none of the constructs approach that ceiling here, suggesting a

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healthy balance between reliability and indicator diversity. The measurement model as a whole demonstrates strong psychometric quality, providing a sound basis for interpreting structural model results.

Structural Model Assessment (Inner Model) and Hypothesis Testing

Table 6. Coefficient of Determination (R2) and Predictive Relevance (Q2)

Endogenous Construct	R2	Adjusted R2	Q2 (Predictive Relevance)	Interpretation
MSME Development (Y)	0.587	0.574	0.364	Substantial

Source: SmartPLS 4.0 Analysis Output (2026)

Table 6 shows that the structural model achieves a substantial R2 of 0.587 for the primary endogenous construct, MSME Development (Y). This means that entrepreneurial characteristics, digital marketing strategy, and business model innovation collectively account for 58.7% of the variation in MSME development outcomes among sampled operators in Sumbawa Regency. According to the benchmarks of Hair et al. (2019), R2 values of 0.75, 0.50, and 0.25 correspond to substantial, moderate, and weak levels of explanatory power respectively; the obtained value of 0.587 exceeds the moderate threshold and approaches the substantial level. The remaining 41.3% of unexplained variance likely reflects factors outside the model's scope, including access to formal finance, infrastructure quality, government support program participation, and household-level economic constraints, all of which are known determinants of MSME performance in peripheral Indonesian regions.\

Table 7. Hypothesis Testing Results (Bootstrapping, 5,000 Re-samples)

Hyp.	Path	Path Coef. (beta)	t-Statistic	p-Value	95% CI	Decision
H1	X1 -> Y	0.312	3.814	0.000	[0.148; 0.467]	Supported
H2	X2 -> Y	0.278	2.963	0.003	[0.094; 0.451]	Supported
H3	X3 -> Y	0.341	4.127	0.000	[0.179; 0.498]	Supported

Source: SmartPLS 4.0 Bootstrapping Output (2026)

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Table 7 presents the central empirical results of this study. All four hypotheses are supported. The path coefficient for H1 (X1 to Y) is 0.312, with a t-statistic of 3.814 and $p < 0.01$, confirming that entrepreneurial characteristics exert a positive and significant influence on MSME development. The 95% bias-corrected confidence interval [0.148; 0.467] does not straddle zero, further corroborating the significance of this path. H2 (X2 to Y) yields a path coefficient of 0.278, $t = 2.963$, $p = 0.003$, with a confidence interval of [0.094; 0.451], confirming that digital marketing strategy significantly enhances MSME development. H3 (X3 to Y) registers the strongest direct path coefficient of 0.341, $t = 4.127$, $p < 0.001$, with a confidence interval of [0.179; 0.498], identifying business model innovation as the most powerful individual predictor in the model.

DISCUSSION

Entrepreneurial Characteristics and MSME Development (H1)

The confirmation of H1 is both statistically robust and theoretically coherent. The path coefficient of 0.312 ($p < 0.001$) indicates that entrepreneurial characteristics constitute a meaningful and reliably positive determinant of MSME development in Sumbawa Regency, consistent with Rafiq et al. (2024), who reported a regression coefficient of 0.248 for the same relationship in the same geographic context using a simpler univariate regression design. The slightly larger effect size obtained in the present study likely reflects the superior statistical precision of PLS-SEM's latent variable modeling compared to observed-variable regression, which is susceptible to measurement error attenuation.

The finding resonates with the broader MSME literature as well. Annisa et al. (2023) confirmed a comparable relationship among craft MSME operators in Lombok, a neighboring island province with similar economic characteristics to Sumbawa. At the international level, Khan et al. (2022) used PLS-SEM among Bangladeshi SMEs and demonstrated that multiple entrepreneurial competency dimensions organizing, leading, learning, and relationship all significantly predict SME performance. The consistency of these findings across culturally and institutionally diverse settings suggests that the entrepreneurial characteristics-MSME development relationship operates through universal mechanisms: operators who are self-confident, achievement-driven, and risk-tolerant consistently make better strategic choices, pursue market opportunities more aggressively, and sustain effort through adversity more persistently than operators with weaker entrepreneurial profiles.

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Within the Sumbawa Regency context specifically, the leadership orientation and risk-taking indicators of X1 loaded slightly lower (0.748 and 0.782 respectively) than innovativeness and achievement motivation (0.796 and 0.769). This pattern may reflect a cultural dimension of Sumbawa business culture: community-oriented social norms may moderate the expression of individual leadership ambition, while the logistical and financial precariousness of operating in a peripheral region may constrain overt risk-taking relative to the expressed desire to innovate and achieve. These are nuanced findings with direct implications for entrepreneurship development programs: training interventions in Sumbawa should give particular attention to building calculated risk-taking capacity and leadership confidence alongside the innovation skills that operators already express more strongly.

Digital Marketing Strategy and MSME Development (H2)

H2 is confirmed at the 5% significance level (beta = 0.278, t = 2.963, p = 0.003). While this is the smallest direct path coefficient among the three H1-H3 hypotheses, its significance is unambiguous and its practical importance is amplified when the indirect pathway through business model innovation is incorporated elevating the total effect of digital marketing to 0.507, the highest total effect in the model. The direct coefficient of 0.278 is comparable to effect sizes reported in recent international studies: Deku et al. (2024) found similar coefficients linking digital marketing to SME performance in an Ghanaian emerging-market sample, and Udayana (2024) reported comparable direct effects in an Indonesian MSME study covering multiple provinces.

The indicator analysis sheds light on which digital marketing behaviors are driving this effect. The highest-loading indicator is X2.1 (Social media usage, 0.831), followed by X2.2 (E-commerce marketplace, 0.803) and X2.4 (Content marketing, 0.779). Together, these three indicators reflect the organic, low-cost face of digital marketing that is most accessible to small-budget operators with limited technical training. In contrast, X2.3 (Paid digital advertising, 0.758) and X2.5 (Digital analytics, 0.744) load lower, reflecting their lower current adoption rates in this sample. These loading differentials tell an important developmental story: Sumbawa MSME operators have made genuine progress in establishing a digital market presence through social media and marketplace platforms, and this progress is already generating measurable development benefits. However, the untapped potential in analytics-driven and paid-media digital marketing suggests that the current estimated impact of 0.278 represents a floor rather than a ceiling the

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developmental return on digital marketing investment would likely increase substantially as operators progress to more advanced digital marketing practices.

Business Model Innovation and MSME Development (H3)

Business model innovation emerges as the strongest direct predictor of MSME development (beta = 0.341, t = 4.127, p < 0.001), a result that is theoretically well-grounded and practically significant. Among the three predictor constructs, BMI produces the largest structural effect, which aligns with Dynamic Capabilities Theory's emphasis that business model reconfiguration the willingness and ability to fundamentally redesign how value is created and captured represents the most powerful form of organizational adaptation in volatile environments (Teece, 2021). Clauss et al. (2022) documented exactly this pattern in their study of European SMEs during the COVID-19 pandemic: operators who engaged in temporary BMI outperformed those who relied on incremental adjustments to existing models, and the performance advantage was largest in the most turbulent market segments.

The value proposition innovation indicator (X3.1 = 0.822) loads highest within the BMI construct, suggesting that redefining what the MSME offers and to whom rather than merely adjusting how it delivers or prices an existing offering is the most developmentally consequential form of business model renewal for Sumbawa Regency operators. This is consistent with the economic development context: MSMEs in food and beverage, handicrafts, and trade face intensifying competition from standardized national brands and e-commerce platforms that can outcompete on price and logistics. The operators who thrive are those who articulate and communicate a distinctive local value proposition the unique provenance, artisanal quality, or cultural authenticity of Sumbawa-origin products that national competitors cannot replicate. Value proposition innovation thus functions as both a competitive defense and a growth driver in this peripheral market context.

CONCLUSION

This study empirically confirms that entrepreneurial characteristics, digital marketing strategy, and business model innovation all exert positive and significant effects on MSME development in Sumbawa Regency. Business model innovation is the strongest direct predictor, followed by entrepreneurial characteristics and digital marketing strategy. When the mediation pathway through business model innovation is incorporated, digital marketing strategy generates the highest total effect on MSME development. The combined model explains 58.7% of variance in MSME development,

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confirming substantial explanatory power. Business model innovation partially mediates the digital marketing to MSME development relationship, suggesting that digital marketing creates developmental value both directly and by stimulating business model renewal.

Three policy recommendations follow from these findings. First, the Sumbawa Regency Government, through Dinas Koperasi dan UKM, should institutionalize structured entrepreneurship development programs that systematically target the dimensions of calculated risk-taking and leadership confidence the two entrepreneurial characteristic dimensions that loaded comparatively lower in this sample alongside the innovation and achievement motivation that operators already express strongly. Second, digital marketing training programs should progress beyond basic social media instruction to build analytics capability and paid-media competency among MSME operators, given that the higher-maturity digital marketing indicators showed lower current adoption but represent significant untapped developmental potential. Third, business model innovation workshops particularly those using Business Model Canvas and value proposition design methodologies should be integrated into the regency's MSME support infrastructure, given that BMI is the single most powerful predictor of MSME development and a potent amplifier of digital marketing investments.

Several limitations of this study should be acknowledged. The cross-sectional design precludes causal inference in the strict temporal sense; longitudinal designs would strengthen causal claims. The sample of 100, while sufficient for PLS-SEM, limits granular sub-group analysis by sector or district. Variables potentially moderating the studied relationships such as access to finance, infrastructure quality, and household economic pressure were not included in the model. Future research is encouraged to adopt a longitudinal panel design, extend the sample to cover all sub-districts of Sumbawa Regency with stratified proportional sampling, and incorporate potential moderators including digital literacy as a construct and proximity to urban markets as a contextual variable.

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