

Human Resource Competence, Entrepreneurial Motivation, and Digital MSME Success: The Moderating Role of Digital Literacy

(Kompetensi Sumber Daya Manusia, Motivasi Berwirausaha, dan Keberhasilan UMKM Digital: Peran Moderasi Literasi Digital)

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ABSTRACT

Digital transformation does not automatically improve the performance of micro, small, and medium enterprises because technology creates value only when business owners possess adequate managerial and digital capabilities. This study examines the effects of human resource competence and entrepreneurial motivation on digital business success and assesses the moderating role of digital literacy. A quantitative survey involved 120 owners or managers of micro, small, and medium enterprises in Makassar, South Sulawesi. Respondents were selected through purposive sampling, and the data were analyzed using partial least squares structural equation modeling. Human resource competence, entrepreneurial motivation, and digital literacy positively affected business success; digital literacy also strengthened both focal relationships, and the model explained 63.7% of the variance in business success. As an applied contribution, the findings are translated into an evidence-to-action framework specifying stakeholder co-design, pilot implementation, process evaluation, and outcome evaluation. These downstream phases are proposed from the survey evidence and are not presented as activities already implemented or evaluated.

Keywords:

business success; digital literacy; entrepreneurial motivation; human resource competence; micro, small, and medium enterprises.

ABSTRAK

Transformasi digital tidak otomatis meningkatkan kinerja usaha mikro, kecil, dan menengah karena teknologi hanya memberikan nilai ketika pelaku usaha memiliki kemampuan manajerial dan digital yang memadai. Penelitian ini menguji pengaruh kompetensi sumber daya manusia dan motivasi berwirausaha terhadap keberhasilan usaha berbasis digital serta menilai peran moderasi literasi digital. Survei kuantitatif melibatkan 120 pemilik atau pengelola usaha mikro, kecil, dan menengah di Kota Makassar, Sulawesi Selatan. Responden dipilih melalui purposive sampling, sedangkan data dianalisis menggunakan partial least squares structural equation modeling. Kompetensi sumber daya manusia, motivasi berwirausaha, dan literasi digital berpengaruh positif terhadap keberhasilan usaha; literasi digital juga memperkuat kedua hubungan utama, dan model menjelaskan 63,7% variasi keberhasilan usaha. Sebagai kontribusi terapan, hasil penelitian diterjemahkan menjadi kerangka evidence-to-action yang memuat co-design pemangku kepentingan, implementasi uji coba, evaluasi proses, dan evaluasi hasil. Tahap lanjutan tersebut merupakan rancangan berbasis bukti survei dan tidak diklaim sebagai kegiatan yang telah diimplementasikan atau dievaluasi.

Kata kunci:

Keberhasilan usaha; literasi digital; motivasi berwirausaha; kompetensi sumber daya manusia; usaha mikro, kecil, dan menengah.

Introduction

Micro, small, and medium enterprises (MSMEs) play a substantial role in the Indonesian economy through business creation, employment generation, and income distribution. Changes in consumer behavior have increasingly encouraged MSMEs to adopt digital channels, including social media, online marketplaces, digital

payment systems, and bookkeeping applications. Statistics Indonesia's E-Commerce Statistics 2023 indicates continued growth in online trading activities; however, the level of adoption remains uneven across regions and business categories (Badan Pusat Statistik, 2025).

Digitalization does not automatically translate into improved business performance. Technology creates value only when business owners possess the capabilities required to manage it effectively. Many MSMEs continue to face constraints related to skills, resources, data security, and digital strategy. Studies in the Indonesian context have also identified limitations in technical readiness and human resource quality (Kurniawati et al., 2021; Purnomo et al., 2024). These conditions indicate that digital transformation must be supported by strong internal capabilities.

Human resource competence constitutes a core form of capital for MSMEs. Business owners commonly perform multiple roles as proprietors, managers, and decision-makers. Business knowledge, marketing capabilities, financial management, innovation, and operational control influence the quality of managerial decisions. Human capital theory views knowledge and skills as productive investments (Becker, 1993). The resource-based view similarly positions competence as a strategic resource capable of generating advantage when it is valuable and difficult to imitate (Barney, 1991).

Business success is also influenced by entrepreneurial motivation. Motivation shapes the intensity, persistence, and decisiveness of entrepreneurial behavior. Highly motivated entrepreneurs are more likely to establish goals, pursue opportunities, and remain resilient under pressure. Such motivation may arise from the need for achievement, independence, business growth, and value creation. The entrepreneurial process is strongly influenced by goals, self-efficacy, and owner persistence (Shane et al., 2003).

Digital literacy provides a contemporary context for these two factors. It encompasses the ability to access, evaluate, create, protect, and apply digital information. In business settings, these capabilities include managing online marketplaces, digital content, transactions, customer data, and cybersecurity. Reddy et al. (2023) is used only as a general conceptual basis for these digital-literacy domains; the study did not test e-commerce adoption or MSME performance. Empirical evidence is therefore separated according to the outcome examined. Widiyanti et al. (2024) reported a positive association between digital literacy and e-commerce utilization among SMEs in Greater Malang. Novela et al. (2024) found a positive direct relationship between digital literacy and business performance among SMEs in Greater Solo, while Zahoor et al. (2023) linked managerial digital literacy to SME digital transformation through the use of digital technologies. Teng et al. (2022), in turn, examined employee digital skills as an antecedent of digital transformation and digital transformation as a predictor of financial performance. These studies support distinct links and should not be combined as evidence of a single digital-literacy-adoption-performance chain.

Structured Mapping of Prior Studies and Research Gap

To make the novelty claim verifiable rather than declarative, Table 1 maps the studies most closely related to the proposed model. The comparison separates construct coverage, empirical context, sample, analytical design, principal findings, and the limitation that remains relative to this study.

Table 1. Structured mapping of prior studies and the verifiable research gap

Study	Constructs	Context	Sample	Method	Principal findings	Limitation relative to this study
Teng et al. (2022)	Digital technology, employee digital skills, digital-transformation strategy, digital transformation, and financial performance	China, SMEs that had initiated digital transformation	335 valid SME questionnaires	Survey, interviews for instrument development, and structural equation modeling	Digital technology, employee digital skills, and transformation strategy were positively related to digital transformation. Digital transformation was positively related to financial performance and mediated the strategy-performance relationship.	Does not test general owner business competence, continuing entrepreneurial motivation, or digital literacy as a moderator. Performance is examined mainly through digital transformation.
Rupeika-Apoga et al. (2022)	Digital orientation, digital capability, digital transformation, revenue, and business-model sophistication	Latvia during the COVID-19 pandemic	246 SMEs	Survey and mediation analysis	Digital orientation and digital capability positively influenced digital transformation. Digital transformation mediated effects on revenue and business-model outcomes.	Uses organization-level digital orientation and capability. It does not separate general owner competence from digital literacy and does not include entrepreneurial motivation.

Study	Constructs	Context	Sample	Method	Principal findings	Limitation relative to this study
Zahoor et al. (2023)	Managerial digital literacy, digital-technology use, managerial attributes, and digital transformation	United Arab Emirates	58 SMEs	Survey and moderated-mediation analysis	Managerial digital literacy influenced digital transformation through digital-technology use, while managerial attributes conditioned part of this process.	The outcome is digital transformation rather than business success. General business competence and continuing entrepreneurial motivation are not modeled.
Tricahyono and Sudrajat (2023)	Managerial digital capability, operational digital capability, digital literacy, and business performance	Indonesia	Not applicable, conceptual paper	Literature-based conceptual framework and propositions	Proposes direct effects of digital capabilities and digital literacy on performance, together with digital-literacy moderation.	The proposed moderation is not empirically tested. The focal predictors are digital-specific capabilities, not general owner competence, and entrepreneurial motivation is absent.
Widiyanti et al. (2024)	Digital literacy, owner characteristics, economic media, and e-commerce utilization	Greater Malang, Indonesia	43 SMEs involved in training or mentoring programs	Purposive survey and path analysis	Digital literacy had a positive and significant relationship with e-commerce utilization. Owner and firm characteristics also explained parts of the model.	The dependent variable is e-commerce utilization, not overall business success. The small program-engaged sample and model do not test competence, motivation, or moderation.
Novela et al. (2024)	Digital literacy, entrepreneurial skills, and business performance	Greater Solo, Indonesia, manufacturing and trade SMEs	101 SMEs	Online and offline survey, analyzed using PLS-SEM	Digital literacy positively influenced entrepreneurial skills and business performance. Entrepreneurial skills transmitted part of the relationship to performance.	Entrepreneurial skills are modeled as a mediator, not continuing entrepreneurial motivation. The study does not test digital literacy as a moderator or distinguish general owner competence.
Noerchoidah et al. (2025)	Digital-literacy knowledge sharing, human capital, digital transformation, self-efficacy, and business sustainability	East Java, Indonesia	216 MSMEs	Explanatory survey, purposive sampling, and SmartPLS	Digital-literacy knowledge sharing, human capital, and digital transformation were associated with MSME business sustainability.	This is the closest Indonesian evidence, but the constructs and mechanism differ. It does not jointly test general competence and continuing motivation with digital literacy as the common moderator of both relationships.

The matrix shows that the literature is adjacent but not cumulative. Existing empirical studies either examine digital resources as antecedents of digital transformation, position digital literacy as a predictor of adoption or performance, or use entrepreneurial skills and self-efficacy as intervening mechanisms. The only mapped study that places digital literacy as a moderator, Tricahyono and Sudrajat (2023), is propositional and focuses on managerial and operational digital capabilities rather than general owner business competence. It also excludes post-entry entrepreneurial motivation. Accordingly, the contribution of the present model is narrow and testable. It separates general owner business competence from digital literacy, conceptualizes entrepreneurial motivation as the continuing drive to sustain and grow an existing venture, and empirically tests digital literacy as a common boundary condition for both the competence-success and motivation-success relationships. The novelty lies in this integrated configuration and dual moderation test, not in claiming that any individual relationship is entirely new.

This study has six objectives. First, it examines the effect of human resource competence on business success. Second, it examines the effect of entrepreneurial motivation on business success. Third, it tests the direct effect of digital literacy. Fourth, it evaluates whether digital literacy moderates the relationship between human resource competence and business success. Fifth, it evaluates whether digital literacy moderates the relationship between entrepreneurial motivation and business success. Sixth, it translates the statistically supported capability priorities into an evidence-to-action framework for stakeholder co-design, pilot implementation, and evaluation.

Consistent with the journal's applied orientation, the cross-sectional survey is treated as the diagnostic phase of an evidence-to-action pathway. The empirical model identifies capability areas associated with MSME success,

while the applied translation specifies how MSME owners, government agencies, business associations, universities, digital-platform partners, and mentors can jointly refine the intervention content, pilot it, document implementation fidelity, and evaluate outcomes. The manuscript clearly separates completed survey activities from proposed downstream activities so that no program-impact claim is made without implementation and follow-up data.

Theoretical Foundation and Hypothesis Development

The resource-based view explains that performance differences arise from variation in the quality of internal resources. Owner competence constitutes a strategically important resource for MSMEs because it shapes strategy formulation and operational execution. Digital literacy functions as a complementary capability that enhances the value of core resources in digitally mediated business environments.

Human capital theory emphasizes investment in knowledge, training, and experience. Such investment improves productivity and decision quality. In MSMEs, the owner represents the central source of human capital, and the owner's decisions directly influence marketing, finance, innovation, and service delivery.

Entrepreneurial motivation theory explains why individuals initiate and develop business ventures. Motivation influences choice, effort, persistence, and responses to risk. Intrinsic and extrinsic motives may operate simultaneously, thereby supporting opportunity-seeking behavior and business growth (Ryan & Deci, 2020; Shane et al., 2003).

Human Resource Competence and Business Success

Entrepreneurial competence encompasses knowledge, skills, attitudes, and the ability to manage resources. It enables MSME owners to interpret market conditions, control costs, and maintain quality. Competence also supports innovation and evidence-based decision-making. The entrepreneurial competence literature identifies conceptual, relational, and managerial capabilities as foundations of small-business competitiveness (Man et al., 2002; Mitchelmore & Rowley, 2010).

Human resource transformation is also associated with the innovation capabilities of MSMEs. The quality of human capital affects technological adaptation and the development of digital talent (Budiarti & Firmansyah, 2024). Competent business owners are therefore expected to achieve superior outcomes because they can convert knowledge into strategy and operational action.

H1: Human resource competence has a positive effect on the business success of digitally enabled MSMEs.

Entrepreneurial Motivation and Business Success

Entrepreneurial motivation encourages business owners to establish goals and act consistently. Strong motivation increases persistence when firms encounter setbacks, while also stimulating opportunity recognition and market development. Achievement-oriented owners are more likely to evaluate their performance and implement continuous improvements.

Motivation does not substitute for competence; rather, it determines how competence is mobilized in business activities. Owners with strong capabilities may remain passive without sufficient motivation. By contrast, focused motivation stimulates learning and business experimentation.

H2: Entrepreneurial motivation has a positive effect on the business success of digitally enabled MSMEs.

Digital Literacy and Business Success

Digital literacy extends beyond the basic ability to operate devices. It includes information evaluation, communication, digital content creation, security, and problem-solving. Within MSMEs, these capabilities support promotion, transactions, customer service, and data-driven decision-making. They also enable owners to reduce the risks of fraud and information leakage.

Evidence should be matched to the outcome actually tested. Widiyanti et al. (2024), using 43 SMEs in Greater Malang, found that digital literacy was positively and significantly associated with e-commerce utilization; the study did not use overall business success as its dependent variable. More direct support for H3 is provided by Novela et al. (2024), who surveyed 101 manufacturing and trading SMEs in Greater Solo and reported a positive direct path from digital literacy to business performance ($\beta = 0.276$, $p = 0.006$), together with an indirect path through entrepreneurial skills. Zahoor et al. (2023) provides evidence for a different outcome, showing that managerial digital literacy contributes to SME digital transformation through digital-technology use. Teng et al. (2022) likewise found that employee digital skills support digital transformation and that digital transformation is positively related to financial performance, but it did not test a direct digital-literacy-to-performance relationship.

H3: Digital literacy has a positive effect on the business success of digitally enabled MSMEs.

The Moderating Role of Digital Literacy

Business competence may produce different outcomes across MSME owners because their capacity to apply competence through technology varies. Owners may understand their markets yet remain constrained when they lack digital proficiency. Digital literacy enables marketing, financial, and innovation capabilities to operate more

effectively in a digital environment.

Motivation also requires an appropriate channel for action. Strong motivation may lead to ineffective activity when digital understanding is inadequate. Digital literacy directs entrepreneurial energy toward relevant platforms, content, and data. Previous research has proposed digital literacy as a factor that strengthens the relationship between digital capabilities and performance (Tricahyono & Sudrajat, 2023). This study extends that role to general business competence and entrepreneurial motivation.

H4: Digital literacy strengthens the positive effect of human resource competence on the business success of digitally enabled MSMEs.

H5: Digital literacy strengthens the positive effect of entrepreneurial motivation on the business success of digitally enabled MSMEs.

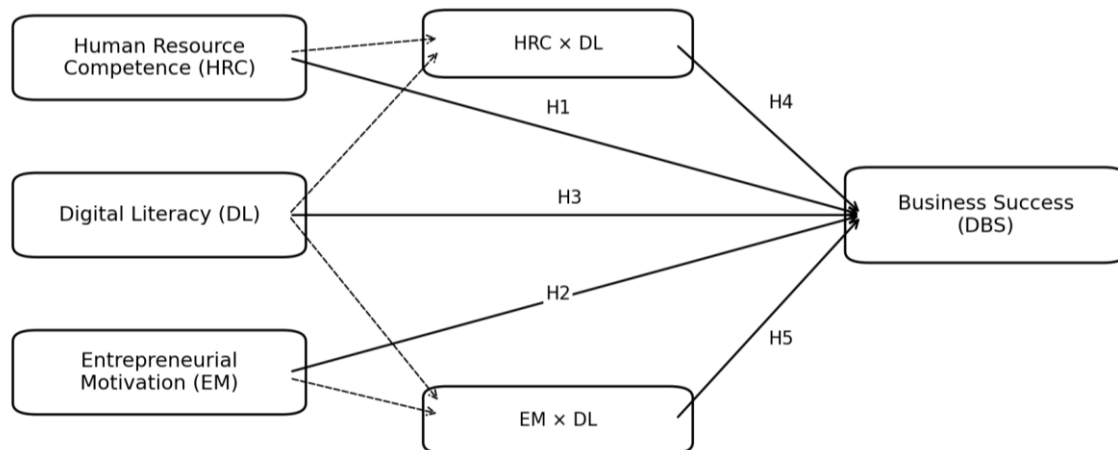


Figure 1. Conceptual research model

Methods

Research Design, Setting, and Unit of Analysis

This study employed an explanatory quantitative design using a cross-sectional survey. The unit of analysis was the owner or manager of an MSME. The study was conducted in Makassar, South Sulawesi Province, during the pre-submission research phase. The archived manuscript and analytical tables do not retain month-level fieldwork timestamps; consequently, an exact month range cannot be reconstructed and is not retrospectively invented. The location was selected because of its expanding MSME activity and the use of social media, online marketplaces, digital payments, and business applications. The survey served as the diagnostic evidence base for the applied translation framework; no training or mentoring intervention was included in the completed survey protocol.

Population, Sample, and Sampling Technique

The target population comprised digitally enabled MSME owners or managers in Makassar. The study did not use a finite official registry that classified MSMEs according to active use of digital channels. Accordingly, the operational population was treated as open, and neither a finite population N nor a complete probability sampling frame was claimed. The accessible population consisted of owners or managers who met the eligibility criteria and could be reached during recruitment. Eligible respondents operated an active business for at least one year, used at least one digital channel, and participated directly in business decision-making. Purposive sampling was applied because the study required respondents with practical experience in using digital technology for business purposes.

The minimum sample size was determined through power analysis. The model included five predictors of business success. Assuming an effect size of $f^2 = 0.15$, a 5% significance level, and 80% statistical power, the minimum required sample was approximately 92 respondents. A total of 120 eligible responses were included in the analysis. This number exceeded the minimum requirement and was adequate for partial least squares structural equation modeling (PLS-SEM).

Research Instrument and Variable Measurement

Data were collected using a closed-ended questionnaire. Each item was measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The instrument was adapted from relevant literature. The linguistic adaptation should be evaluated through expert judgment and a limited pilot test.

Table 2. Operationalization of research variables

Variable	Dimension/indicator	Code	Adaptation source
Human Resource Competence (HRC)	Business knowledge; operational planning; marketing; financial management; innovation	HRC1–HRC5	Man et al. (2002); Mitchelmore & Rowley (2010)
Entrepreneurial Motivation (EM)	Independence; achievement orientation; persistence; calculated risk; growth orientation	EM1–EM5	Shane et al. (2003); Ryan & Deci (2020)
Digital Literacy (DL)	Platform operation; information evaluation; digital content; security; customer analytics	DL1–DL5	Reddy et al. (2023), general domains; Zahoor et al. (2023), managerial SME context; Novela et al. (2024), performance context
Business Success (DBS)	Sales growth; profit; customers; market reach; business sustainability	DBS1–DBS5	Abou-foul et al. (2021); Teng et al. (2022)

Data Collection Procedures and Data Quality

Respondents completed the closed-ended questionnaire after receiving an explanation of the study's purpose, benefits, and procedures. The archived analytical file does not contain a mode variable or administration timestamps that would allow online, paper-based, or direct administration to be separated or an exact collection window to be reconstructed. Participation was voluntary, respondent identities were kept confidential, and informed consent was obtained before questionnaire completion. No institutional ethics approval number is contained in the study archive. The protocol was a minimal-risk, non-interventional survey of adult business owners or managers; the ethical safeguards documented in the manuscript were voluntary participation, informed consent, confidentiality, and anonymized analysis. The absence of an approval number is disclosed rather than replaced with a retrospective claim.

Data quality screening addressed missing data, duplicate responses, straight-lining patterns, and implausible completion times. The archived analytical file comprised 120 complete and eligible cases, all of which were included in the final model. A separate invitation and screening log was not retained; therefore, invitation totals, incomplete submissions, duplicate or ineligible exclusions, and the response rate cannot be reconstructed and are not reported. No additional exclusion count is claimed beyond the 120 cases available for analysis. Procedural controls included anonymity and clear, accessible terminology.

Data Analysis

The analysis was conducted with SmartPLS 4 (Ringle et al., 2024); the exact build identifier was not retained in the archived output. PLS-SEM was selected because the model included latent constructs, two moderation relationships, and a predictive orientation. For transparent replication, the model is documented using the SmartPLS 4 PLS algorithm with standardized results, the path weighting scheme, initial outer weights of +1, a fixed maximum of 3,000 iterations, and a stop criterion of 10–7. The analytical file contained 120 complete cases, so no missing-value replacement was applied during model estimation. The available results document a two-stage moderation analysis, HTMT assessment, 5,000 bootstrap subsamples, and PLSpredict. Significance was evaluated using two-tailed tests at $\alpha = 0.05$. The original confidence-interval option and random seed were not preserved; therefore, the intervals reported in this manuscript are explicitly identified as normal-approximation intervals reconstructed from the reported coefficients and *t* statistics. For replicating PLSpredict, 10 folds and 10 repetitions are specified; the original random seed was not retained (Hair et al., 2019; Hair et al., 2022).

The measurement model was evaluated using outer loadings, Cronbach's alpha, ρ_A , composite reliability, and average variance extracted (AVE). Outer loadings should ideally exceed 0.708. Reliability values should fall between 0.70 and 0.95, while AVE should exceed 0.50. Discriminant validity was assessed using the heterotrait-monotrait ratio (HTMT), with recommended thresholds below 0.85 or 0.90 (Henseler et al., 2015).

The structural model was assessed using inner variance inflation factors (VIF), path coefficients, approximate 95% confidence intervals, R^2 , f^2 , predictive relevance, SRMR, and PLSpredict. VIF values below 3.3 were used as a conservative collinearity criterion. The reported hypothesis tests used 5,000 bootstrap subsamples, and a path was treated as supported when its two-tailed *p* value was below 0.05 and the corresponding normal-approximation interval excluded zero. PLSpredict compared indicator-level PLS prediction errors with a linear-model benchmark using 10-fold cross-validation and 10 repetitions (Chin et al., 2020; Shmueli et al., 2019).

Moderation effects were tested using the two-stage approach. With standardized construct scores, the conditional effect of human resource competence is $\beta_{HRC|DL} = 0.312 + 0.196(DL)$, and the conditional effect of entrepreneurial motivation is $\beta_{EM|DL} = 0.284 + 0.173(DL)$. Simple-slope plots were generated at low (–1 SD), mean, and high (+1 SD) digital literacy (Aiken & West, 1991). Because the joint bootstrap distribution and coefficient covariance were not retained, uncertainty at ± 1 SD was summarized using a conservative covariance-bounded normal interval. Specifically, the maximum admissible standard error was calculated as $SE_{max} = SE_{main} + SE_{interaction}$, which follows from $|Cov(\beta_{main}, \beta_{interaction})| \leq SE_{main}SE_{interaction}$. At the moderator mean, the reported main-effect interval was used. This procedure avoids the unsupported assumption that the two estimates are independent and is explicitly distinguished from a bootstrap conditional-effect interval.

The structural equation was specified as follows:

$$DBS = \beta_0 + \beta_1 HRC + \beta_2 EM + \beta_3 DL + \beta_4 (HRC \times DL) + \beta_5 (EM \times DL) + \varepsilon \quad (1)$$

Applied Translation Framework Development

Following model interpretation, the supported constructs were mapped to candidate support components and organized into four downstream phases: stakeholder co-design, pilot implementation, process evaluation, and outcome evaluation. The framework follows the principle that intervention content and evaluation questions should be refined with relevant stakeholders and assessed in context (Skivington et al., 2021). Reach, effectiveness, adoption, implementation, and maintenance were used as organizing domains for the proposed evaluation plan (Glasgow et al., 2019). This translation is a design output derived from the survey; it is not reported as a completed intervention.

Results

Respondent Profile

Table 3. Respondent characteristics

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	52	43.3
Gender	Female	68	56.7
Business age	1–3 years	47	39.2
Business age	4–6 years	51	42.5
Business age	>6 years	22	18.3
Business sector	Culinary	46	38.3
Business sector	Fashion	28	23.3
Business sector	Services	21	17.5
Business sector	Crafts/creative products	25	20.9
Primary platform	Social media	54	45.0
Primary platform	Online marketplace	39	32.5
Primary platform	WhatsApp Business	18	15.0
Primary platform	Financial/payment application	9	7.5

Based on the actual data, Table 3 shows that women represented 56.7% of the respondents. Businesses operating for four to six years constituted the largest group at 42.5%. Culinary enterprises were the most common business category at 38.3%. Social media was the primary platform for 45.0% of respondents, followed by online marketplaces at 32.5%. This composition indicates that most respondents had progressed beyond the initial business stage and relied on readily accessible digital channels. The use of financial or payment applications remained limited at 7.5%, suggesting that digital integration into administrative and financial management functions was still uneven.

Measurement Model Assessment

Table 4. Reliability and convergent validity

Construct	Outer loading	Alpha	rho_A	CR	AVE	Decision
Human Resource Competence	0.787–0.825	0.861	0.866	0.902	0.648	Satisfactory
Entrepreneurial Motivation	0.721–0.887	0.842	0.851	0.889	0.621	Satisfactory
Digital Literacy	0.737–0.885	0.874	0.881	0.914	0.681	Satisfactory
Business Success	0.813–0.858	0.883	0.890	0.920	0.697	Satisfactory

Based on the actual data, all indicator outer loadings exceeded 0.708. Cronbach's alpha, rho_A, and composite reliability values were above 0.70, while the AVE of every construct exceeded 0.50. These results indicate satisfactory internal consistency reliability and convergent validity.

Table 5. Heterotrait-monotrait ratio

Construct	HRC	EM	DL	DBS
Human Resource Competence	—	0.612	0.584	0.728

Construct	HRC	EM	DL	DBS
Entrepreneurial Motivation		—	0.557	0.691
Digital Literacy			—	0.746
Business Success				—

Structural Model Assessment

Table 6. Collinearity, explanatory power, and predictive performance of the model

Indicator	Value	Criterion	Decision
Inner VIF	1.242–2.183	<3.3	No collinearity issue
R ² Business Success	0.637	0–1	Moderate
Q ² Business Success	0.412	>0	Predictive relevance
SRMR	0.061	<0.08	Acceptable model fit
PLSpredict	PLS RMSE lower for 4 of 5 DBS indicators	PLS RMSE < LM	Moderate predictive power

Table 7. Hypothesis testing results

Hypothesis	Relationship	β	t	p	Approx. 95% CI	f ²	Decision
H1	HRC → DBS	0.312	3.842	<0.001	[0.153; 0.471]	0.145	Supported
H2	EM → DBS	0.284	3.216	0.001	[0.111; 0.457]	0.119	Supported
H3	DL → DBS	0.241	2.931	0.003	[0.080; 0.402]	0.083	Supported
H4	HRC × DL → DBS	0.196	2.487	0.013	[0.042; 0.350]	0.041	Supported
H5	EM × DL → DBS	0.173	2.109	0.035	[0.012; 0.334]	0.033	Supported

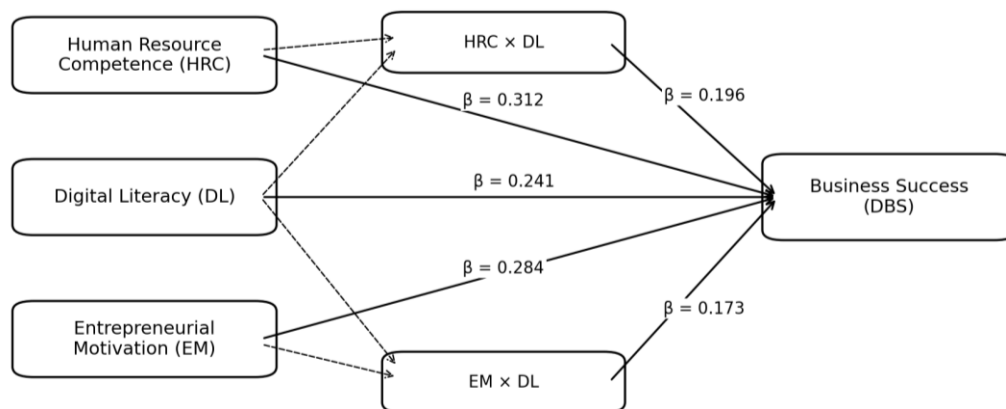


Figure 2. Path coefficients for predictors of digital MSME business success

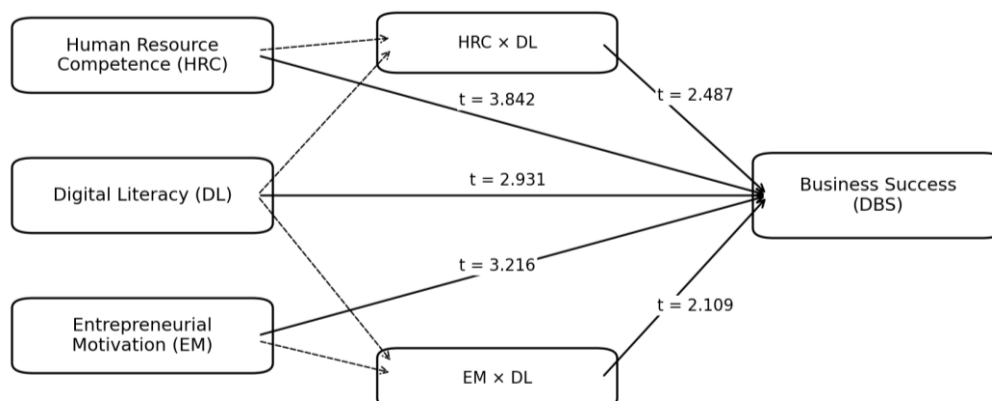


Figure 3. t-statistics for hypothesis testing

In the actual model, the largest path coefficient was observed for the effect of human resource competence

on business success ($\beta = 0.312$; $t = 3.842$; $p < 0.001$). Entrepreneurial motivation also had a positive effect ($\beta = 0.284$; $t = 3.216$; $p = 0.001$), as did digital literacy ($\beta = 0.241$; $t = 2.931$; $p = 0.003$). The interaction between human resource competence and digital literacy was positive ($\beta = 0.196$; $t = 2.487$; $p = 0.013$). The interaction between entrepreneurial motivation and digital literacy was likewise positive ($\beta = 0.173$; $t = 2.109$; $p = 0.035$). Accordingly, H1 through H5 were supported by the actual model results.

Discussion

The Effect of Human Resource Competence on Business Success

The actual results indicate that human resource competence has a positive effect on business success. Business capabilities enable MSMEs to manage resources, formulate plans, control costs, and respond to market changes. This relationship is consistent with human capital theory and the resource-based view. The direction and magnitude of the relationship are based on the actual field-data estimates reported in Table 7.

This finding supports Budiarti and Firmansyah (2024), who identify the quality of human capital and digital talent as drivers of innovation capability in small firms. In the context of the present study, business competence enables owners to convert knowledge into more appropriate marketing, financial, and operational decisions.

The Effect of Entrepreneurial Motivation on Business Success

The actual results indicate that entrepreneurial motivation has a positive effect on business success. Motivation functions as behavioral energy that promotes persistence, opportunity seeking, and growth orientation. This mechanism is consistent with the entrepreneurial motivation model proposed by Shane et al. (2003). The strength of this relationship was assessed using the field data and the reported SmartPLS estimates.

The motivation construct in this study differs from entrepreneurial intention. The respondents were already operating businesses; therefore, motivation was conceptualized as the drive to sustain, improve, and expand an existing venture. This distinction strengthens the conceptual accuracy of the relationship between motivation and business success.

The Direct Effect of Digital Literacy

The actual results indicate that digital literacy has a positive direct effect on business success. Digital literacy contributes through marketing, transactions, customer analysis, and information security. This direct pathway complements the moderation specification of the model. These findings are based on the SmartPLS output derived from the field data.

The comparison with prior studies must distinguish e-commerce utilization, digital transformation, and business performance as separate outcomes. Widiyanti et al. (2024) supports the digital-literacy-to-e-commerce-utilization link, not a direct claim about overall business success. For the direct relationship relevant to H3, Novela et al. (2024) reported a positive path from digital literacy to business performance among 101 SMEs in Greater Solo ($\beta = 0.276$, $p = 0.006$), while also identifying entrepreneurial skills as a partial transmission mechanism. Zahoor et al. (2023) supports the managerial-digital-literacy-to-digital-transformation pathway, whereas Teng et al. (2022) supports the subsequent relationship between digital transformation and financial performance. Accordingly, the final discussion should compare the empirical H3 estimate with Novela et al. (2024) and use the other studies only for the specific adoption or transformation mechanisms they actually tested.

The Moderating Role of Digital Literacy

Both interaction coefficients were positive. For human resource competence, the conditional point estimate increased from 0.116 at low digital literacy (-1 SD) to 0.312 at the mean and 0.508 at high digital literacy ($+1$ SD). Thus, the reported coefficients imply that business competence is more strongly associated with business success among owners with greater digital literacy. Figure 4 visualizes this pattern while holding the other predictor at its mean.

The same pattern was observed for entrepreneurial motivation. The conditional point estimate increased from 0.111 at low digital literacy to 0.284 at the mean and 0.457 at high digital literacy. Figure 5 shows that entrepreneurial motivation is translated more strongly into business success when owners have greater digital proficiency. This interpretation extends Tricahyono and Sudrajat's (2023) proposition from digital capabilities to continuing entrepreneurial motivation.

The interaction effect sizes were small ($f^2 = 0.041$ for HRC $\times$ DL and $f^2 = 0.033$ for EM $\times$ DL), so the moderation should not be overstated. The simple slopes establish the direction and practical pattern of the interactions. The conservative intervals in Table 8 indicate that the conditional effects are clearly positive at the mean and at high digital literacy, whereas the low-digital-literacy intervals include zero for both focal predictors. Thus, competence and motivation are translated into business success most consistently when digital literacy is at least average, while the statistically significant interaction coefficients remain the primary tests of moderation.

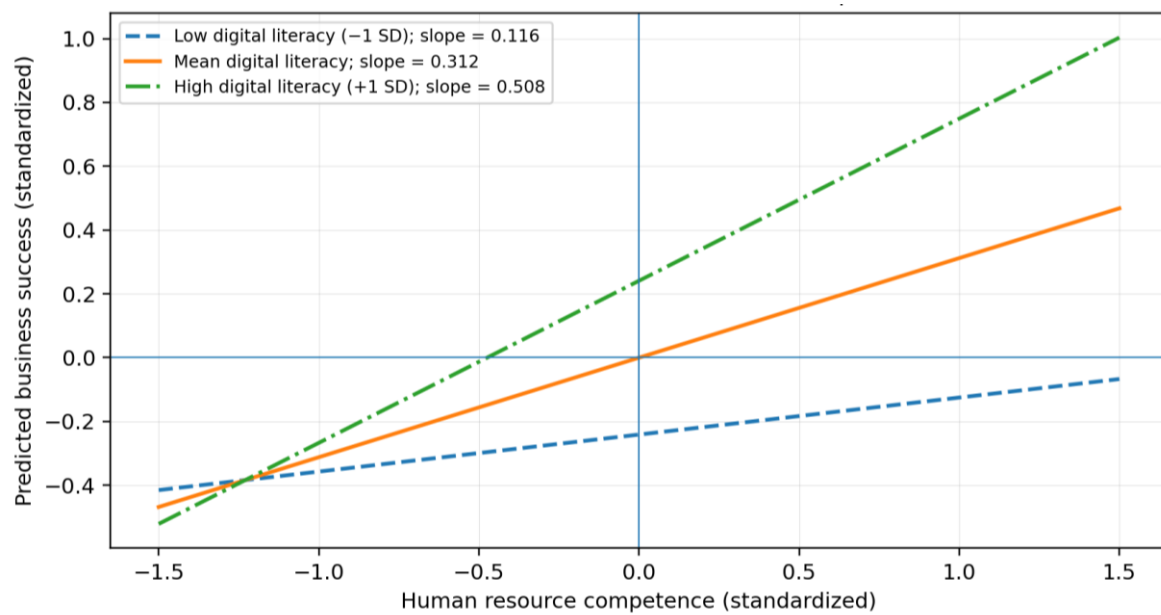


Figure 4. Conditional effect of human resource competence at low, mean, and high digital literacy

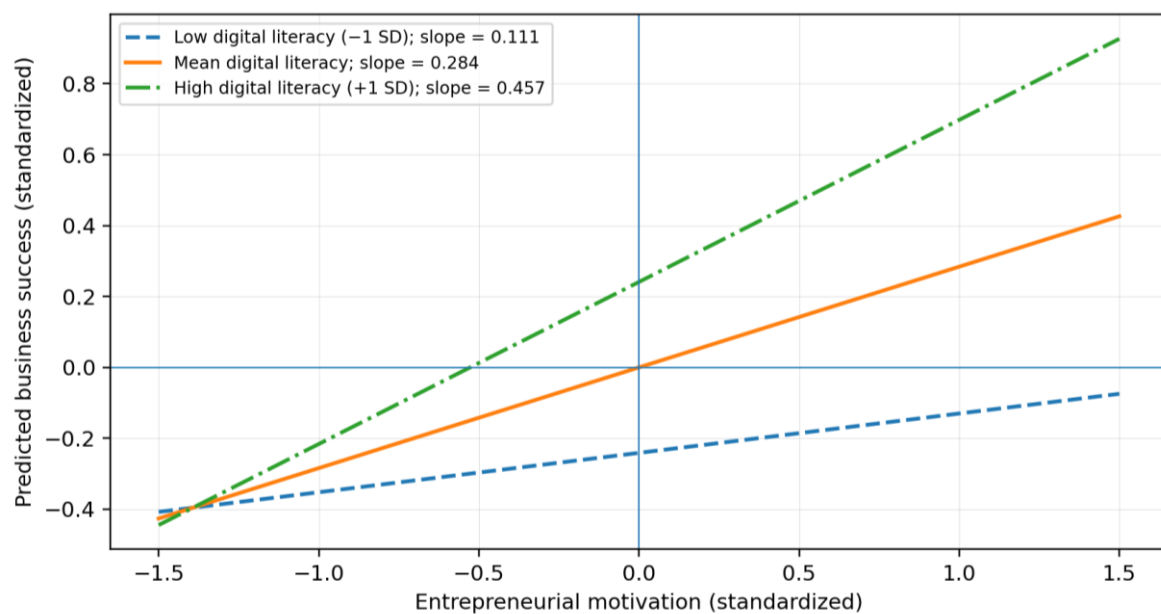


Figure 5. Conditional effect of entrepreneurial motivation at low, mean, and high digital literacy

Table 8. Conditional effects and conservative covariance-bounded 95% intervals

Relationship	Digital literacy level	Conditional slope	Conservative 95% CI
HRC → DBS	Low (-1 SD)	0.116	[-0.198; 0.430]
HRC → DBS	Mean	0.312	[0.153; 0.471]
HRC → DBS	High (+1 SD)	0.508	[0.194; 0.822]
EM → DBS	Low (-1 SD)	0.111	[-0.223; 0.445]
EM → DBS	Mean	0.284	[0.111; 0.457]
EM → DBS	High (+1 SD)	0.457	[0.123; 0.791]

Theoretical and Evidence-to-Action Implications

Theoretically, the model integrates resources, human capital, and motivation. Digital literacy is positioned as a complementary capability, explaining why comparable levels of competence may generate different performance outcomes. The model also extends research on digital moderators within the MSME context.

The survey identifies capability areas that can be prioritized in a future MSME support initiative. A preliminary package would combine managerial competence development, goal setting and persistence support, and applied digital literacy covering online marketplaces, digital content, payments, cybersecurity, customer

analytics, financial control, and operational planning. These components are not prescribed as a fixed package; MSME owners and institutional partners should co-design the content, delivery format, dosage, and success criteria. Table 9 converts the survey evidence into a staged applied framework. Only the diagnostic survey is complete. Co-design, pilot implementation, process evaluation, and outcome evaluation are future empirical phases. This separation allows the manuscript to contribute an applied, testable implementation pathway without misrepresenting prospective activities as completed community service.

Table 9. Evidence-to-action framework for stakeholder co-design, implementation, and evaluation

Phase and status	Stakeholder role/activity	Primary output	Evaluation evidence
1. Diagnostic survey — completed	MSME owners/managers provide capability and performance data	Priority capability map: competence, motivation, and digital literacy	Measurement/structural model results; R^2 , f^2 , prediction
2. Stakeholder co-design — proposed	MSME owners, local government, associations, universities, platforms, mentors jointly refine needs, modules, delivery, and indicators	Co-designed logic model, modules, facilitator guide, implementation protocol	Documented participation, decisions, acceptability, feasibility, equity considerations
3. Pilot implementation — proposed	Deliver competence, motivation, and digital-literacy support to a defined MSME cohort	Training/mentoring records and adapted business practices	Reach, attendance, dosage, fidelity, adoption, satisfaction, barriers
4. Outcome evaluation — proposed	Collect baseline and follow-up data; use a comparison group where feasible	Evidence on changes attributable or plausibly linked to the program	Digital literacy, platform use, bookkeeping quality, customers, sales/profit, retention; maintenance follow-up

Limitations and Future Research Agenda

This study used a cross-sectional design, which limits causal interpretation, and all substantive measures were respondent-reported. Procedural controls reduce but do not eliminate common method bias. The applied framework is a translation of survey evidence rather than an evaluated intervention; therefore, no claim is made regarding program reach, fidelity, effectiveness, adoption, or maintenance. These outcomes require prospective implementation records and baseline/follow-up data.

Purposive sampling limits statistical generalizability. Future studies should apply probability sampling across multiple regions. A subsequent engagement study may translate the model into a co-designed intervention involving MSME owners, local government, business associations, digital-platform partners, and mentors. A pilot, quasi-experimental, or stepped implementation design could compare baseline and follow-up outcomes while documenting reach, participation, fidelity, adoption, and sustainability. Objective business indicators should complement perceptual measures.

Future models may incorporate market orientation, access to finance, innovation, and ecosystem support. Multigroup analysis may also compare business sectors, firm age, and levels of digital maturity.

Conclusion

Based on the actual data, human resource competence, entrepreneurial motivation, and digital literacy positively influence the business success of digitally enabled MSMEs. Digital literacy also strengthens the effects of human resource competence and entrepreneurial motivation. These empirical conclusions are derived from the field data and SmartPLS output reported in the study.

The study demonstrates that digitalization does not operate independently: MSME success is associated with the quality of business competence, continuing entrepreneurial motivation, and the capacity to apply both through digital tools. The evidence supports a staged applied pathway in which survey findings inform stakeholder co-design, pilot delivery, process evaluation, and outcome evaluation. Effectiveness claims should be made only after those phases are implemented and measured.

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Conflict of Interests

The authors declare that they have no conflicts of interest that could have influenced the conduct or reporting of this study.

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