The Impact of Entrepreneurial, Financial, and Digital Literacy on MSME Performance

Besse Wediawati
Universitas Jambi; Muaro Jambi, Indonesia
E-Mail: besse_wediawati@unja.ac.id

Zulfina Adriani
Universitas Jambi; Muaro Jambi, Indonesia
E-Mail: zulfina_adriani@unja.ac.id

Rike Setiawati
Universitas Jambi; Muaro Jambi, Indonesia
E-Mail: rike_setiawati@unja.ac.id

RTS. Ratnawati
Universitas Jambi; Muaro Jambi, Indonesia
E-Mail: ratnawari@unja.ac.id

Erwita Dewi
Universitas Jambi; Muaro Jambi, Indonesia
E-Mail: erwita_dewi@unja.ac.id

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ABSTRACT

This study investigates the influence of entrepreneurial, financial, and digital literacy on micro, small, and medium enterprise (MSME) performance, with microfinance acting as a moderating factor. Conducted among 158 MSMEs partnered with Islamic microfinance institutions in Jambi Province, Indonesia, the research adopts a quantitative approach using Partial Least Squares (PLS) to test the proposed model. The findings confirm that all three types of literacy significantly and positively affect business performance, with entrepreneurial literacy showing the strongest influence. Despite financial literacy being only moderately high and digital literacy still relatively low, both remain important predictors of improved business outcomes. Notably, microfinance plays a key moderating role by enhancing the impact of these literacies on performance, emphasizing its role beyond financial support toward capacity-building and knowledge empowerment. The results suggest that improving the literacy of microfinance managers and building partnerships with stakeholders, universities, and digital communities are crucial steps toward strengthening MSME resilience and competitiveness. This study contributes a novel empirical model from the perspective of micro-entrepreneurs, offering a foundation for future research that explores microfinance and MSME dynamics from both demand and supply perspectives to better support business sustainability in the digital economy.

Keywords*: Digital Literacy, Entrepreneurial Literacy, Financial Literacy, MSME Performance, Microfinance Moderation.*

ABSTRAK

Studi ini menyelidiki pengaruh literasi kewirausahaan, keuangan, dan digital terhadap kinerja usaha mikro, kecil, dan menengah (UMKM), dengan keuangan mikro berperan sebagai faktor moderasi. Dilakukan di antara 158 UMKM yang bermitra dengan lembaga keuangan mikro Islam di Provinsi Jambi, Indonesia, penelitian ini mengadopsi pendekatan kuantitatif menggunakan

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Partial Least Squares (PLS) untuk menguji model yang diusulkan. Temuan tersebut menegaskan bahwa ketiga jenis literasi secara signifikan dan positif memengaruhi kinerja bisnis, dengan literasi kewirausahaan menunjukkan pengaruh terkuat. Meskipun literasi keuangan hanya cukup tinggi dan literasi digital masih relatif rendah, keduanya tetap menjadi prediktor penting dari hasil bisnis yang lebih baik. Khususnya, keuangan mikro memainkan peran moderasi utama dengan meningkatkan dampak literasi ini terhadap kinerja, menekankan perannya di luar dukungan keuangan menuju pembangunan kapasitas dan pemberdayaan pengetahuan. Hasilnya menunjukkan bahwa peningkatan literasi manajer keuangan mikro dan membangun kemitraan dengan pemangku kepentingan, universitas, dan komunitas digital merupakan langkah penting untuk memperkuat ketahanan dan daya saing UMKM. Penelitian ini memberikan kontribusi berupa model empiris baru dari perspektif wirausaha mikro, yang menawarkan landasan bagi penelitian masa depan yang mengeksplorasi dinamika keuangan mikro dan UMKM dari perspektif permintaan dan penawaran untuk mendukung keberlanjutan bisnis dalam ekonomi digital..

***Kata kunci**: Literasi Digital, Literasi Kewirausahaan, Literasi Keuangan, Kinerja UMKM, Moderasi Keuangan Mikro.*

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are the backbone of the Indonesian economy. Their role is vital not only in terms of employment generation but also in contributing significantly to the national gross domestic product (GDP). As of 2019, MSMEs accounted for around 97% of employment in the private sector and contributed 61.14% to Indonesia's GDP (Ministry of Cooperatives and SMEs, 2020). This dominance continued into 2021, with approximately 64.2 million MSMEs representing 98.70% of all business units across the country. Moreover, MSMEs have consistently demonstrated strong business resilience, particularly during economic downturns, due to their wide market reach and local adaptability (Juniarta et al., 2023; Sari & Hadyarti, 2024).

Despite this quantitative strength, MSMEs in Indonesia still face considerable qualitative challenges. A key concern is their relatively low competitiveness on a global scale. Global Competitiveness Index in 2019, Indonesia ranks 65th out of 141 countries, indicating a lag in global economic competitiveness (Ceicdata, 2025). Several fundamental issues underlie this limitation, including a shortage of skilled human resources (Mohiya et al., 2020; Chandan, 2023), constrained capital, and limited access to financing (Yoshino & Taghizadeh, 2016). These persistent obstacles hinder the ability of MSMEs to grow sustainably and innovate.

In the context of the Industrial Revolution 4.0, knowledge has become a critical strategic resource, especially for MSMEs aiming to remain competitive. The knowledge-based view (KBV) emphasizes that organizational success in this era is heavily reliant on the ability to acquire, manage, and apply knowledge assets effectively (Curado, 2006). These assets are often embodied in various forms of literacy entrepreneurial, digital, and financial which are considered fundamental for business adaptation and innovation in the 21st century (Adams & Hamm, 2001).

Entrepreneurial literacy empowers business owners to identify and exploit opportunities creatively and innovatively, supporting adaptive and proactive business strategies. Digital literacy equips MSMEs with the capabilities to use digital tools, access online information, and expand their market reach efficiently (Aziz, 2021; Purbasari et al., 2021). Meanwhile, financial literacy enables sound financial decision-making, access to funding, and resource optimization for business sustainability (Hamid et al., 2024; Martadinata & Pasek, 2024). Collectively, these literacies form the internal knowledge capital needed for MSMEs to achieve optimal performance (Anis et al., 2024; Habibie et al., 2024)

However, current data show that Indonesian MSMEs still lag in these essential literacies. The national financial literacy rate stands at 38.03% well below neighboring countries like Singapore and Malaysia and among MSMEs, it is only 43.60% (OJK, 2019;

Aritonang et al., 2023). Digital literacy is similarly limited, with only 30% of MSMEs considered digitally literate (Apindo, 2022). Although data on entrepreneurial literacy is scarce, the entrepreneurship ratio in Indonesia is a mere 3.47%, further illustrating the challenge of internal capability gaps in the MSME sector.

Existing studies have partially explored how these literacies impact MSME performance. For example, research by Yani et al. (2020) found a positive link between entrepreneurial literacy and MSME performance in South Sulawesi, while Winarno and Wijijayanti (2018) found no such relationship in East Java. Similarly, several studies have investigated the roles of financial and digital literacy individually or in pairs Kulathunga et al. (2020), Kwuta et al. (2023) and Rizki and Hendarman (2024), but research integrating all three literacies simultaneously remains rare. One exception is Hasan et al. (2024), which demonstrated the positive combined influence of all three literacies on MSME success. However, these studies largely ignore the influence of external factors such as financing access.

In practice, MSMEs not only need internal capacity through literacy but also external support particularly in the form of financing. According to the dynamic capabilities theory Teece et al. (1997), firms must be able to integrate and reconfigure both internal knowledge and external partnerships. For MSMEs, access to microfinance becomes a critical factor in enabling business scalability and sustainability. Studies have shown that microfinance can enhance MSME performance Destiana 2016 and Husaeni and Dewi (2019), yet contradictory evidence also exists. Research by Banerjee and Duflo (2011) and Diptyana et al. (2022) suggests that without proper literacy or financial management, microfinance can lead to over-indebtedness, mental strain, and declining business performance.

In the specific context of Jambi Province, the development of Sharia-based microfinance is notably underexplored. Although there were around 2,046 cooperatives in 2021, nearly half became inactive by 2022 (AntaraNews, 2025). No research to date has empirically examined how the integration of internal MSME literacy and external microfinance collaboration affects MSME performance in this province (Supeni & Sari, 2025).

Therefore, this study aims to fill the research gap by developing a comprehensive performance model that integrates three forms of literacy entrepreneurial, financial, and digital as internal factors, with microfinance as a moderating external factor. Unlike previous studies, this research explores not only the direct impact of literacy on MSME performance but also how microfinance moderates this relationship. This study seeks to examine the influence of entrepreneurial literacy, digital literacy, and financial literacy on MSME performance in Jambi Province and to analyze the moderating role of microfinance in strengthening or weakening these relationships. This study aims to investigate whether entrepreneurial literacy, financial literacy, and digital literacy each have a significant and positive effect on the performance of MSMEs in Jambi Province. Additionally, it examines whether microfinance serves as a moderating variable in the relationship between entrepreneurial literacy, digital literacy, and financial literacy on MSME performance in Jambi Province.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

Entrepreneurial Literacy and MSME Performance

Entrepreneurial literacy encompasses the knowledge, skills, and attitudes necessary for identifying business opportunities, managing risks, and efficiently utilizing resources to generate economic value (Mwasalwiba, 2010). For Micro, Small, and Medium Enterprises (MSMEs), this literacy serves as a critical foundation for enhancing competitiveness and resilience. Studies indicate that MSMEs with strong entrepreneurial literacy exhibit improved performance through innovation, strategic decision-making, and adaptability to market changes (Schilder et al., 2016). The ability to recognize opportunities and implement effective strategies directly contributes to revenue growth, customer satisfaction, and operational efficiency. Research by Winarno and Wijijayanti

(2018) further supports this, showing a positive correlation between entrepreneurial literacy and MSME performance in East Java, where skilled entrepreneurs outperformed their less literate counterparts (Qur'ani & Zulkifli, 2025; Panjaitan et al., 2025). This suggests that entrepreneurial literacy equips MSME owners with the tools to navigate challenges and capitalize on market trends, thereby boosting overall business success. Thus, it is hypothesized that higher levels of entrepreneurial literacy will significantly and positively influence MSME performance by fostering a proactive and innovative business approach.

H1: Entrepreneurial literacy has a significant positive effect on MSME performance.

Financial Literacy and MSME Performance

Financial literacy, defined as the ability to understand and apply financial information for effective decision-making in personal and business contexts Ismanto et al. (2023), is crucial for MSMEs. It enables owners to manage cash flow, plan finances, secure loans, and assess performance. Poor financial literacy often leads to mismanagement, a primary cause of micro-business failures, particularly in financing decisions. Research by Aritonang et al. (2023) highlights that MSMEs with strong financial literacy in North Sumatra exhibited better performance due to improved financial planning and resource allocation. Similarly, Yakob et al. (2021) found that financially literate MSMEs in Malaysia outperformed others in profitability and sustainability. This literacy allows MSME owners to optimize funding, reduce debt risks, and enhance operational stability. Given these insights, it is hypothesized that increased financial literacy will significantly and positively impact MSME performance by improving financial decision-making and resource management.

H2: Financial literacy has a significant positive effect on MSME performance.

Digital Literacy and MSME Performance

Digital literacy, extending beyond basic technology use to include cybersecurity, social media marketing, and digital transaction skills Van Laar et al. (2017), is increasingly vital for MSMEs. It enables market expansion, operational efficiency, and customer engagement in the digital era. Kurniawati (2022) found that MSMEs with high digital literacy in Indonesia adopted new technologies faster, improving their competitiveness and survival in digital markets. Additionally, Diptyana et al. (2022) demonstrated that digital literacy enhances MSME performance by facilitating online sales and customer outreach. This literacy empowers MSMEs to leverage digital tools for marketing, data analysis, and process automation, directly boosting productivity and revenue. Given the growing reliance on digital platforms, it is hypothesized that higher digital literacy will significantly and positively affect MSME performance by enhancing technological adoption and market reach.

H3: Digital literacy has a significant positive effect on MSME performance

Microfinancing as Moderating Effects

Entrepreneurial literacy equips individuals with the skills to identify opportunities, manage risks, and utilize resources effectively Mwasalwiba (2010), forming a foundation for MSME competitiveness (Fayolle & Gailly, 2015). However, its impact on performance may depend on access to capital. Microfinancing, particularly sharia-based, provides inclusive funding with justice and profit-sharing principles Obaidullah and Khan (2008), enabling MSMEs to implement entrepreneurial strategies. Contingency theory suggests that supportive conditions, like financing, enhance capability effectiveness. Studies show microfinance, when paired with education, boosts MSME growth (Husaeni & Dewi, 2019). For instance, Destiana (2016) found that financed MSMEs in Cirebon improved performance through better resource allocation. Thus, entrepreneurial literacy

may indirectly enhance MSME performance by leveraging microfinancing to execute innovative ideas and expand operations. This suggests that microfinancing acts as a mediator, amplifying literacy's effect by providing the necessary capital. It is hypothesized that entrepreneurial literacy has a significant indirect positive effect on MSME performance through microfinancing, as funding bridges the gap between knowledge and actionable business outcomes.

H4: Entrepreneurial literacy has a significant indirect positive effect on MSME performance through microfinancing.

Financial literacy enables MSMEs to manage cash flow, plan finances, and make informed loan decisions (Lusardi & Mitchell, 2014). However, its full potential on performance may require adequate funding. Microfinancing, especially sharia-based, offers capital with transparency and profit-sharing Obaidullah and Khan (2008), supporting financial management practices. Contingency theory posits that environmental support, such as financing, enhances strategy effectiveness. Research by Muhammad Arif and Hardiyanti (2020) indicates that microfinance improves MSME development by enabling better financial planning. Similarly, Kwuta et al. (2023) found that financial literacy, mediated by financing, positively affects MSME performance in Sikka Regency through improved cash flow. This suggests that microfinancing amplifies financial literacy's impact by providing resources to implement learned financial strategies. Without funding, literacy alone may not translate into performance gains. Thus, it is hypothesized that financial literacy has a significant indirect positive effect on MSME performance through microfinancing, as capital enables the practical application of financial knowledge.

H5: Financial literacy has a significant indirect positive effect on MSME performance through microfinancing.

Digital literacy, encompassing technology use, cybersecurity, and online marketing Van Laar et al. (2017), enhances MSME efficiency and market reach. However, implementing digital strategies often requires investment in tools and infrastructure. Microfinancing, with its inclusive approach Obaidullah and Khan, (2008), provides the capital needed to adopt digital technologies. Contingency theory indicates that supportive conditions, like financing, optimize capability use. Diptyana et al. (2022) found that microfinanced MSMEs with digital literacy improved performance through online sales. Similarly, Rizki and Hendarman (2024) noted that funding enabled digital literacy to build resilience in Bandung MSMEs by supporting technology adoption. This suggests microfinancing mediates digital literacy's effect by funding digital tools, such as websites or e-commerce platforms, which drive performance. Without capital, digital skills may remain underutilized. Thus, it is hypothesized that digital literacy has a significant indirect positive effect on MSME performance through microfinancing, as funding facilitates the application of digital competencies.

H6: Digital literacy has a significant indirect positive effect on MSME performance through microfinancing.

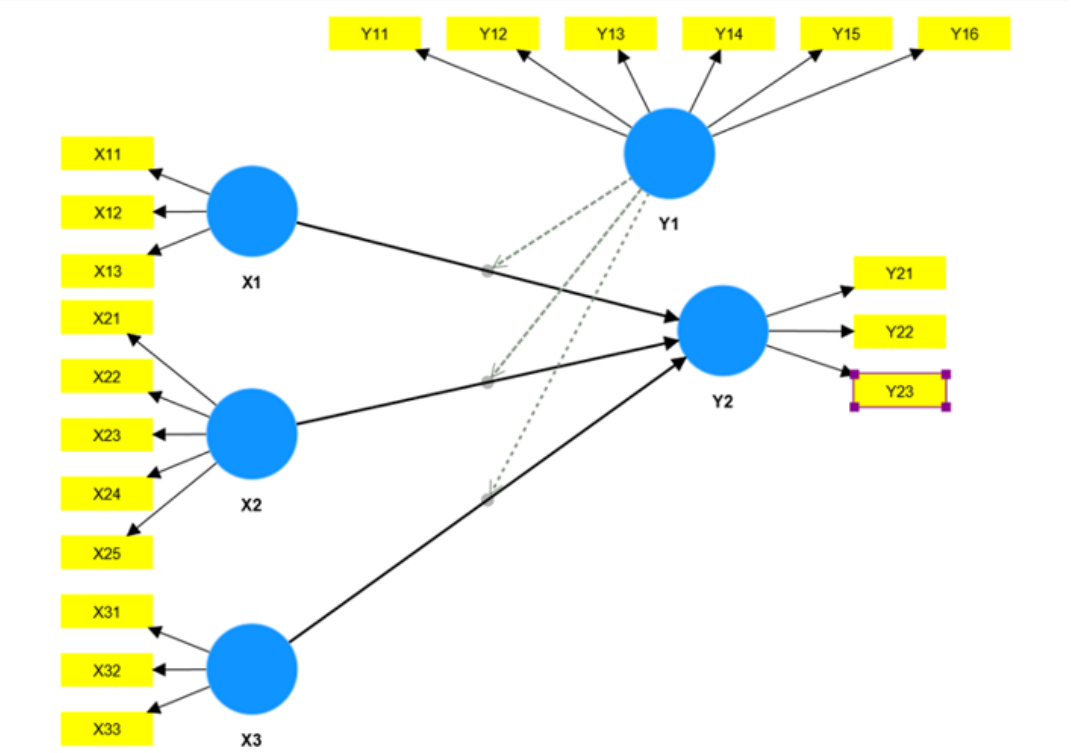

Figure 1. Research Model

Description: X1 (Entrepreneurial Literacy); X2 (Financial Literacy); X3 (Digital Literacy); Y (Microfinancing); Z = MSME Performance.

RESEARCH METHOD

This research employs a quantitative approach utilizing a survey method to investigate the relationships within the research model. The study includes one dependent variable, MSME performance (Z), three independent variables entrepreneurial literacy (X1), financial literacy (X2), and digital literacy (X3) and microfinance (Y) as a moderating variable (Figure 1). The population comprises MSMEs partnered with Islamic microfinance institutions in Jambi Province, as documented by Puskopsyah (2020). A purposive sampling technique was applied, targeting micro-businesses operational for over one year and having engaged in multiple savings transactions and financing cycles with Islamic microfinance. From 225 micro-entrepreneurs, 158 MSME units in Jambi Province met these criteria. Data were collected via questionnaires distributed online through Google Forms and offline by directly visiting entrepreneurs at their businesses or homes, accommodating those without smartphone access.

Entrepreneurial literacy is defined as the ability to recognize opportunities, understand market needs, create and develop new ideas, produce and promote products and services, and manage a business effectively. Digital literacy refers to the ability to use digital technologies, including computers, mobile devices, the internet, and social media, to obtain, evaluate, and utilize information effectively (UNESCO, 2019). Financial literacy is an individual's capacity to make informed financial decisions, encompassing knowledge of financial and investment concepts, understanding financial information, and skills in managing money, including debt and budgeting. Microfinance is the provision of small loans to underserved individuals or groups to initiate or expand small businesses, aiming to alleviate poverty and bolster local economies (Yunus, 1998). Micro-business performance is the ability of MSMEs to achieve business goals and maintain market competitiveness.

Table 1. Operational Definition of Research Variables

Variables	Indicators	Data Scale
Entrepreneurial Literacy	1. Basic knowledge of entrepreneurship 2. Knowledge of business ideas and opportunities 3. Knowledge of business operations and aspects	Ordinal
Digital Literacy	1. Ability to obtain and share information via social media 2. Ability to manage online identity 3. Ability to filter digital information 4. Ability to use digital tools and services for business 5. Ability to utilize social media for business reference	Ordinal
Financial Literacy	1. Financial knowledge 2. Financial attitudes 3. Financial skills (e.g., budgeting, saving, investing)	Ordinal
Microfinance	1. Fundraising support 2. Financing activities 3. Provision of financial services 4. Business assistance for MSMEs 5. Enhancing customer trust 6. MSME empowerment programs	Ordinal
Micro Business Performance	1. Business productivity 2. Marketing performance 3. Financial performance	Ordinal

The analysis tool, Partial Least Square (PLS), was chosen due to the model's novelty, predictive nature, latent variables, and reflective indicators, making it a suitable approach (Ali et al., 2023).

RESULTS

The research presents general data on respondents, micro-enterprises partnered with Islamic microfinance in Jambi City. Gender distribution reveals a majority of female respondents (53%), with men comprising 47%, indicating women's growing role in entrepreneurship. Most respondents are part-time micro-entrepreneurs, supplementing family income, pursuing personal dreams, or responding to COVID-19 challenges, alongside hobbies or seeking independent earnings beyond spousal income. Age data shows 48% of respondents are over 50, with the 41-50 age group following, and few under 30, suggesting younger individuals prefer employment over entrepreneurship. Educational background indicates most respondents completed high school or vocational training, reflecting secondary education dominance due to financial constraints or a desire for independence post-graduation, challenging the notion of entrepreneurship as a last resort. Table 2 also highlights that most respondents initiated their businesses independently, with some collaborating with spouses or family, and a few continuing family legacies, showcasing women's risk-taking entrepreneurial spirit. Moreover, the table reveals widespread social media use, with WhatsApp leading, followed by Facebook, Instagram, and TikTok, with a minority lacking accounts or devices, underscoring digital engagement's role in business growth through marketing.

This study analyzed the opinions of micro business actors in Jambi City to examine three key variables that influence business performance: Entrepreneurial Literacy (X1), Digital Literacy (X2), and Financial Literacy (X3). Entrepreneurial Literacy (X1) consists of three dimensions: basic knowledge, knowledge of business opportunities, and knowledge of business aspects such as finance, marketing, HR, and production. Most respondents rated their competencies at level 3 (good), particularly in understanding business risks, creativity, and product pricing. The average scores suggest that respondents have a moderate to good level of entrepreneurial literacy, especially in recognizing and managing essential business operations. Digital Literacy (X2) reveals relatively low competence. Most respondents scored level 2 (lacking) across dimensions like online identity management, use of digital tools, and finding business-related data. The only dimension with strong results was information filtering, where most respondents scored

at level 3 (good). This indicates that while they can assess digital content, they struggle to use digital platforms effectively in their business processes.

Table 2. Respondents' Characteristics

Characteristic	Category	Percentage (%)	Frequency (n)
Gender	Female	53	84
	Male	47	74
Age	Under 30	5	8
	31–40	15	24
	41–50	32	51
	Over 50	48	75
Education Level	Elementary	10	16
	Junior High	15	24
	High School/Vocational	60	95
	College/University	15	23
Business Initiation	Self-built	65	103
	With Spouse	20	32
	With Family	10	16
	Family Legacy	5	7
Social Media Use	WhatsApp	70	111
	Facebook	15	24
	Instagram	10	16
	TikTok	3	5
	None	2	2

Financial Literacy (X3) includes knowledge, attitudes, and behavior toward financial planning, savings, and investment. The majority of responses fall within level 3 (good) but with considerable answers also in level 2 (lacking), indicating moderate financial competence (Table 3). Respondents showed decent understanding of income, costs, and banking products, but demonstrated weaker financial planning and saving behaviors.

Table 3. Average Response Distribution by Variable

Variable	Excellent (4)	Good (3)	Lacking (2)	Poor (1)
Entrepreneurial Literacy	16.54%	71.27%	11.57%	0.62%
Digital Literacy	16.35%	39.06%	41.73%	2.87%
Financial Literacy	16.49%	48.45%	32.42%	2.64%

The measurement model (outer model) was analyzed to assess the validity and reliability of the constructed model using confirmatory factor analysis (CFA) in two stages due to its multidimensional, reflective nature. This study includes three independent variables entrepreneurial literacy (X1), digital literacy (X2), financial literacy (X3) one dependent variable, MSME performance (Y), and microfinance (Y) as a moderator. Data were analyzed using Smart PLS 4.00. Initial PLS algorithm tests identified invalid indicators (loading factor < 0.7), which were dropped, and retesting confirmed all remaining indicators as valid.

Table 4. Reliability and Validity Measures

Variable	Cronbach's Alpha	Composite Reliability (ρ_c)	Composite Reliability (ρ_0)	Average Variance Extracted (AVE)
X1 (Entrepreneurial Literacy)	0.801	0.817	0.838	0.635
X2 (Financial Literacy)	0.704	0.787	0.801	0.514
X3 (Digital Literacy)	0.704	0.783	0.787	0.564
Y1 (Microfinancing)	0.862	0.891	0.897	0.656
Y2 (MSME Performance)	0.781	0.872	0.847	0.650

Table 4 presents the reliability and validity measures for the study's variables, assessing the internal consistency and construct validity of the measurement model. Cronbach's Alpha values range from 0.704 to 0.862, indicating acceptable to excellent reliability across all variables. Composite Reliability ρ_c) and ρ_0 values also demonstrate strong

internal consistency, with all constructs exceeding the recommended threshold of 0.7. Average Variance Extracted (AVE) values range from 0.514 to 0.656, confirming adequate convergent validity as they all surpass the 0.5 benchmark. Specifically, Entrepreneurial Literacy (X1) shows strong reliability with a Cronbach's Alpha of 0.801 and AVE of 0.635, while Microfinancing (Y1) has the highest reliability and validity scores. Financial Literacy (X2) and Digital Literacy (X3) show moderate but acceptable values. The results of the construct reliability test, as presented in the table above, show that the Composite Reliability and Cronbach's Alpha values for all latent variables exceed 0.70, except for variable X2. However, since this research is exploratory, the Cronbach's Alpha value of 0.674 for X2 is still acceptable according to Hair (2017), as it is above the 0.5 threshold. Therefore, all dimensions used to measure the latent variables in the estimated model are considered reliable. Consequently, testing of the structural model (inner model) can proceed.

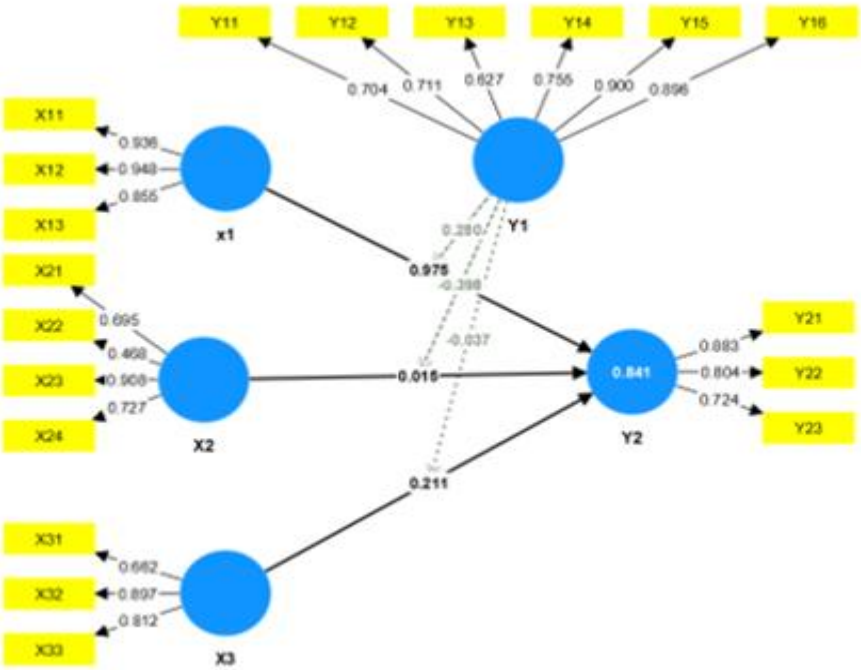

Figure 2. Structural Model with Loading Factors

Table 5. Structural Model Evaluation

Analysis	Value
R^2	0.841
R^2 Adjusted	0.790
P Value	0.000
Q^2	0.490
GoF	0.652

The results in Table 5 show that Micro Business Performance has an R^2 of 0.841 and an adjusted R^2 of 0.790, both above 0.5 and classified as moderate to strong according to Hair et al. (2017). This indicates that Entrepreneurial Literacy and Digital Literacy jointly explain 84.1% of the variance in micro business performance, with the remaining 13.99% influenced by other factors outside the model. The predictive relevance value (Q^2) of 0.490 (> 0.35) indicates strong predictive power. Additionally, the Goodness of Fit (GoF) value of 0.652 (> 0.35) confirms that the overall model fits the empirical data well. These results suggest the model is robust, valid, and reliable, supporting further hypothesis testing (Figure 3).

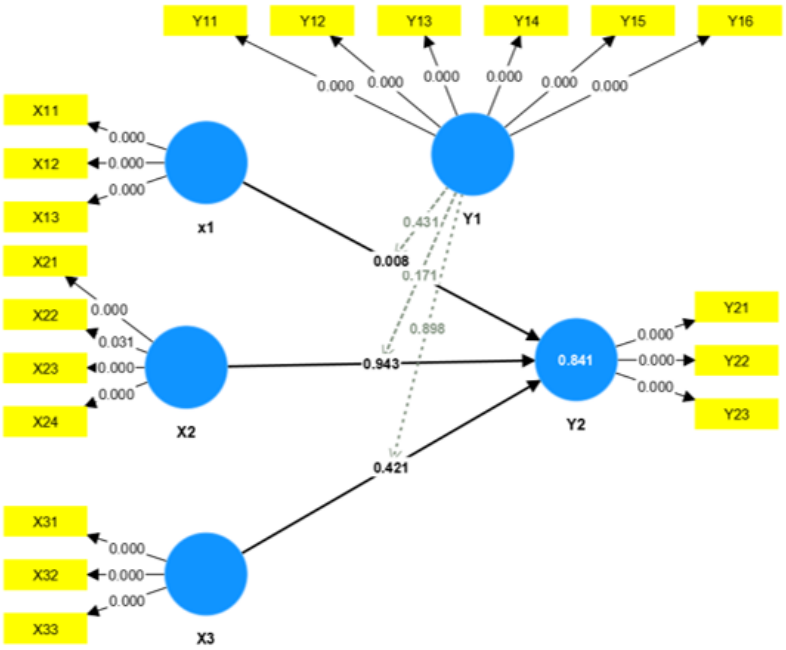

Figure 3. Bootstrapping Results

Table 6. Hypothesis Testing Results

Variable	Original sample	Sample mean	Standard deviation	T-statistics (|O/STDEV|)	P-values
X1 (Entrepreneurial Literacy_ -> Y2 (Business Performance)	0.975	0.775	0.369	2.639	0.008
X2 (Digital Literacy) -> Y2 (Business Performance)	0.015	0.041	0.216	2.072	0.021
X3 (Financial Literacy) -> Y2 (Business Performance)	0.110	0.269	0.262	2.805	0.009
Y1 (Micro financing) -> Y2 (Business performance)	0.238	0.124	0.329	2.725	0.009
Y1*X1 -> Y2 (Microfinance Moderation)	0.280	0.256	0.356	2.788	0,000
Y1*X2 -> Y2 (Microfinance Moderation)	0.390	0, 327	0.291	2.368	0.008
Y1*X3 -> Y2 (Microfinance Moderation)	0.037	0.036	0.291	3.128	0.008

Table 6 show the first hypothesis states that entrepreneurial literacy positively influences business performance. The test shows a strong path coefficient (0.975), a significant t-value (2.639), and p-value (0.008), indicating acceptance. This means better entrepreneurial literacy among micro-entrepreneurs significantly enhances business outcomes such as profitability and growth. The implication is that improving entrepreneurial literacy can be a key strategy for microbusinesses to improve performance and sustainability.

The second hypothesis proposes that digital literacy positively affects business performance. The path coefficient is 0.015 with a t-value of 2.072 and p-value 0.021, confirming acceptance despite the small coefficient. It suggests digital skills, though having a smaller effect, still contribute significantly to business success. Enhancing digital literacy can help micro-entrepreneurs leverage technology to improve marketing, operations, and competitive advantage.

The third hypothesis posits entrepreneurial literacy impacts business performance positively. Results show a coefficient of 0.110, t-value 2.805, and p-value 0.009, confirming acceptance. This highlights the importance of entrepreneurial knowledge and skills in driving microbusiness success. Supporting entrepreneurial literacy development can strengthen strategic decision-making and business resilience.

The fourth hypothesis examines if microfinance moderates the effect of financial literacy on performance. The coefficient is 0.280, with a highly significant t-value (2.788) and p-value (0.000), confirming acceptance. Microfinance support enhances the positive influence of financial literacy on business outcomes, implying microfinance institutions can amplify the benefits of financial education for micro-entrepreneurs.

The fifth hypothesis tests microfinance as a moderator between digital literacy and performance. Results show a coefficient of 0.390, significant t-value (2.368), and p-value (0.008), confirming acceptance. This indicates microfinance strengthens how digital literacy improves business performance, suggesting integrating digital training with microfinance services could boost microbusiness success.

The seventh hypothesis tests microfinance moderation on entrepreneurial literacy's effect. The coefficient is 0.037, with significant t-value (3.128) and p-value (0.008), confirming acceptance. Microfinance support slightly but significantly enhances the impact of entrepreneurial literacy on business outcomes, indicating that financial backing complements knowledge in fostering microbusiness growth.

DISCUSSION

Based on the results of hypothesis testing using Partial Least Squares (PLS) with a bootstrap approach, the analysis reveals a compelling relationship between entrepreneurial literacy and the performance of microfinance partner micro-businesses, where the effect is significantly positive. This finding, with a path coefficient of 0.975 and a p-value of 0.008, supports earlier research by Yani et al. (2020) which demonstrated that entrepreneurial literacy positively contributes to MSME performance. This indicates that micro-entrepreneurs with a sound understanding of entrepreneurial concepts including opportunity recognition, innovation, and managerial practices are more likely to translate that knowledge into improved business performance. As Adams and Hamm (2001) suggested, in a multimedia and knowledge-based economic era, entrepreneurial literacy becomes a central tool in enabling effective decision-making and opportunity exploitation. These findings are consistent with Curado's (2006) knowledge-based view of the firm, emphasizing that knowledge especially entrepreneurial knowledge is a critical intangible asset that drives firm performance.

From the field, it was observed that many micro-entrepreneurs gained entrepreneurial literacy through informal pathways family traditions, vocational training, community experiences, and even self-education via online platforms. These experiential and social learning processes validate the notion that entrepreneurial knowledge in developing economies is not always institutionalized but acquired through embedded, context-specific interactions. This is further aligned with the conclusions of Hasan et al. (2024), who argue that entrepreneurial creativity and success in MSMEs are often rooted in contextual and experiential learning, especially when formal education is limited.

The performance of MSMEs is also significantly influenced by digital literacy, with a path coefficient of 0.015 and a p-value of 0.021. This validates Hypothesis 2 and is consistent with Sariwulan et al. (2020) and Diptyana et al. (2022), who assert that digital literacy is a key enabler of business competitiveness in the digital era. Despite the low digital proficiency among MSME actors in the study categorized as "digitally incompetent" even minimal familiarity with social media and digital communication tools appears to contribute positively to business performance. This supports Aziz (2021), who emphasized that digital capability, even at a basic level, is becoming a core requirement in navigating the modern economy under Society 5.0. However, the descriptive analysis reveals a stark gap between digital potential and digital application, where many micro-entrepreneurs use platforms like WhatsApp, Facebook, and Instagram primarily for social communication rather than structured business promotion or digital marketing. This gap illustrates the unleveraged potential of digital tools to enhance market reach and business innovation.

Moreover, microfinance institutions have not yet fully facilitated digital literacy development among MSMEs. The absence of structured programs or strategic

collaborations with digital service providers such as Telkom or the Communication and Information Service limits the institutional capacity to foster digital transformation in micro-businesses. This resonates with the findings of Hamid et al. (2024), who underscored the importance of FinTech and digital literacy infrastructure as prerequisites for MSME growth in digitally transforming economies.

Similarly, financial literacy is shown to have a significant positive impact on MSME performance, with a path coefficient of 0.324 and a p-value of 0.001. These findings align with research conducted by Yakob et al. (2021) and Kwuta et al. (2023), who highlighted that sound financial understanding enhances the sustainability and operational performance of micro-enterprises. Despite this, the financial literacy level of micro-entrepreneurs is generally categorized as moderate. Microfinance institutions currently focus primarily on financial product delivery rather than broader financial education including budgeting, investment strategies, insurance knowledge, or long-term financial planning. This is consistent with Aritonang et al. (2023), who also found that financial education within microfinance settings tends to be narrow in scope and lacking systemic delivery.

Further strengthening the research framework is the finding that microfinance plays a moderating role in each of the literacy dimensions entrepreneurial, digital, and financial towards MSME performance. The moderation of microfinance in the relationship between entrepreneurial literacy and performance is significant, with a coefficient of 0.280 and a p-value of 0.000. This suggests that entrepreneurial knowledge is more effectively actualized when supported by financial resources. This complements Banerjee and Duflo's (2011) argument that microfinance serves not only as capital provision but as an enabler that empowers entrepreneurial agency among the poor.

In the relationship between digital literacy and performance, the moderating effect of microfinance is even stronger (coefficient = 0.390, p-value = 0.008), implying that access to capital can enhance the ability of MSMEs to utilize digital platforms through investment in equipment, content creation, and digital advertising. Without financial resources, digital knowledge may remain underutilized. This is in line with Husaeni and Dewi (2019), who identified that digital inclusion requires parallel financial support to bridge the digital divide in micro-enterprises.

The moderating effect of microfinance on the relationship between financial literacy and performance, although statistically significant (coefficient = 0.037, p-value = 0.008), is relatively weaker. Nonetheless, it still confirms that financial capital enhances the application of financial knowledge, allowing MSMEs to manage cash flow, take calculated risks, and adopt formal financial systems. This aligns with Chandan (2023), who noted that financial constraints limit human resource and financial management practices in MSMEs.

CONCLUSION

The findings of this study highlight the strong interdependence between entrepreneurial, digital, and financial literacy and the performance of microfinance partner micro-enterprises. These three forms of literacy have each demonstrated a positive and significant contribution to enhancing micro-business performance in Jambi City. Among them, entrepreneurial literacy stands out with a good level among entrepreneurs, showing a clear relationship with increased productivity, marketing ability, and overall business efficiency. Meanwhile, financial literacy, although only at a moderate level, still contributes positively by encouraging sound financial behavior and enabling better financial planning and resource allocation. Digital literacy, however, remains a challenge, with many entrepreneurs falling into the less proficient category. Although the majority already use social media platforms for promotion and communication, the potential of digital tools for business growth remains underutilized, suggesting a need for structured and targeted digital capacity-building programs.

Importantly, microfinance plays a crucial moderating role in amplifying the effects of these literacy types on business outcomes. Rather than functioning solely as a source of

funding, microfinance institutions should be repositioned as strategic development partners that not only provide capital but also help bridge the knowledge and skill gaps among their members. This integrated approach would enhance the practical application of literacy in entrepreneurial settings, especially in a rapidly evolving digital economy. By supporting literacy programs, microfinance institutions can strengthen the cognitive capacity and adaptive skills of entrepreneurs, ensuring a more impactful and sustainable contribution to MSME growth.

To further improve micro-business performance, efforts should be directed toward elevating entrepreneurial literacy from a "good" to a "very good" level and advancing digital literacy from "poor" to "proficient." Financial literacy also requires improvement beyond the current moderate standing. A practical starting point is the upskilling of microfinance managers, enabling them to champion the importance of these three literacies in the Industry 4.0 era. Partnerships with institutions such as Financial Service Authority (*Otoritas Jasa Keuangan/OJK)*, state-owned enterprises like Telkom and Telkomsel, banks, universities, and digital communities should be developed to facilitate regular training programs.

This study provides a novel empirical model linking microfinance, literacy, and MSME performance from the perspective of micro-entrepreneurs. Future studies are encouraged to explore this relationship from the supply side namely the perspective of microfinance institutions to develop a more comprehensive understanding of how both financing and literacy can jointly empower micro-businesses in a digitally transforming economy.

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