

Modeling the Effect of Financial Literacy and Inclusion on MSME Sustainability Through Financial Management

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Abstract—This study investigates the influence of financial literacy and financial inclusion on the sustainability of micro, small, and medium enterprises (MSMEs) in Mamuju Regency, with financial management as a mediating variable. Data were collected from 112 MSME respondents and analyzed using Partial Least Squares (SmartPLS). The results reveal that financial literacy ($\beta = 0.452$, $p < 0.001$) and financial inclusion ($\beta = 0.417$, $p < 0.001$) both have significant positive effects on sustainability. Moreover, financial management emerged as the most influential factor ($\beta = 0.779$, $p < 0.001$) and significantly mediates the effects of both financial literacy (indirect $\beta = 0.353$, $p < 0.001$) and financial inclusion (indirect $\beta = 0.325$, $p < 0.001$) on sustainability. These findings highlight that while knowledge and access are crucial, effective financial management is the key mechanism through which MSMEs can achieve long-term sustainability. The study contributes to the literature by clarifying the mediating role of financial management and offers practical recommendations for strengthening MSME financial practices and policies.

Keywords: Financial Literacy; Financial Inclusion; Financial Management; MSME Sustainability.

1. INTRODUCTION

The strategic role of Micro, Small, and Medium Enterprises (MSMEs) in national economic development is widely acknowledged. MSMEs contribute significantly to economic growth, employment creation, and the enhancement of community welfare (Saif Adyatma & Ayudiati, 2024). However, in Indonesia, a considerable number of MSMEs still operate without formal legal status, which restricts their access to formal financial institutions, particularly banking services. These limitations, as highlighted by (Nugraha & Ekayani, 2022) include restricted access to capital, technology, markets, and legal legitimacy elements essential for both short- and long-term growth. Furthermore, low human capital quality, limited financial literacy, and an underdeveloped regulatory environment contribute to the financial exclusion experienced by many MSMEs (Dewi & Purwantini, 2023a).

Recent data on MSMEs in Mamuju District from 2020 to 2022 reveal a concerning trend. In 2020, there were 9,512 MSMEs comprising 4,973 micro enterprises, 3,765 small enterprises, and 774 medium enterprises. This distribution indicates that the majority of business actors are concentrated at the micro level, characterized by limited capital, labor, and production scale. In 2021, the total number of MSMEs decreased to 8,743 units, although micro enterprises increased to 5,671 units. Small and medium enterprises declined to 2,351 and 721 units, respectively, likely due to the prolonged economic impact of the COVID-19 pandemic.

The most significant decline occurred in 2022, where only 2,360 MSMEs were recorded. Medium enterprises were particularly affected, with only 12 remaining. This represents a drop of more than 73% compared to the previous year. While the decline reflects the pandemic's economic toll, the accuracy of the 2022 data may be in question, given the nationwide MSME census (PL-KUMKM) conducted by the Indonesian Statistics Agency (BPS) in 2023. Nevertheless, the sharp decrease underscores the urgent need to strengthen financial literacy and inclusion among MSMEs to ensure business sustainability.

Financial literacy is a critical component that enables MSME actors to manage their finances effectively, based on a sound understanding of financial principles. Proper knowledge of income management, budgeting, and financial planning is essential for improving business performance and growth (Hutauruk et al., 2024). In parallel, financial inclusion is equally vital. Enhanced access to financial services has been empirically shown to significantly improve business financial performance (Andriyani & Mulyanto, 2022). Financial inclusion empowers MSMEs by enabling access to formal credit and financial tools (Putra Nainggolan, 2023). (Tahu G, 2025) emphasize that financial inclusion encompasses the accessibility, availability, and usage of financial services, all of which are crucial for MSME development.

Another essential aspect in ensuring MSME sustainability is financial management. This includes bookkeeping, monitoring, planning, and financial decision-making. Many MSMEs still lack structured financial systems, fail to differentiate between personal and business finances, and do not engage in proper long-term planning. These issues compromise cash flow control and reduce resilience to market fluctuations. Research by (Dahrani et al., 2022) identifies financial management as a fundamental factor influencing the success and sustainability of small businesses.

Business sustainability itself refers not only to the ability to generate consistent profits but also to adaptability, customer retention, and potential for growth. According to (Putra Nainggolan, 2023). sustainability encompasses economic, social, and environmental dimensions. However, for small-scale MSMEs, economic sustainability particularly in terms of financial and operational resilience is often the most critical indicator. (Kusumawati, Akmalia, Rifandi, et al., 2022) further argue that managerial capabilities, especially in financial management, are strongly associated with long-term business sustainability.

2. RESEARCH METHODS

2.1 Research Design

This study utilizes a quantitative approach with an explanatory design to explore the causal links between financial literacy, financial inclusion, financial management, and MSME sustainability. The explanatory method enables the identification of direct and indirect relationships among variables, particularly the mediating effect of financial management. Data collection was carried out at a single point in time, making the study cross-sectional in nature. The survey method was employed, using structured questionnaires to gather data directly from respondents. This approach is suitable for uncovering patterns and testing hypotheses about the dynamics that influence the sustainability of MSMEs in the region.

2.2 Population and Sampling

The study's population consists of Micro, Small, and Medium Enterprises (MSMEs) located in Mamuju Regency, West Sulawesi. Based on the records of the local Office of Cooperatives and SMEs, around 7,530 MSMEs were actively operating in the region as of 2023. The sample size was determined using Slovin's formula with a 5% margin of error, resulting in a minimum requirement of 98 participants. To increase reliability and account for possible non-responses, a total of 112 MSME owners or managers were ultimately included. A simple random sampling technique was applied to ensure each member of the population had an equal chance of selection.

2.3 Data Collection Method and Instrument

Primary data were obtained using a structured questionnaire, which was administered directly to respondents. Each item was rated using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire was segmented into five sections corresponding to the study's variables: Demographic Information, Financial Literacy, Financial Inclusion, Financial Management and MSME Sustainability. Prior to full deployment, the instrument was pre-tested on 15 MSME owners in a neighboring area to evaluate its clarity, wording, and relevance. Based on their feedback, minor revisions were made to enhance the questionnaire's validity and ease of use.

2.4 Data Analysis Techniques

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS version 3.0. This analytical technique is well suited for exploratory and predictive research involving latent variables and complex causal relationships.

The data analysis process followed a two-stage approach:

2.4.1. Measurement Model Evaluation (Outer Model)

The measurement model was assessed to determine the validity and reliability of the constructs. Convergent Validity was evaluated through factor loadings and Average Variance Extracted (AVE). Acceptable thresholds were > 0.70 for loadings and > 0.50 for AVE. Discriminant Validity was assessed using the Fornell-Larcker criterion, ensuring that the square root of the AVE for each construct exceeded the correlations with other constructs. Reliability was confirmed using Composite Reliability (CR) and Cronbach's Alpha, both required to be greater than 0.70. (Hair et al., 2014)

2.4.2. Structural Model Evaluation (Inner Model)

The structural model was examined to test the hypothesized relationships among the variables, Collinearity issues were identified using the Variance Inflation Factor (VIF), with acceptable values below 5. Path coefficients were analyzed to estimate both direct and indirect effects. Bootstrapping with 5,000 subsamples was conducted to assess the statistical significance of the path coefficients, based on T-statistics and p-values. Coefficient of Determination (R^2) was used to measure the model's explanatory power for each endogenous variable. Effect Size (f^2) was calculated to evaluate the relative impact of each predictor. Predictive Relevance (Q^2) was examined using the blindfolding procedure, to assess the model's ability to predict endogenous constructs (Hair et al., 2014).

2.5 Literatur Review

2.5.1. Financial Literacy

Financial literacy is commonly defined as the ability to understand and utilize financial knowledge to make informed and effective decisions (OJK, 2019). It encompasses financial knowledge, financial skills, and confidence in managing personal and business finances. According to (Hidayat & Abdul Moin, 2023), financial literacy refers to individuals' awareness and ability to manage financial resources effectively, which significantly influences their financial behavior. Higher financial literacy enables individuals especially MSME actors to make rational financial decisions, understand financial risks, and improve their overall business sustainability (Kusumawati, et,al, 2022) The operational indicators of financial literacy include, Understanding of basic financial concepts such as interest rates and inflation, Ability to plan and manage personal and business budgets, Confidence in making day-to-day financial decisions, Awareness and

understanding of various financial products and services, and Each of these indicators was assessed using items on a five-point Likert scale and tested for reliability and validity using standard psychometric techniques.

2.5.2 Financial Inclusion

Financial inclusion refers to the degree to which individuals and businesses have access to affordable, timely, and appropriate financial products and services (SNKI, 2020). It eliminates barriers such as high cost, lack of information, or geographic constraints, thereby enabling equitable access to formal financial systems. (Pandey et al., 2022) emphasize that inclusive financial systems ensure that all individuals can use financial services without discrimination or obstacles. Similarly, (Andriyani & Mulyanto, 2022) assert that greater financial inclusion positively impacts business performance by expanding access to capital and financial tools. The operational indicators of financial inclusion are: Ownership of bank accounts or digital wallets, Access to business loans or credit facilities, Utilization of digital financial services (mobile banking, e-wallets), Frequency and regularity of formal financial transactions, and These indicators serve as a proxy for the extent to which MSMEs are integrated into the formal financial system.

2.5.3 Financial Management

Financial management is defined as the process of planning, organizing, directing, and controlling a business's financial resources to achieve its objectives (Hutauruk et al., 2024) Effective financial management is essential for maintaining liquidity, ensuring solvency, and sustaining long-term profitability. (Dahrani et al., 2022) explain that financial management involves funding acquisition, asset allocation, and income generation all of which are crucial to business growth and sustainability. (Meilani & Andriana, 2024) The operational dimensions of financial management include, Financial planning and budgeting activities, Bookkeeping and accurate financial reporting, Cash flow control and liquidity monitoring, Decisionmaking related to capital reinvestment and asset utilization, and Each of these components was measured using structured items and tested for internal consistency using Cronbach's Alpha and composite reliability.

2.5.4 MSME Sustainability

The sustainability of Micro, Small, and Medium Enterprises (MSMEs) is their ability to endure, grow, and adapt in the face of changing environments, competition, and market trends. Based on Indonesian Law No. 20 of 2008, MSMEs are categorized into micro, small, and medium-sized businesses based on their net assets and annual sales. According to (Pandey et al., 2022) MSME sustainability can be assessed through a firm's innovation, strategic capabilities, structural resilience, and financial health. Sustainable MSMEs are those that can continuously meet customer needs, innovate their offerings, and manage resources effectively. (Purbadharmaja & Widanta, 2023) Operational indicators of MSME sustainability include, Business continuity and operational lifespan, Trends in revenue growth and profitability, Ability to withstand market fluctuations and adapt to change, Innovation in product or service delivery and These indicators provide a comprehensive view of how resilient and adaptable a business is over time.

2.6 Correlation of Variables

In this study, it has a research model that is described as follows:

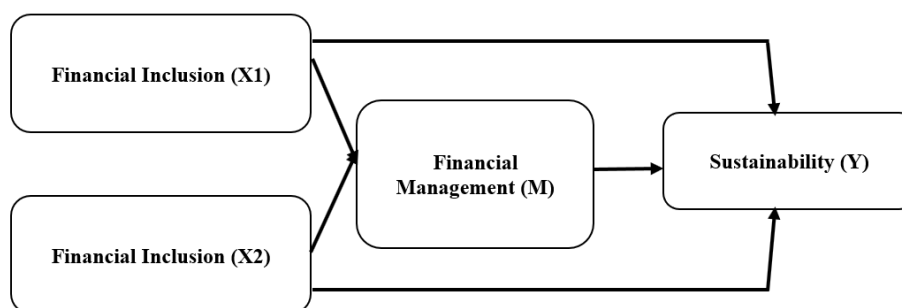


Figure 1. Research Model

For this research method, using quantitative methods with primary data sources taken using questionnaires distributed to MSME respondents in Mamuju Regency. With the acquisition of 112 respondents who were taken by random sampling and hypothesis testing was carried out with the technical analysis being SEM-PLS (Structural Equation Modeling) with the following series of data processing:

3. RESULTS AND DISCUSSION

3.1 Results of Research

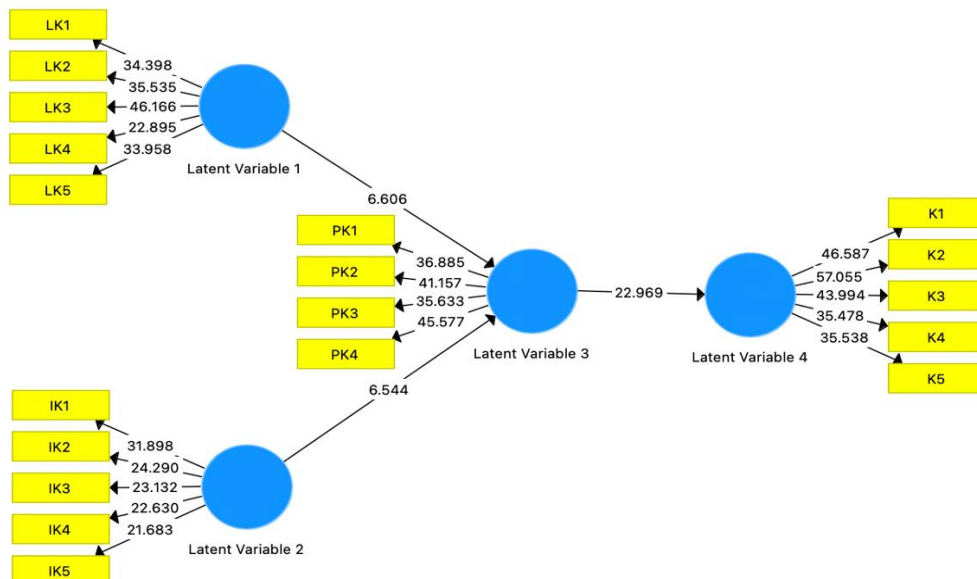


Figure 2. Outer Model

Figure 2 Outer Model illustrates the measurement relationships between latent variables and their observed indicators. Latent Variable 1 (LK1–LK5) and Latent Variable 2 (IK1–IK5) each have five indicators with loading values ranging from approximately 21.68 to 46.16. Both variables influence Latent Variable 3, with path coefficients of 6.606 and 6.544, respectively. Latent Variable 3 (PK1–PK4) then affects Latent Variable 4 (K1–K5) with a path coefficient of 22.969, showing how the constructs are interconnected in the structural equation model.

3.1.1 Average Variance Extracted

In general, the AVE value recommended to indicate good convergent validity is ≥ 0.50 (Hair et al., 2014) This value indicates that more than 50% of the indicator variance can be explained by the measured construct. Based on the results of the AVE calculation on each construct in this study, the following values are obtained:

Table 1. Average Variance Extracted (AVE)

Average Variance Extracted (AVE)	
Financial Literacy	0.670
Financial Inclusion	0.702
Financial Management	0.757
Sustainability	0.773

All AVE values for the constructs in Table 1 above are above the minimum threshold of 0.50 This indicates that each construct has sufficient convergent validity. In other words, the indicators used to measure each construct are significantly able to represent the intended latent construct. The highest AVE value is obtained in the Sustainability construct (0.773), which indicates that the indicators in this construct are very good at explaining the variance of the construct. While the lowest AVE value is in Financial Literacy (0.670), it is still in the good category because it exceeds the minimum threshold. This indicates that the measurement model used in this study has met the criteria for convergent validity statistically.

3.1.2 Heterotrait-Monotrait Ratio

Heterotrait-Monotrait Ratio (HTMT) is a method used to assess discriminant validity between constructs in a measurement model. Discriminant validity indicates the extent to which a construct is truly different from other constructs in the same model. HTMT was introduced by (Hair et al., 2014) as a more sensitive and accurate approach than traditional methods such as the Fornell-Larcker criterion. HTMT measures the ratio between the correlation between different constructs (heterotrait) and the correlation between indicators within the same construct (monotrait). The HTMT Assessment Criteria is that the HTMT Value < 0.90 indicates good discriminant validity.

Table 2. Heterotrait-Monotrait Ratio (HTMT)

	Financial Literacy	Financial Inclusion	Financial Management	Sustainability
Financial Literacy	0.838			
Financial Inclusion	0.405	0.819		
Financial Management	0.621	0.600	0.879	
Sustainability	0.626	0.593	0.779	0.870

Based on the results of Table 2 above, all HTMT values between constructs are below the threshold of 0.90. This indicates that each construct used in the model has adequate discriminant validity, meaning that each construct can be distinguished empirically from the other constructs. The highest values of HTMT are Financial Management and Sustainability (0.779), Financial Literacy, Sustainability (0.626), Financial Management and Financial Literacy (0.621). Thus, these HTMT results reinforce that the measurement model in this study has good discriminant validity, which supports the validity of the construct structure used in the model.

3.1.3 Reliability test

Construct reliability in this study was analyzed using two approaches, namely Cronbach's Alpha and Composite Reliability (CR). These two indicators are used to test the internal consistency of the indicators in each latent construct. Based on the analysis results, the Cronbach's Alpha and Composite Reliability values for each construct are obtained as follows:

Table 3. Cronbach's Alpha and Composite Reliability

	Cronbach's Alpha	Composite Reliability
Financial Literacy	0.894	0.702
Financial Inclusion	0.877	0.670
Financial Management	0.902	0.773
Sustainability	0.919	0.757

In Table 3, all constructs have Cronbach's Alpha values > 0.70 , indicating that the instrument has good internal consistency (Hair et al., 2014). In fact, two constructs, namely Financial Management (0.902) and Sustainability (0.919), show very high reliability, which indicates that the indicators in the construct are very consistent in measuring the intended concept. Meanwhile, the Composite Reliability results also show adequate values, where all constructs have a CR value ≥ 0.70 , with the exception of the Financial Inclusion construct which has a CR value of 0.670. This value is still acceptable in the context of exploratory research (Hair et al., 2014). Therefore, overall it can be concluded that all constructs in this research model have acceptable reliability, so they are suitable for use in the exploratory stage.

3.1.4 Collinearity test

Multicollinearity test is conducted to ensure that there is no high correlation relationship between indicators in each latent construct. One common way used to detect multicollinearity is through the Variance Inflation Factor (VIF) value. According to (Hair et al., 2014) a good VIF value should be below 5.00, where values above this limit indicate the potential for multicollinearity which can affect model stability.

The results of multicollinearity testing on each indicator are shown in the following table:

Table 4. Collinearity test

LK1	2.129
LK2	2.250
LK3	2.639
LK4	1.983
LK5	2.304
IK1	2.271
IK2	2.110
IK3	1.978
IK4	2.089
IK5	1.962
PK1	2.422
PK2	2.821
PK3	2.464
PK4	2.668
K1	3.339
K2	4.210
K3	2.544
K4	2.732
K5	2.419

Based on the Table 4 above, it can be seen that all VIF values are below 5.00, which means that there are no significant symptoms of multicollinearity between indicators in the tested constructs. The highest VIF value is found in indicator K2 (4.210) in the Sustainability construct, but still within safe limits.

Thus, it can be concluded that there is no multicollinearity in the model, so that each indicator can be said to be statistically independent in explaining its latent construct. These results support that the instruments used in this study

qualify as valid and stable measuring instruments, and are suitable for use in further analysis such as structural modeling (SEM/PLS).

3.1.5 Inner model

3.1.5.1 Coefficient of determination

The coefficient of determination (R-Square or R²) is used to measure how much the independent variable is able to explain the dependent variable in the research model. R² shows the proportion of variance of the dependent variable that can be explained by the independent constructs in the structural model.

In this study, there are two dependent variables, namely Financial Management and Sustainability, each of which has an R-Square value as follows:

Table 5. R-Square Results

	R-Square	R-Square Adjusted
Financial Management	0.531	0.523
Sustainability	0.608	0.604

Based on the data in Table 5 above, the R² value of 0.531 in the Financial Management construct indicates that 53.1% of the variability of Financial Management can be explained by the independent constructs in the model (e.g. Financial Literacy and Financial Inclusion), while the rest (46.9%) is explained by other factors outside the model. Meanwhile, the R² value of 0.608 on the Sustainability construct indicates that 60.8% of the variability of Sustainability can be explained by the independent variables, such as Financial Literacy, Financial Inclusion, and Financial Management, with 39.2% explained by other external factors. Thus, both constructs in this model (Financial Management and Sustainability) have R-Square values in the moderate category, which indicates that the model has a fairly good explanatory ability in describing the relationship between the variables studied.

3.1.5.2 F-Square

Effect size analysis using the f-square (f²) value aims to measure the relative contribution of each independent construct to the dependent construct in the structural model. The f² value indicates the magnitude of the effect of an exogenous construct (independent variable) on the endogenous construct (dependent variable) when the construct is removed from the model. According to (Hair et al., 2014) the criteria for interpreting the f² value are as follows: f² ≥ 0.35 = Large effect, 0.15 ≤ f² < 0.35 = Medium effect, 0.02 ≤ f² < 0.15 = Small effect, f² < 0.02 = No effect. Based on the data obtained, the f² values of each construct relationship are as follows:

Table 6. F-square Results

	Financial Literacy	Financial Inclusion	Financial Management	Sustainability
Financial Literacy			0.365	
Financial Inclusion			0.310	
Financial Management				1.548
Sustainability				

Based on the data in Table 6 above, it can be described as follows:

- a. Financial Literacy : Financial Management (f² = 0.365)
This value indicates that Financial Literacy has a major influence on Financial Management. This means that an increase in financial literacy will significantly improve individual financial management skills.
- b. Financial Inclusion : Financial Management (f² = 0.310)
This value shows a moderate to near large effect, which indicates that access to financial services also contributes quite strongly to the ability of individuals to manage their finances.
- c. Financial Management : Sustainability (f² = 1.548)
This value is very high and indicates that Financial Management is a major contributor (very large effect) in explaining the Sustainability variable. This means that sustainability (both in financial and other contexts) is highly dependent on how individuals or organizations manage their finances.

3.1.5.3 Path Coefficient

Path coefficient analysis is used to determine the direction, strength, and significance of the direct relationship between constructs in the structural model. The assessment is based on three main indicators, namely the Original Sample (O) value, T-Statistic, and P-Values. The Original Sample value indicates the magnitude of the effect (direction and strength), the T-Statistic value is used to test significance, and the P-Values indicate the probability of the effect occurring by chance. According to (Hair et al., 2014) the relationship is said to be statistically significant if the T-Statistic ≥ 1.96 (for a significance level of 5%) and the P-Value ≤ 0.05. The following are the results of testing the relationship between constructs in the research model:

Table 7. Path Coefficient Results

	Original Smapel (O)	T Statistist	P Values
Financial Literacy > Sustainability	0.452	6.606	0.000
Financial Inclusion > Sustainability	0.417	6.544	0.000
Financial Management > Sustainability	0.779	22.969	0.000

The results of Table 7 of the path analysis on the structural model show that all exogenous constructs, namely Financial Literacy, Financial Inclusion, and Financial Management, have a significant influence on the endogenous construct, namely Sustainability. First, the relationship between Financial Literacy and Sustainability shows a coefficient value of 0.452 with a T-statistic value of 6.606 and a P-value of 0.000. These results indicate that Financial Literacy has a positive and significant effect on Sustainability. This means that the higher the level of individual understanding of financial concepts, the greater the ability to make wise, efficient, and long-term oriented financial decisions. This supports the importance of financial education and counseling in shaping sustainable financial behavior.

Furthermore, Financial Inclusion on Sustainability also shows a positive and significant effect, with a coefficient of 0.417, T-statistic of 6.544, and P-value of 0.000. These findings suggest that access to financial products and services—such as savings, loans, and insurance—play an important role in encouraging individuals and community groups to manage resources more productively, which in turn supports their sustainability. Good financial inclusion allows people to plan for the future in a more structured way.

Financial Management has the strongest relationship with Sustainability, as indicated by a path coefficient value of 0.779, a T-statistic of 22.969, and a P-value of 0.000. These results show that Financial Management is the primary predictor of sustainability in this research model. This implies that sound financial management practices—such as budgeting, expenditure control, and long-term financial planning—substantially contribute to achieving a stable and sustainable financial condition. It underscores that the ability to manage finances effectively is a fundamental pillar in achieving sustainability, whether at the individual, family, or organizational level.

3.1.5.4 Indirect Path Coefficients

In addition to the direct effects between constructs, this research model also examines indirect effects mediated by the Financial Management construct. The indirect influence demonstrates the contribution of exogenous constructs in affecting Sustainability through the mediator (Financial Management). The results of the indirect path analysis indicate that Financial Literacy and Financial Inclusion have a significant influence on Sustainability through Financial Management as a mediating variable.

Table 8. Indirect Path Coefficient Results

	Original Smapel (O)	T Statistist	P Values
Financial Literacy > Financial Management > Sustainability	0.353	6.126	0.000
Financial Inclusion > Financial Management > Sustainability	0.325	6.022	0.000

Explanation of Table 8 Data Above:

a. Financial Literacy → Financial Management → Sustainability

The analysis results indicate that Financial Literacy has a significant influence on Sustainability through Financial Management. The obtained indirect path coefficient of 0.353 indicates a positive and moderate effect. This means that the higher a person’s level of financial literacy, the more likely they are to manage their finances effectively. In turn, this enhances their ability to plan and manage finances sustainably. A T-statistic of 6.126, which exceeds the critical value of 1.96, and a very small P-value (0.000) indicate that this effect is statistically significant, meaning the relationship is not due to chance. Practically, these findings suggest that improving financial literacy which includes understanding money management, long-term planning, and investment can strengthen financial management practices that ultimately contribute to achieving sustainability. Therefore, financial literacy is essential not only for day-to-day financial management but also for making financial decisions that support long-term sustainability.

b. Financial Inclusion → Financial Management → Sustainability

Similar findings were observed in the indirect relationship between Financial Inclusion and Sustainability, mediated by Financial Management. The indirect path coefficient of 0.325 indicates a positive influence, albeit slightly lower than that of Financial Literacy, but still within the moderate range. This suggests that the greater an individual’s access to financial services and products, the more likely they are to use that access to manage their finances more effectively and sustainably.

A T-statistic of 6.022, which also exceeds 1.96, and a P-value of 0.000 confirm that this relationship is statistically significant, meaning the results are not merely coincidental. Financial inclusion provides individuals with access to a variety of financial products that enable better planning, saving, and investing, which are critical for long-term sustainability.

3.2 Discussion

3.2.1 The Influence of Financial Literacy on Sustainability

The findings indicate that financial literacy positively affects MSME sustainability in Mamuju. This aligns with the theoretical premise that financial knowledge empowers individuals to make informed financial decisions, thus supporting long-term stability and growth. According to the framework of financial capability theory, literacy enhances individuals' ability to plan, save, and invest wisely, which in turn fosters resilience and sustainability. This result is consistent with previous research by (Dewi & Purwanti, 2023a) and (Ariyanti & Keterkaitan Inklusi dan Literasi Keuangan dengan Kinerja dan Keberlanjutan UMKM di Perkotaan, 2024) who found that higher financial literacy among entrepreneurs is associated with improved business performance and sustainability. However, the contextual nuance in Mamuju where many MSMEs operate in semi-informal sectors underscores the critical role of practical knowledge in managing cash flow and avoiding debt traps. Therefore, financial literacy interventions in this region should not be generic but rather tailored to the unique needs and constraints of local business owners.

3.2.2 The Influence of Financial Inclusion on Sustainability

The evidence also confirms that financial inclusion has a significant positive relationship with sustainability. This supports theories emphasizing the importance of access to formal financial systems such as savings, loans, and insurance as tools for promoting financial health and reducing vulnerability to external shocks. Prior studies (Nugraha Sugita & Seri Ekayani, 2022) and (Jean et al., 2025) similarly reported that financial inclusion improves entrepreneurs' ability to scale their businesses, build resilience, and invest in long-term growth. In the Mamuju context, many MSMEs have historically lacked access to affordable credit or digital payment systems. The study's findings thus highlight the need for broader outreach by financial institutions and fintech services to bridge this inclusion gap, especially in rural and coastal areas.

3.2.3 The Influence of Financial Management on Sustainability

Among all variables tested, financial management emerged as the most influential factor on sustainability. This finding reinforces resource-based theory, which posits that internal capabilities such as the ability to budget, allocate, and control financial resources are pivotal in achieving organizational sustainability. This result extends the findings of (Dahrani et al., 2022) and (Nyaman et al., 2025) who argue that financial management is not only a skill but also a strategic asset that determines survival in volatile environments. In Mamuju, where MSMEs often rely on informal recordkeeping and short-term planning, the strength of this relationship implies that building internal management capacity is more impactful than external factors such as credit access or financial knowledge alone. The result also suggests a shift in focus for capacity-building programs: from merely increasing awareness (literacy) or access (inclusion) toward enhancing practical financial management skills tailored to microenterprise operations.

3.2.4 Indirect Influence (Mediating Effect)

The study provides strong empirical support for the mediating role of financial management between both financial literacy and inclusion toward sustainability. This is in line with the mediational framework suggested by (Rahadjeng et al., 2023) and (Mellinia et al., 2023) where capability building acts as the bridge linking cognitive and structural enablers to behavioral outcomes. In simpler terms, having knowledge (literacy) or access (inclusion) does not automatically result in sustainable outcomes unless entrepreneurs can effectively manage their finances. This mediating role has been highlighted in earlier research by (Akpene Akakpo et al., 2022) and (Dewi & Purwanti, 2023b) yet rarely in the context of remote or underbanked areas like Mamuju. These findings carry significant theoretical and practical implications. Theoretically, they reinforce the notion that financial literacy and inclusion should be viewed not as isolated constructs, but as parts of an ecosystem that depends on management capability to translate potential into outcomes. Practically, this suggests that government and NGO interventions must integrate all three elements literacy, inclusion, and management rather than treating them as separate programs.

4. CONCLUSION

Based on the results of this study, it can be concluded that Financial Literacy, Financial Inclusion, and Financial Management each exert a significant influence on the Sustainability of MSMEs, both directly and indirectly. Among these variables, Financial Management demonstrates the strongest impact on sustainability outcomes. This finding suggests that the ability to manage financial resources effectively plays a more decisive role than merely possessing financial knowledge or having access to financial services. Moreover, the study confirms the mediating role of Financial Management in strengthening the link between both Financial Literacy and Sustainability, as well as Financial Inclusion and Sustainability. In essence, while financial knowledge and access to financial services are important, they may not translate into sustainable outcomes unless supported by sound financial management capabilities. The implications of these findings are notable. Promoting long-term sustainability among MSMEs requires more than theoretical understanding or improved access to financial products it calls for practical financial management skills. Therefore, policies and programs aiming to improve MSME sustainability should prioritize not only financial literacy and inclusion but also provide targeted support to enhance financial decision-making and management practices. Community-based financial education, business mentoring, and tailored training initiatives could serve as effective strategies to build these competencies. However, this study is not without limitations. The research was confined to 112 MSMEs in the Mamuju Regency, which may limit the generalizability of the results to other regions or broader populations. Additionally, data

collection relied solely on self-reported questionnaires, which may be subject to respondent bias or inaccuracies in perception. Future research could address these limitations by expanding the sample size across multiple regions, employing mixed methods to include qualitative insights, or incorporating longitudinal designs to better assess causal relationships over time. Exploring sectoral variations within MSMEs or integrating behavioral finance perspectives could also enrich the analysis and provide deeper understanding of how financial behaviors influence business sustainability.

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