

Financial Literacy's Moderating Role in Savings and MSME Sustainability: Evidence from Central Java, Indonesia

Efriyani Sumastuti^{a*}, C. Tri Widiastuti^a, Rizka Ariyanti^b, Ali Imron^b

^aUniversitas Persatuan Guru Republik Indonesia Semarang, Jl. Sidodadi Timur No.24, Kota Semarang, Jawa Tengah, 50232, Indonesia

^bITSNU Pekalongan, Jalan Karangdowo No. 9, Karangdowo, Kecamatan Kedungwuni, Kabupaten Pekalongan, Jawa Tengah 51173, Indonesia

Abstract

The objective of This investigation is to investigate the influence of financial inclusion and financial literacy on the sustainability of businesses, with business savings serving as a mediating factor and financial literacy acting as a moderator. The study involved 150 culinary MSMEs in Central Java and utilized a quantitative method with the SmartPLS 3.0 analytical tool. The findings suggest that financial literacy and financial inclusion significant direct influences on business sustainability. Additionally, Financial literacy significantly influences business savings, highlighting its important role in shaping the financial behaviors of MSMEs. On the other hand, business savings do not show a statistically significant direct impact on business sustainability, and their mediating role receives only partial support. The moderating effect of financial literacy on the connection between business savings and business sustainability is significant but in a negative direction. These results suggest that while financial literacy is generally advantageous, it can change the role of savings if not integrated with effective financial planning. This research provides a theoretical contribution to the comprehension of financial behavior models in MSMEs and supports the achievement of SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation, and Infrastructure) through inclusive financial empowerment.

Keywords: Financial inclusion; Financial literacy; Business saving; Business sustainability; MSMEs.

Received: 5 July 2025

Revised: 18 August 2025

Accepted: 25 August 2025

1. Introduction

Micro, small, and medium enterprises (MSMEs) hold a vital position in the Indonesian economy. The number of MSMEs in Indonesia is projected to reach around 65 million units in 2024 (Ministry of Cooperatives and Small and Medium Enterprises). This sector employs 97% of the total national workforce and accounts for 61% of the The Gross Domestic Product (GDP) stands at Rp9,580 trillion. This strategic significance underscores the necessity for inclusive and integrated development policies and strategies to ensure the sustainability of MSMEs. However, behind these great contributions, MSMEs face various challenges, both in terms of financial access, financial literacy skills, and business resilience. Low capacity in business financial management and limited access to formal financial institutions are serious obstacles that limit the competitiveness and sustainability of MSMEs, especially in the highly dynamic and labor-intensive culinary sector (Sumastuti et al., 2024).

Previous studies have shown that to encourage the development and viability of small enterprises, it is necessary to understand the concept of finance and the accessibility of financial services (Ahmad et al., 2024; Morgan & Long, 2020). Financial inclusion is the reference to the capacity of business owners to utilize formal financial instruments and services, including savings accounts, loans, and electronic payment systems. Enhanced financial inclusion enables MSME operators to boost business efficiency, broaden their market reach, and manage business risks more effectively (Dong et al., 2025; Azmeh, 2025). Nevertheless, access alone is insufficient; it must be complemented by the ability to comprehend and make the best use of financial services, which is known as financial literacy. Owners of MSMEs with a high level of financial literacy are likely to make better informed and successful financial decisions (Charfeddine et al., 2024).

* Corresponding author.

E-mail address: efriyanisumastuti@upgris.ac.id

One of the important financial behaviors in the context of MSMEs is the ability to save in the form of business savings. Business savings have a strategic role in building financial resilience and supporting long-term business growth (Sumastuti et al., 2024). MSME actors who are used to setting aside profits to save will be better prepared to face unexpected conditions and have capital reserves for expansion. However, this saving practice is also greatly influenced by financial literacy factors and the availability of access to formal financial institutions (Mpaata et al., 2020). Therefore, it is important to understand how financial inclusion and literacy contribute to saving practices and their impact on business sustainability.

Business sustainability is an important issue that is increasingly being considered in the development of MSMEs. Sustainability is not only measured by income growth, but also by business resilience in the face of economic shocks, its ability to create jobs, and its contribution to sustainable development (Maulana et al., 2024; Alshammari, 2025). In this regard, the sustainability of MSMEs facilitates the attainment of the sustainable development goals, particularly target 8, which emphasizes decent work and economic growth, and goal 9, which pertains to industry, innovation, and infrastructure. Strengthening MSMEs through increased financial literacy, broader financial inclusion, and the promotion of prudent saving practices is a key approach to building resilient businesses and promoting inclusive development.

Although many studies have examined the impact of financial inclusion and financial literacy on financial behavior and business performance, there are still limited studies that examine the mediated role of business saving in these relationships. In addition, the function of moderation from financial literacy on the connection between business savings and sustainability has also not been widely explored, especially in the context of culinary MSMEs in Indonesia. This research offers a comprehensive model that integrates the direct and indirect influences of financial inclusion and financial literacy on business sustainability through business saving, with financial literacy as the moderator. This model is also relevant to the inclusive approach to economic growth and financial empowerment.

This research seeks to evaluate the impact of financial inclusion and financial literacy on business sustainability, both directly and indirectly through the mediation of business savings, as well as to explore the moderating role of financial literacy in the relationship between business savings and business sustainability. This research not only enriches the academic literature in the field of development economics and finance, but also makes a practical contribution in designing MSME empowerment policies. In particular, the results of the study is anticipated to support the achievement of the SDGs targets by strengthening the structure of microfinance based on inclusivity, literacy, and sustainability.

2. Literature Review

2.1. Financial Inclusion

Financial inclusion refers to the capacity of individuals and businesses to utilize formal financial systems, including savings, credit, insurance, and digital payment services. By broadening availability of financial resources, financial inclusion promotes economic expansion and enhances the resilience of small businesses. (Ahmed, 2025; Brixiová et al., 2020). The findings indicate that financial inclusion supports improving welfare, reducing disparities, and creating jobs, especially in the MSME sector (Dong et al., 2025; Song et al., 2025; Pandey et al., 2025).

The development of online technology is accelerating the expansion of financial inclusion, especially through fintech and digital financial services (Azme, 2025; Tay et al., 2022). In addition to strengthening business capacity, financial inclusion is also related to achieving business sustainability, both economically and environmentally (Alshammari, 2025; Shashwat et al., 2025). Research by Ahmad et al. (2024) and Morgan & Long (2020) also shows that financial inclusion accompanied by financial literacy is able to encourage positive financial behaviors, such as saving habits, which are important for the sustainability of MSMEs. To be successful in business, the ability to manage financial information is required, in addition to having access to financial services.

2.2. Financial Literacy

Financial literacy encompasses a person's knowledge of fundamental financial concepts such as savings, investments, interest, risk, and inflation, along with the capability to make sound financial decisions (Ahmad et al., 2024; Baporikar & Akino, 2020). In the context of MSMEs, financial literacy plays an important role in business financial management, including cash flow planning, wise credit taking, and allocation of funds for investment or savings (Charfeddine et al., 2024; Efriyani Sumastuti, Subur Harahap, 2024). A study by Pandey et al. (2025) in India found that financial literacy significantly increases the effectiveness of financial inclusion programs and the success of small businesses.

The relationship between financial access and productive financial behavior is moderated by financial literacy (Morgan & Long, 2020; Mpaata et al., 2020). MSME actors who understand the risks and benefits of financial products tend to be more able to utilize financial services to save and develop their businesses sustainably (Sumastuti et al., 2024). Therefore, in this model, financial literacy is positioned as a key variable that not only directly affects business saving, but also strengthens its influence on business sustainability.

2.3. Business Saving

Business saving refers to the decision of business actors to set aside part of their income or profits to be saved, either in the form of cash savings, bank deposits, or other financial instruments. This practice is important to maintain business sustainability, anticipate risks, and support long-term investment (Morgan & Long, 2020; Sumastuti et al., 2024). In the context of MSMEs, especially the culinary sector, the habit of saving is often the main source of capital and acts as a buffer when economic uncertainty occurs (Pandey et al., 2025; Efriyani Sumastuti, Subur Harahap, 2024).

Financial literacy and access to financial services greatly affect the saving behavior of MSME actors. A study by Mpaata et al. (2020) shows that business actors who understand financial benefits tend to be more consistent in saving. In addition, good financial inclusion provides a safe and efficient means of saving business funds. In this model, business savings is positioned as a strategic mediation variable that bridges the impact of financial inclusion and financial literacy on the sustainability of businesses.

2.4. Business Sustainability

Business sustainability refers to the ability of a business to survive and develop in the long term by maintaining a balance between economic, social, and environmental aspects. In the context of MSMEs, sustainability includes operational efficiency, income stability, adaptation to market changes, and contribution to community welfare (Maulana et al., 2024; Alshammari, 2025). Business sustainability is essential to drive local economic growth and poverty alleviation, especially in the informal sector such as culinary.

Factors such as financial literacy, access to financial services, and saving behavior have been proven to contribute to business sustainability. The study by Shashwat et al. (2025) and Dong et al. (2025) confirms that digital financial inclusion and green finance play a role in increasing the resilience and sustainability of small businesses. In this model, business sustainability is the main dependent variable, directly influenced by financial inclusion and business saving, and indirectly moderated by financial literacy.

2.5. Relationship Between Constructs

The relationship between financial inclusion and business saving reflects the important role of financial access in supporting the saving behavior of MSME actors. When business actors have access to banking or digital finance services, they tend to have wider and safer options to store excess business funds (Pandey et al., 2025; Song et al., 2025). Financial literacy also plays a direct role in encouraging wise saving decisions, because understanding the financial benefits and risks allows MSME actors to manage cash flow more effectively (Ahmad et al., 2024; Charfeddine et al., 2024).

Business saving itself is a link between financial inclusion and literacy and business sustainability. Business savings provide reserve funds for expansion, market adaptation, or facing a crisis. A study by Sumastuti et al. (2024) shows that business savings can increase the sustainability of culinary MSMEs. Financial literacy is also modeled as a moderator, which strengthens the influence of business savings on sustainability. The higher the financial literacy, the greater the positive impact of savings on business continuity (Morgan & Long, 2020; Mpaata et al., 2020).

2.6. Conceptual Framework and Hypothesis Development

Drawing from theoretical studies and prior research, a conceptual framework has been formulated to illustrate the connections among financial inclusion, financial literacy, business savings, and business sustainability. In this framework, financial inclusion and financial literacy function as independent variables that influence business saving behavior. Additionally, business savings are posited to have a direct effect on business sustainability, highlighting the

importance of savings in supporting business continuity and growth. The model also incorporates financial literacy as a moderating variable, which enhances the relationship between business saving and business sustainability.

The relationship between financial inclusion, financial literacy, business saving, and business sustainability is assumed to directly or indirectly affect each other. Financial inclusion provides access to formal financial services such as savings and credit, which encourages MSME actors to save business funds more safely and planned (Ahmed, 2025; Pandey et al., 2025). Financial literacy also allows business actors to understand the risks and benefits of financial products, thereby supporting healthy financial behaviors, including saving (Ahmad et al., 2024; Charfeddine et al., 2024). These two factors are estimated to affect business savings and directly or indirectly impact business sustainability.

Business savings serve as a mediating variable that links the effects of financial inclusion and financial literacy to business sustainability. This suggests that business owners who have both access to and an understanding of financial matters are more inclined to save, which subsequently enhances business sustainability (Sumastuti et al., 2024; Morgan & Long, 2020). Furthermore, financial literacy is also presumed to reinforce the connection between business savings and business sustainability, and is therefore tested as a moderating variable, as illustrated in Figure 1. Based on this explanation, the following hypotheses are proposed:

- H1: Financial inclusion positively influences business saving.
- H2: Financial literacy positively influences business saving.
- H3: Financial inclusion positively influences business sustainability.
- H4: Business savings positively influence business sustainability.
- H5: Financial literacy positively influences business sustainability.
- H6: Financial literacy moderates the effect of business savings on business sustainability.
- H7: Business savings mediate the effect of financial inclusion on business sustainability.
- H8: Business savings mediate the effect of financial literacy on business sustainability.

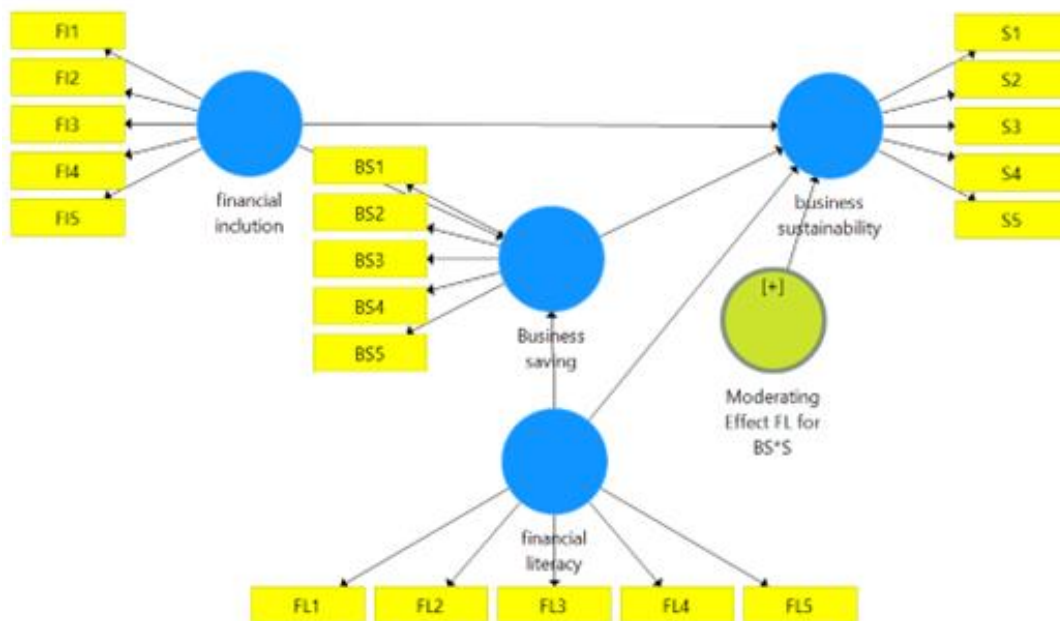


Figure 1. Research Model

3. Methods

This research employs a quantitative approach using a survey method to examine the effects of financial inclusion, financial literacy, and business savings on the sustainability of culinary MSMEs in Central Java Province. A total of

150 respondents were selected using purposive sampling techniques with the following criteria: active business for at least one year, having financial activities, and willing to fill out a questionnaire. The research instrument was developed from valid indicators based on previous literature and measured using a 5-point Likert scale. Before the main analysis, validity and reliability tests were carried out using outer loading, AVE, and composite reliability values. The data were analyzed using SmartPLS 3.0 software, which is suitable for complex models with moderate samples as well as data that are not completely normal. Model evaluation includes testing measurement models (validity and reliability) and structural models to determine the direct, indirect (mediative), and moderate influence of financial literacy. The bootstrapping technique is used to test the significance of paths and effects in the model.

Table 1. Constructs, Indicators, Measurement Items, and Sources

Construct	Code	Measurement Item	Source
Financial Inclusion	FI1	I have access to formal financial services (banks, e-wallets, etc.)	Pandey et al. (2025); Tay et al. (2022)
	FI2	I can easily open a savings account or access digital banking	Song et al. (2025); Azmeh (2025)
	FI3	I use financial services to support my business operations	Morgan & Long (2020)
	FI4	I have access to credit or financing from formal institutions	Brixiová et al. (2020); Dong et al. (2025)
	FI5	I regularly use mobile or digital payment systems for business transactions	Tay et al. (2022); Alshammari (2025)
Financial Literacy	FL1	I understand basic financial concepts (interest, inflation, risk)	Ahmad et al. (2024); Baporikar & Akino (2020)
	FL2	I am confident in managing money and making financial decisions	Mpaata et al. (2020); Charfeddine et al. (2024)
	FL3	I can evaluate the risks and benefits of financial products	Pandey et al. (2025); Morgan & Long (2020)
	FL4	I plan and monitor my business expenses and income regularly	Efriyani Sumastuti, Subur Harahap (2024)
	FL5	I know where to seek financial advice when needed	Ahmad et al. (2024); Charfeddine et al. (2024)
Business Saving	BS1	I allocate a portion of business income for savings regularly	Sumastuti et al. (2024); Morgan & Long (2020)
	BS2	I use formal savings institutions (e.g., banks, cooperatives) for saving	Mpaata et al. (2020)
	BS3	My business savings are planned and targeted	Charfeddine et al. (2024)
	BS4	I save to support future business investments	Ahmad et al. (2024); Efriyani Sumastuti, Subur Harahap (2024)
	BS5	I save to prepare for emergencies or unexpected business costs	Pandey et al. (2025); Sumastuti et al. (2024)
Business Sustainability	S1	My business has shown consistent profit growth over the past year	Maulana et al. (2024); Dong et al. (2025)
	S2	I can maintain operations even during economic uncertainty	Alshammari (2025); Shashwat et al. (2025)
	S3	I reinvest in the business to ensure long-term growth	Morgan & Long (2020)
	S4	My business contributes to local employment and community welfare	Maulana et al. (2024)
	S5	I adopt sustainable practices in operations (e.g., reducing waste, energy-saving)	Alshammari (2025); Dong et al. (2025)

4. Result and Discussions

4.1. Empirical Findings/Result

R-Square analysis is used to evaluate how much independent variables are able to explain variations in dependent variables. Based on Table 2, the R Square value for business savings is 0.822, which means that 82.2% of the variation in business savings can be explained by financial inclusion and financial literacy. Meanwhile, the R Square value for business sustainability is 0.888, which means that 88.8% of the variation in business sustainability is accounted for by financial inclusion, financial literacy, business savings, and the moderating effect of financial literacy.

Table 2. R Square

	R Square	R Square Adjusted
Business saving	0.822	0.819
business sustainability	0.888	0.884

According to Joseph F. Hair et al. (2022), these values are classified as "strong," with an R Square above 0.75 indicating that the model possesses high predictive capability. Therefore, the structural model used in this research demonstrates a very strong ability to explain the phenomena under investigation, particularly regarding the business sustainability of MSMEs.

An assessment of the outer model was conducted to examine the validity and reliability of the constructs, which involved analyzing outer loading, Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach's Alpha, as presented in Table 3. The loading factor value of each indicator was above 0.70, indicating that all indicators have good convergent validity (Sarstedt et al., 2020). For example, the FI1, FI3, and FI5 indicators in the financial inclusion construct have very high loading values (FI1 = 0.905; FI3 = 0.912; FI5 = 0.917). The same can be seen in the financial literacy indicator (FL1 = 0.849; FL5 = 0.859), business savings (BS1 = 0.834; BS5 = 0.846), and business sustainability (S1 = 0.894; S5 = 0.891).

Table 3. Outer Loading, Validity and Reliability

Variable	Item	loading	Cronbach's Alpha	CR	AVE
Business saving	BS1	0.834	0.889	0.919	0.693
	BS2	0.841			
	BS3	0.814			
	BS4	0.828			
	BS5	0.846			
Inancial Inclusion	FI1	0.905	0.937	0.952	0.798
	FI2	0.854			
	FI3	0.912			
	FI4	0.876			
	FI5	0.917			
Financial literacy	FL1	0.849	0.893	0.921	0.701
	FL2	0.838			
	FL3	0.777			
	FL4	0.860			
	FL5	0.859			
Business sustainability	S1	0.894	0.907	0.931	0.731
	S2	0.782			
	S3	0.811			
	S4	0.891			
	S5	0.891			

The Composite Reliability (CR) value of the entire construct is above 0.90, indicating that the entire construct has excellent internal reliability. For example, financial inclusion has a CR of 0.952 and business savings of 0.919. Cronbach's Alpha value is also above 0.85 for all constructs, which indicates high internal consistency between measurement items. All constructs also show AVE values above 0.50, which means that more than 50% of the indicator's variance can be explained by their respective constructs. The highest AVE value was found in the financial inclusion construct (0.798), followed by business sustainability (0.731), which corroborates that the indicators used are able to represent the construct well. Thus, the measurement model in this study has met the requirements for validity and reliability, making it feasible to use in structural model testing.

The discriminant validity test is performed to ensure that each construct in the model is clearly distinguishable from the others. The Fornell-Larcker criterion is one method used, where the square root of the AVE for each construct is compared to the correlations it has with other constructs. A construct is said to meet discriminant validity if its diagonal value (the square root of AVE) is greater than the correlation values with other constructs in the corresponding row or column (Sarstedt & Moisescu, 2024).

The results of the analysis in Table 4 show that the entire construct meets the Fornell-Larcker criteria. For example: the diagonal value for financial literacy is 0.837, higher than the correlation with business savings (0.898) and financial inclusion (0.385). The diagonal value for business savings is 0.833, higher than its correlation with financial inclusion (0.458) and business sustainability (0.902). The value for business sustainability is 0.855, higher than its correlation with other constructs. Thus, the validity of the discriminators in this model has been met, and the constructs used can be empirically distinguished from each other.

Table 4. Fornell-Larcker Criterion

	Business saving	Moderating Effect FL for BS*S	business sustainability	financial inclusion	financial literacy
Business saving	0.833				
Moderating Effect FL for BS*S	-0.957	0.958			
business sustainability	0.902	-0.925	0.855		
financial inclusion	0.458	-0.460	0.496	0.893	
financial literacy	0.898	-0.929	0.913	0.385	0.837

Hypothesis testing was carried out to determine the relationship between constructs in structural models. The test results are presented in Table 5, which includes the path coefficient (β) values, t-statistics, and p-values. The hypothesis is considered significant if the $p <$ value is 0.10 (Joseph F. Hair et al., 2022).

Table 5. Hypothesis test results

Path analysis	β	T Statistics	P Values
Business saving -> business sustainability	0.131	1.692	0.091
Moderating Effect FL for BS*S -> business sustainability	-0.158	2.912	0.004
financial inclusion -> Business saving	0.132	2.791	0.005
financial inclusion -> business sustainability	0.108	3.502	0.001
financial literacy -> Business saving	0.848	19.539	0.000
financial literacy -> business sustainability	0.418	4.327	0.000
financial inclusion -> Business saving -> business sustainability	0.017	1.404	0.161
financial literacy -> Business saving -> business sustainability	0.111	1.674	0.095

The structural test results reveal several key findings. Firstly, financial literacy exerts the strongest and most significant impact on both business savings ($\beta=0.848$; $p=0.000$) and business sustainability ($\beta=0.418$; $p=0.000$), indicating that higher financial literacy among MSME actors increases their propensity to save and to sustain their businesses. Secondly, financial inclusion also significantly affects these two variables, though with a smaller coefficient. The direct link between business savings and business sustainability is significant. Furthermore, the moderating effect of financial literacy on the relationship between business savings and business sustainability is significant but negative ($\beta=-0.158$;

$p=0.004$), suggesting that higher financial literacy may alter or diminish the positive impact of business savings on business sustainability.

The mediating effect of business savings on the relationship between financial inclusion and business sustainability is not significant ($p=0.161$), while the mediation between financial literacy and business sustainability demonstrates marginal significance ($p=0.095$). This provides an initial indication that business savings could serve as a potential indirect pathway in supporting business sustainability driven by financial literacy.

4.2. Discussion

The findings of this research indicate that financial inclusion significantly influences both business savings ($\beta=0.132$; $p=0.005$) and business sustainability ($\beta=0.108$; $p=0.001$). These results affirm that convenient access to formal financial services, including savings, credit, and digital transactions, enables MSME owners to manage their business finances more effectively. These results are in line with studies conducted by Pandey et al. (2025) and Song et al. (2025), which stated that financial inclusion directly increases the financial managerial capacity and operational efficiency of MSMEs. In the context of culinary MSMEs in Central Java, access to financial services is an important instrument in supporting business resilience and adaptation to local market dynamics.

Moreover, financial literacy has been shown to have a very strong direct effect on both business savings ($\beta=0.848$; $p=0.000$) and business sustainability ($\beta=0.418$; $p=0.000$). This demonstrates that MSME owners' understanding of essential financial principles, such as interest, risk, and inflation, along with their ability to make prudent financial choices, greatly improves saving behavior and strengthens business resilience. These findings are consistent with the research of Ahmad et al. (2024) in Jordan and Charfeddine et al. (2024) in Qatar, both of which emphasize the vital importance of financial literacy as a foundation for rational financial practices and long-term business growth. Within the framework of the SDGs, financial literacy supports SDG 8 (Decent Work and Economic Growth) by enhancing the productivity and resilience of small business owners.

The direct influence between business saving and business sustainability shows significance at the 90% confidence level. ($\beta = 0.131$; $p = 0.091$) These findings indicate that saving practices have the potential to increase business sustainability, although they are not statistically strong enough at the level of 5%. One possible cause is the quality or purpose of the savings themselves. If savings are only used as passive reserves or are not strategically directed to business development, then the impact on sustainability will be limited. This is in line with the findings of Mpaata et al. (2020) in Uganda, who emphasized that the effectiveness of savings depends on how they are used and the managerial capacity of MSME actors. Therefore, these findings remain relevant to consider in the context of policy interventions.

The mediation test showed that business savings did not significantly mediate the relationship between financial inclusion and business sustainability ($\beta = 0.017$; $p = 0.161$), but had a significant mediating effect on the relationship between financial literacy and business sustainability ($\beta = 0.111$; $p = 0.095$). This indicates that savings have potential as a transition mechanism from financial literacy to business sustainability, although the effect is still weak. These results differ from the findings of Morgan & Long (2020) which shows that saving behavior is an effective path in strengthening the resilience of small businesses. In the context of Central Java, savings seem to play more of a role as a short-term financial buffer than as an instrument of business transformation. This shows the need for additional efforts to encourage the use of savings more strategically and productively by MSME actors.

The results of the moderation test showed that financial literacy moderated significantly but negatively the relationship between business saving and business sustainability ($\beta = -0.158$; $p = 0.004$). These findings are counterintuitive and open up space for critical interpretation. MSME actors with a high level of literacy tend not to rely on savings as the main tool for sustainability, but rather take advantage of other resources such as investment, expansion, or business diversification. This supports the argument of Charfeddine et al. (2024) that high literacy encourages business actors to make more dynamic financial decisions, which are sometimes not in line with conventional saving practices.

Theoretically, this study contributes to the development of a model of the relationship between financial inclusion, financial literacy, and business sustainability by paying attention to the role of mediation and moderation simultaneously. This model expands on previous findings by proving that literacy functions not only as a predictor variable, but also as a reinforcer or even a change in the direction of relationships between variables. In the economic development literature, this approach is important because it emphasizes that strengthening MSMEs is not enough just by providing access to finance, but also by increasing the cognitive and literative capacity of business actors (Baporikar & Akino, 2020; Raharjo et al., 2022).

From the practical side, the results of this study show that MSME empowerment programs should not stop at the aspect of access, but need to simultaneously strengthen financial literacy capacity. Financial literacy training must be directed to equip business actors with evaluative skills—for example, in making investment decisions, managing risk, and using savings strategically. This is supported by studies by Mpaata et al. (2020) and Ahmad et al. (2024), which emphasize that strong financial literacy is able to encourage business actors to allocate resources efficiently and adaptively to market changes. Local governments, financial institutions, and the MSME community can take advantage of the results of this research to design financial education programs that are not only informative but also applicable and contextual.

This research makes a direct contribution to SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation, and Infrastructure). By encouraging the use of financial literacy and inclusion as the foundation for MSME economic empowerment, this model can be a policy reference in encouraging inclusive and sustainable local economic growth. The study by Dong et al. (2025) and Alshammari (2025) also shows that digitalization and financial inclusion have a significant impact on people's economic resilience. If widely applied, this model can also help reduce the gap in access to financial knowledge in developing regions, especially areas with high concentrations of MSMEs such as Central Java.

5. Conclusions

Data analysis from 150 respondents using SmartPLS shows that financial inclusion and financial literacy affect business savings and business sustainability. These findings affirm that a solid understanding of financial principles and access to financial services are the primary factors enabling businesses to achieve sustainable growth. Business savings do not have a direct effect on business sustainability, nor do they mediate the influence of financial literacy or financial inclusion. Additionally, the relationship between business savings and business sustainability is negatively moderated by financial literacy.

The theoretical contribution of this study lies in the development of an integrative model that combines direct effects, mediation, and moderation between financial variables in the context of MSMEs. Practically, this result implies that MSME empowerment policies should not only focus on expanding financial access, but also need to strengthen financial literacy so that business actors are able to make smart and strategic financial decisions. These findings also support the sustainable development agenda through the achievement of SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation and Infrastructure) by empowering MSMEs through an integrated financial approach. The government, financial institutions, and business communities can use the results of this research as the basis for the development of literacy-based intervention programs and financial digitalization.

For further research, it is recommended to further explore factors that can strengthen the effectiveness of business savings as a long-term financial management instrument. In addition, a mixed-methods approach can be used to explore a deeper understanding of the financial behavior of MSME actors qualitatively. The research can also be extended to other MSME sectors or different geographical regions to obtain a stronger generalization of findings. The use of additional variables such as digital finance adoption, risk management, or entrepreneurial orientation can also enrich the model developed in this study.

References

- Ahmad, M., Yaser, A., & Hamshari, M. (2024). Discover Sustainability The impact of financial literacy on financial inclusion for financial well - being of youth: evidence from Jordan. *Discover Sustainability*. <https://doi.org/10.1007/s43621-024-00704-6>
- Ahmed, H. (2025). Crowdfunding and entrepreneurial/SME finance: regulatory framework for financial inclusion. *Journal of Banking Regulation*, 0123456789. <https://doi.org/10.1057/s41261-025-00273-2>
- Alshammari, A. M. (2025). How does financial inclusion influence environmental sustainability in Saudi Arabia? *Energy Strategy Reviews*, 57(December 2024), 101643. <https://doi.org/10.1016/j.esr.2025.101643>
- Azmeh, C. (2025). Bridging divides: the role of Fintech and financial inclusion in reducing poverty and inequality in developing countries. *Innovation and Development*, 10(February), 100277. <https://doi.org/10.1080/2157930X.2025.2467515>
- Baporikar, N., & Akino, S. (2020). Financial Literacy Imperative for Success of Women Entrepreneurship.

International Journal of Innovation in the Digital Economy, 11(3), 1–21.
<https://doi.org/10.4018/ijide.2020070101>

- Brixiová, Z., Kangoye, T., & Yogo, T. U. (2020). Access to finance among small and medium-sized enterprises and job creation in Africa. *Structural Change and Economic Dynamics*, 55, 177–189. <https://doi.org/10.1016/j.strueco.2020.08.008>
- Charfeddine, L., Umlai, M. I., & El-Masri, M. (2024). Impact of financial literacy, perceived access to finance, ICT use, and digitization on credit constraints: evidence from Qatari MSME importers. *Financial Innovation*, 10(1). <https://doi.org/10.1186/s40854-023-00557-4>
- Dong, Q., Balsalobre-Lorente, D., & Syed, Q. R. (2025). The critical role of financial inclusion in green growth: Evidence from BRICS countries. *Research in International Business and Finance*, 76, 102847. <https://doi.org/10.1016/j.ribaf.2025.102847>
- Efriyani Sumastuti, Subur Harahap, G. S. (2024). Exploring the Impact of Green Finance, Financial Literacy, and Social Capital on the Performance and Financial Sustainability of Indonesian MSMEs. *COSTING: Journal of Economic, Business and Accounting Volume*, 7(4), 10869–10886. <https://doi.org/https://doi.org/10.31539/costing.v7i4.9719>
- Joseph F. Hair, J., Ringle, G. T. M. H. C. M., & Sarstedt, M. (2022). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (L. Fargotstein (ed.); Third Edit). SAGE Publishing.
- Maulana, S., Nasution, S. Y., Pramadi, Y., Rusata, T., Hartanto, A., & Hendrix, T. (2024). Conceptual Model on Creative Economy Development of Waterfront Cities in Indonesia: Lesson Learned From Palembang and Surabaya. *Spatium*, 123(51), 21–31. <https://doi.org/10.2298/SPAT231219004M>
- Morgan, P. J., & Long, T. Q. (2020). Financial literacy, financial inclusion, and savings behavior in Laos. *Journal of Asian Economics*, 68, 101197. <https://doi.org/https://doi.org/10.1016/j.asieco.2020.101197>
- Mpaata, E., Koskei, N., & Saina, E. (2020). Financial literacy and saving behavior among micro and small enterprise owners in Kampala, Uganda: The moderating role of social influence. *Journal of Economics, Finance and Accounting Studies (JEFAS)*, 2(1), 22–34. <https://www.al-kindipublisher.com/index.php/jefas/article/view/10>
- Pandey, A., Kiran, R., & Sharma, R. K. (2025). Examining financial inclusion success in north India via financial inclusion drivers, financial literacy and financial initiatives: A variance based-SEM approach. *Journal of Open Innovation: Technology, Market, and Complexity*, 11(2), 100542. <https://doi.org/10.1016/j.joitmc.2025.100542>
- Raharjo, I., Ekawati, M., & Syafitri, W. (2022). Forced migration and household welfare in Indonesia. *Journal of Innovation in Business and Economics*, 6(01), 27–36. <https://doi.org/10.22219/jibe.v6i01.20787>
- Sarstedt, M., & Moisescu, O. I. (2024). Quantifying uncertainty in PLS-SEM-based mediation analyses. *Journal of Marketing Analytics*, 12(1), 87–96. <https://doi.org/10.1057/s41270-023-00231-9>
- Sarstedt, M., Ringle, C. M., Cheah, J. H., Ting, H., Moisescu, O. I., & Radomir, L. (2020). Structural model robustness checks in PLS-SEM. *Tourism Economics*, 26(4), 531–554. <https://doi.org/10.1177/1354816618823921>
- Shashwat, S., Chhabra, M., & Giri, A. K. (2025). Environmental Externalities of Digital Financial Inclusion: a Green Growth perspective. *Discover Sustainability*, 6(1). <https://doi.org/10.1007/s43621-025-00862-1>
- Song, X., Qin, X., Wang, W., & Man Li, R. Y. (2025). Financial inclusion, technologies, and worldwide economic development: A spatial Durbin model approach. *Journal of Finance and Data Science*, 11(March 2024), 100155. <https://doi.org/10.1016/j.jfds.2025.100155>
- Sumastuti, E., Amelia, D. R., & Indriasari, I. (2024). Are Business Savings a Mediator for Culinary Tourism Development? *Economics Development Analysis Journal*, 13(2), 247–258. <https://doi.org/https://doi.org/10.15294/edaj.v13i2.78980>
- Tay, L. Y., Tai, H. T., & Tan, G. S. (2022). Digital financial inclusion: A gateway to sustainable development. *Heliyon*, 8(6), e09766. <https://doi.org/10.1016/j.heliyon.2022.e09766>