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LINKING ENTREPRENEURIAL FINANCIAL LITERACY TO SME OUTCOMES: THE ROLE OF GREEN CAPITAL AND FINANCIAL CONSTRAINTS

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Abstract

This study aims to analyze the influence of entrepreneurial financial literacy, green intellectual capital, access to digital finance tools, and financial constraints on SME financial performance, with financial resilience as a moderating variable. This study is motivated by the importance of strengthening the financial capacity of SMEs in facing funding constraints and economic pressures. The research design uses an explanatory approach through a survey of 260 SME actors and is analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method. The measurement model results show that all constructs meet the validity and reliability requirements. VIF was below the threshold, and HTMT indicated adequate discriminant validity. Structurally, entrepreneurial financial literacy, access to digital finance tools, green intellectual capital, and financial constraints significantly influenced financial performance. However, not all moderating relationships were statistically significant. The R^2 value of 0.585 and Q^2 of 0.432 indicate the model's strong predictive ability. Through Importance-Performance Map Analysis (IPMA), entrepreneurial financial literacy was identified as the top priority for strengthening because it has high importance but moderate performance. The results of this study contribute to understanding the mechanism of improving SME financial performance through financial literacy, digital access, and financial resilience.

Keywords: financial literacy, digital financial access, green intellectual capital, financial resilience, MSME financial performance.

INTRODUCTION

Micro, Small and Medium Enterprises (MSMEs) play a vital role in the Indonesian economy. By 2023, the number of MSMEs is estimated to reach around 66 million units, contributing 61% to the national Gross Domestic Product (GDP), which reached IDR 9,580 trillion, and absorbing around 117 million workers, covering 97% of the total labor force (Mashita & Anggresta, 2022; Sarfiah et al., 2019). In this context, MSMEs not only serve as the driving force of economic growth, but also as the main driver in creating jobs and distributing income more equitably in society (Hartika et al., 2023; Yahya et al., 2023).

In a regional context, data from West Java Province shows that the number of MSMEs increased from 6,644,548 units in 2022 to 7,055,660 units in 2023, or grew by 6.18% (Budhi et al., 2022). This growth is particularly pronounced in the East Priangan region, which includes Tasikmalaya, Garut, Ciamis, Banjar and Pangandaran. Local governments and institutions such as OJK Tasikmalaya are actively conducting financial literacy and inclusion education through intensive programs, in line with the spirit of digital transformation and sustainability. For example, through the Pagelaran Kreasi Priangan Timur and Puspa Kriya 2024 events, more than 60 MSMEs were facilitated with digital payment systems such as QRIS and BI-Fast, reflecting the accelerated adoption of financial technology at the grassroots level (depostjabar, 2024). On the other hand, the Bank Indonesia Tasikmalaya initiative also encourages the application of Green Intellectual Capital (GIC) concepts, such as green process and green output, as part of a sustainable MSME development strategy (radartasik, 2025).

In today's digital era, the use of technology and digital is an important key in driving the growth of MSMEs. Research shows that the implementation of digital strategies can significantly increase market reach and product sales (Amalia, 2023; Hilmianà & Kirana, 2021). This is reinforced by the ability of MSMEs to utilize digital media to expand interactions with consumers and respond to changing market trends and demands (Chairi et al., 2022). On the other hand, financial literacy and digital accounting are also considered to contribute to the effectiveness of financial management and business decision-making, which ultimately improves the welfare of MSME actors (Ayuningtyas & Utomo, 2023; Purwantini et al., 2023).

Financial performance is a key indicator in assessing the health and sustainability of MSME businesses (Sudaryanti et al., 2025). Problems such as low profitability, high fixed and variable costs, and difficulty maintaining positive cash flow have been found in many regions, including East Priangan (Almansour et al., 2019; Halabi et al., 2010; Hamzah et al., 2023). Low managerial capacity and financial literacy are the main factors that hinder the ability of MSME actors to prepare adequate financial reports and plan financial strategies effectively (Mukarromah et al., 2020; Sudaryanti et al., 2025).

East Priangan, which includes areas such as Tasikmalaya, Garut, Ciamis, Banjar and Pangandaran, is an area with rapid growth of MSMEs. However, this rapid growth has not been fully accompanied by improved financial literacy and managerial capacity of business actors. Many MSME actors still have difficulties accessing working capital, managing cash flow, and assessing investment feasibility (AH Munawar et al., 22 C.E.; Munawar et al., 2023; Rosliyati & Iskandar, 2022; Zuryati, 2021). The inability to prepare accurate financial reports is a major obstacle for business actors in accessing financing from financial institutions (AH Munawar et al., 22 C.E.; Astuti & Soleha, 2023; Rinofah et al., 2022).

Strong financial literacy can be a catalyst for improving the financial performance of MSMEs. Business owners who understand basic financial principles can better plan investments, manage working capital, and assess business risks (Fajri et al., 2021; Nindy, 2021; Rachmawati, 2024). Therefore, various financial literacy education and training efforts are important to strengthen the adaptability and sustainability of MSMEs, especially in developing regions such as East Priangan (Dwyanti, 2024; Kaboka, 2023; Rahmajati & Kusuma, 2023).

In the era of sustainability, Green Intellectual Capital (GIC) is an important aspect in shaping an environmentally friendly and efficient MSME business model. GIC consists of three main components, namely green human capital, green structural capital, and green relational capital (Y. Chen, 2007; Yong et al., 2019). GIC helps firms develop innovation and efficiency through sustainable resource utilization and building supportive relationships with the external environment (Ang & Mon, 2022; Sahid & Henny, 2023). However, the application of GIC in Indonesian MSMEs still encounters major obstacles, such as limited resources, lack of knowledge, and access to adequate technology (Chaerani & Firmansyah, 2024; Gusneli et al., 2023; Widyaningsih & Widodo, 2024).

Along with digital transformation, access to digital financial tools such as fintech, e-wallets, mobile banking, and Point of Sale (POS) systems is also an important factor affecting transaction efficiency and access to finance for MSMEs (Karim et al., 2020; Ming & Jais, 2022). Research shows that financial literacy plays an important role in facilitating the adoption of these technologies, as businesses with high literacy are quicker to adopt and utilize these technologies (Mujiyana et al., 2022; Rahi et al., 2023; Ulum & Solekah, 2024). The factors of ease of use of applications and trust in digital systems are determinants in increasing the effectiveness of their use (Fadhilah & Darmawati, 2023; Narendrar et al., 2023; A. U. Putri et al., 2023).

However, financial constraints remain a significant challenge for MSMEs. Limited access to formal financing due to collateral requirements, the ability to prepare financial reports, and business feasibility, makes it difficult for many MSMEs to obtain financial support (Juwarso et al., 2023; Kiring'a et al., 2021; Rifa'i, 2017). In addition, from an internal perspective, there are still many MSME actors who do not have a good financial recording system or an understanding of the evaluation of investment feasibility (Andrean, 2023; Noerhidajati & Fahruroji, 2023).

The condition of MSMEs in East Priangan reflects this complexity. Despite quantitative growth in the number of MSMEs (Budhi et al., 2022), challenges in financial literacy, GIC implementation, financial technology adoption, and financing constraints remain key barriers (Aditya et al., 2023; Rahoyo et al., 2023; Ratnasari et al., 2023). Therefore, an integrative research approach is needed that simultaneously examines the effect of financial literacy on the financial performance of MSMEs, taking into account the mediation of GIC and digital financial access, as well as the moderation of financial constraints.

This study aims to fill this gap by building a comprehensive model of the relationship between these variables in the context of MSMEs in East Priangan. The findings of this study are expected to provide theoretical contributions in the development of MSME financial management literature as well as practical implications for the formulation of policies and strategies to strengthen the capacity of MSME actors in developing regions.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Entrepreneurial financial literacy (EFL) plays an important role in improving the financial performance of MSMEs as it provides in-depth managerial understanding related to cash flow management, financial statement preparation, investment planning, and strategic decision making (Dwyanti, 2024; Kaban & Safitry, 2020; Rahmawati et al., 2023). Research shows that EFL significantly supports profitability, prevents businesses from common mistakes such as overtrading and wasting costs (Rahmawati et al., 2023), and strengthens business foundations through systematic training (Idawati & Pratama, 2020). Furthermore, financial literacy facilitates the recognition of new opportunities that act as mediators in improving MSME competitiveness in the market (Anwar et al., 2020; Harmadji et al., 2022). In relation to modern business transformation, EFL also contributes to the effectiveness of technology adoption and financial inclusion, thereby strengthening resource management and adaptability to market dynamics (Fikri & Nahda, 2023; Gunawan et al., 2023). Therefore, entrepreneurial financial literacy is believed to have a positive effect on the financial performance of MSMEs.

H1: Entrepreneurial Financial Literacy has a positive effect on the financial performance of MSMEs.

Entrepreneurial Financial Literacy (EFL) plays a strategic role in driving the formation of Green Intellectual Capital (GIC), as good financial literacy enables entrepreneurs to understand the long-term implications of green investments and design sustainable business strategies (Ang & Mon, 2022; Sahid & Henny, 2023). This knowledge supports the development of green human capital through increased competence and environmental awareness, and green structural capital through operational systems and procedures that support environmental efficiency and compliance (Sahid & Henny, 2023). Entrepreneurs with high EFL also tend to be better able to build green relational capital through external networks that support the green business ecosystem, enhancing reputation and cross-sector collaboration (Ang & Mon, 2022; Bansal et al., 2019). Overall, financial literacy not only strengthens financial management, but also provides the foundation for strategically managing GICs as part of a commitment to sustainable business practices (Ang & Mon, 2022; Belz & Binder, 2015).

H2: Entrepreneurial Financial Literacy has a positive effect on Green Intellectual Capital.

Entrepreneurial Financial Literacy (EFL) plays a crucial role in encouraging access to and adoption of digital financial tools by MSME players as adequate understanding of the benefits, risks, and mechanics of services such as mobile banking, e-wallets, and Point of Sale applications increases

users' readiness and intention to adopt financial technology (Hermawan et al., 2022). Studies by Hermawan et al. and Addo & Asante show that high financial literacy promotes positive attitudes towards digital payments and the ability to analyze alternative sources of financing (Addo & Asante, 2023; Hermawan et al., 2022). In addition, (Zaniarti et al., 2022)emphasized that low literacy creates barriers to accessing loans, while adequate literacy levels allow MSME actors to optimize access to digital finance which has an impact on business performance (Bakashaba et al., 2024b). Ease of use and trust in technology are also influenced by literacy, which accelerates user adaptation to digital platforms (Ferli, 2023; R. Li & Qian, 2019). Thus, EFL not only improves internal financial management capabilities, but also strengthens the capabilities of MSME actors in exploring and effectively utilizing technology-based financing opportunities (Bakashaba et al., 2024b).
H3: Entrepreneurial Financial Literacy has a positive effect on Access to Digital Finance Tools.

Green Intellectual Capital (GIC) contributes significantly to improving the financial performance of MSMEs because it reflects sustainability-oriented intellectual assets through the optimization of human resources, internal systems, and environmentally-based external relationships (Y. Chen, 2007; Yong et al., 2019). GIC consists of green human capital, green structural capital, and green relational capital, which collectively support operational efficiency, process innovation, and competitive business reputation (Ang & Mon, 2022; Sahid & Henny, 2023). Research shows that the development of green competencies among MSME actors strengthens adaptive and innovative capacity, while environmentally oriented business structures and networks promote cost efficiency and increased consumer loyalty (Chaerani & Firmansyah, 2024; Widyaningsih & Widodo, 2024). In addition, GIC implementation is proven to improve financial performance through more socially and environmentally responsible business processes, resulting in long-term competitive advantage (Amalia, 2023; Gusneli et al., 2023). Thus, the higher the implementation of GIC, the greater the potential for MSMEs to achieve better and more sustainable financial performance.
H4: Green Intellectual Capital has a positive effect on the financial performance of MSMEs.

Access to digital financial tools has a positive effect on the financial performance of MSMEs because it allows businesses to obtain faster, cheaper, and more accessible financial services such as e-wallets, mobile banking, and fintech platforms, which have a direct impact on operational efficiency and better decision making (Bakashaba et al., 2024a; Lu et al., 2021; Yu et al., 2023). Research (Lu et al., 2021)confirms that digital financial inclusion can overcome financing constraints and encourage investment, while (Bakashaba et al., 2024a)shows that access to digital financing is positively correlated with improved business performance. (Gaglio et al., 2022)also emphasized that digitalization allows MSME actors to improve productivity and process innovation, thereby increasing the efficiency and accuracy of financial records. Furthermore, (Yu et al., 2023)state that digital inclusive finance optimizes resource allocation and bridges the information gap, strengthening MSMEs' ability to explore financing alternatives. Thus, financial digitalization is proven to not only support short-term efficiency, but also sustainably strengthen the profitability and financial stability of MSMEs.
H5: Access to Digital Finance Tools has a positive effect on the financial performance of MSMEs.

The sixth hypothesis emphasizes that Financial Constraints (FC) may moderate the relationship between Entrepreneurial Financial Literacy (EFL) and financial performance of MSMEs, as limited access to funds often hinders the application of financial knowledge in business practices. Although EFL is believed to improve performance, research shows that financial constraints can limit the effectiveness of literacy-based business decisions (Hussain et al., 2018). (Fatoki, 2021)also asserts that although entrepreneurs have high financial knowledge, limitations in financing remain a significant obstacle to strategic decision making, especially in the small business sector. This is reinforced by (Yanto et al., 2022), which shows that working capital and strict collateral requirements limit MSME actors in implementing financial strategies. (Dwyanti, 2024; Tuffour et al., 2020)state that the benefits of financial literacy will be maximized only if structural barriers to access to finance are reduced. Thus, FC serves as a variable that weakens the positive effect of EFL on performance, and should be taken into account in any strategy to improve financial literacy of MSMEs (Amri & Iramani, 2018).

H6: Financial Constraints moderate Entrepreneurial Financial Literacy on Financial Performance of MSMEs

The seventh hypothesis states that Financial Constraints (FC) moderate the relationship between access to digital financial tools and financial performance of MSMEs, as limited capital, high service fees, or low credit scores may hinder optimal utilization of financial technologies such as e-wallets, mobile banking, and fintech (Lu et al., 2021). Lu et al.'s research shows that while digital financial inclusion can reduce financing barriers, limited start-up funds remain a significant barrier to its implementation. (Yang et al., 2022)emphasize that investor confidence and capital capacity largely determine the effectiveness of using digital financial tools, while financial limitations can reduce their impact on business performance. (Ozili, 2018)also noted that financial technology does help improve transaction processes and financial management, but is unable to fully make up for the lack of working capital. Therefore, FC is seen as a moderating variable that can weaken or hinder the positive effect of digital financial access on overall MSME performance (Ozili, 2018; Yang et al., 2022).

H7: Financial Constraints moderate Digital Finance Tools on Financial Performance of MSMEs

RESEARCH METHODS

This research was conducted using a quantitative approach, focusing on Micro, Small and Medium Enterprises (MSMEs) in the East Priangan region of West Java Province, Indonesia. The research area covers districts and cities such as Tasikmalaya, Garut, Ciamis, Banjar, and Pangandaran, which are known as areas with a high intensity of MSME activities and a wide variety of business sectors. However, MSMEs in this region also face various constraints, especially related to limited access to financing and pressure from various stakeholders.

The sample in this study was obtained through a stratified probability sampling technique based on regional division, taking into account the number of MSMEs and their proportions in each region as a reference.

Table 1. Number of MSMEs in East Priangan

District/City	Total Population	Percentage
Garut district	69.365	28.80%
Tasikmalaya Regency	77.632	32.24%
Ciamis Regency	30.454	12.65%
Tasikmalaya City	26.706	11.09%
Pangandaran Regency	32.043	13.31%
Banjar City	4.609	1.91%
Total	240.809	100%

Source: Office of Cooperatives and MSMEs in the East Priangan region in 2024

The types of MSMEs focused on in this study include the culinary, fashion, handicrafts, and agribusiness sectors-sectors that generally dominate in each of the regions studied. The respondents selected are owners or managers of MSMEs who have a direct role in decision-making related to finance and business operations. The distribution of MSMEs in the study areas is recorded as follows: Garut Regency accounts for 28.8% of the total MSME population, followed by Tasikmalaya Regency at 32.24%, Ciamis at 12.65%, Tasikmalaya City at 11.09%, Pangandaran at 13.31%, and Banjar at 1.91%. These proportions are used as a reference in determining the number of samples in each region as shown in Table 2.

Table 2. Planned areas and number of respondents taken

No.	District/City	Proportion	Number of Respondents
1	Garut district	28.80%	86
2	Tasikmalaya Regency	32.24%	97
3	Ciamis Regency	12.65%	38
4	Tasikmalaya City	11.09%	33
5	Pangandaran Regency	13.31%	40
6	Banjar City	1.91%	15
	Total	100%	315

Data Collection Techniques and Instruments

Data were collected through a structured questionnaire developed from indicators of research variables based on previous literature. Each variable was measured using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), with details as follows:

1. Entrepreneurial Financial Literacy (EFL): Financial knowledge (indicators: understanding the concepts of interest, inflation, money management, and investment); financial behavior (indicators: recording transactions, preparing budgets, and managing business finances regularly); financial attitudes (indicators: Having a positive view of the importance of financial planning and decision-making) (Chaidir et al., 2020; Idawati & Pratama, 2020; N. L. D. M. E. Putri et al., 2022).
2. Green Intellectual Capital (GIC): Green Human Capital (Employee knowledge and skills in sustainable business practices, as well as green innovation); Green Structural Capital (Organizational systems, procedures and culture that support environmental sustainability and process efficiency); Green Relational Capital (Relationships with stakeholders that support environmentally friendly practices and green business reputation) (Hina et al., 2024; Rauf et al., 2023; Tekala et al., 2024);
3. Access to Digital Finance Tools (ADFT): Accessibility (Ease of access to services such as mobile banking and e-wallets; digital skills of users); Usage (Frequency and intensity of use of digital finance tools in MSME operations; Trust (Level of confidence in the security, reliability, and convenience of using digital services) (W. Li & Pang, 2023; Sensen, 2023; Tanapaisankit et al., 2024).
4. Financial Constraints (FC): Access to Financing (Ease of obtaining loans or business capital from financial institutions); Financing Costs (Interest rate or other fees charged for obtaining financing); Financing Requirements (Requirements and eligibility criteria that must be met to obtain financing) (C. Chen et al., 2023; Lu et al., 2021; Sun & Wong, 2024).
5. SME Financial Performance (SFP): Profitability (Level of profit, net profit margin, and revenue growth); Liquidity (Ability to meet short-term obligations based on business perception (e.g., enough cash to pay bills); Operational Efficiency Management of costs and resources to produce optimal output) (Beraha et al., 2023; Hidayat & Muniroh, 2021; Karadağ, 2015).

Here is the research model:

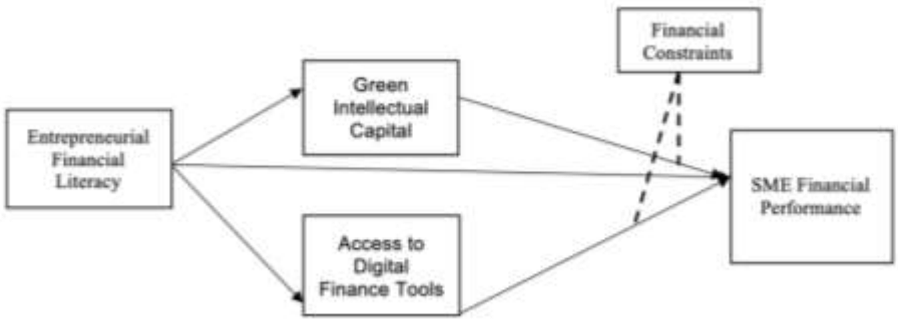


Figure1. Research Model

Data Analysis Technique

This research uses a quantitative approach with the Structural Equation Modeling-Partial Least Squares (SEM-PLS) analysis technique run using SmartPLS software. The SEM-PLS method was chosen because it is able to handle complex models, with a relatively large number of indicators, and is suitable for data that does not meet the assumptions of multivariate normal distribution (Hair et al., 2017). The analysis process in SEM-PLS is carried out in two main stages: first, testing the measurement model (outer model) to assess construct validity and reliability; second, testing the structural model (inner model) to evaluate the relationship between latent constructs in the model.

The structural model built in this study involves two exogenous variables, namely Financial Constraints (FC) and Stakeholder Pressure (SP), one mediating variable, namely Access to Finance (AF), one endogenous variable, namely Financial Performance (FP), and one moderating variable, namely Financial Resilience (FR).

In principle, SEM-PLS is a multivariate analysis method that combines factor analysis, *path analysis*, and regression into one integrated analysis framework. The advantage of this approach compared to classical statistical methods lies in its ability to identify latent construct indicators, test the validity and reliability of measuring instruments, and evaluate the suitability of theoretical models with field data. In addition, SEM-PLS can be used even though the data is not multivariate normally distributed and is able to test the causal relationship between variables simultaneously (Ghozali, 2013; Hair et al., 2021).

The general steps in applying SEM consist of seven stages (Ghozali, 2013): (1) formulate a model based on theory; (2) develop a path diagram of the relationship between variables; (3) formulate structural model specifications; (4) select data and estimation methods; (5) test model identification; (6) assess model *goodness of fit*; and (7) interpret the results and make model modifications if necessary.

As a complement, this research also uses the Importance-Performance Map Analysis (IPMA) approach to provide a more in-depth picture of the importance and performance of each construct in the model. IPMA is useful for assessing the extent to which independent constructs contribute to the dependent variable, as well as helping to identify strategic priorities in performance improvement. Through IPMA, researchers can determine which areas need more attention and strategize resource allocation more efficiently in order to support the improvement of MSME performance (Hair et al., 2021; Ringle & Sarstedt, 2016).

RESULTS AND DISCUSSION

Measurement Model

Evaluation of the measurement model in this study was carried out to assess construct quality through validity and reliability testing, which includes convergent validity, discriminant validity, and internal reliability (Hair et al., 2022). Convergent validity is assessed through the outer loading value and Average Variance Extracted (AVE). All indicators in this study have an outer loading value that exceeds 0.70, indicating that each indicator has a significant contribution in explaining its respective latent construct. In addition, the AVE value of all constructs also exceeds the threshold value of 0.50, with values ranging from 0.779 to 1.000, indicating that the constructs are able to explain more than half of the variance of the forming indicators.

Construct reliability was reviewed using Composite Reliability (CR) and Cronbach's Alpha values. The results show that all constructs have CR values above 0.90 and Alpha values above 0.94, indicating excellent internal reliability. For example, the Access to Digital Finance Tools construct has a CR value of 0.970 and Alpha of 0.961; while the Entrepreneurial Financial Literacy construct has a CR value of 0.961 and Alpha of 0.951. These values indicate strong internal consistency between indicators within each construct. Discriminant validity was examined with the Heterotrait-Monotrait ratio (HTMT). The HTMT results show that all inter-construct values are well below the conservative threshold of 0.90, which confirms that each construct has good concept differentiation and can be empirically distinguished (Hair et al., 2022). In addition, the multicollinearity test is carried out by analyzing the Variance Inflation Factor (VIF) value. All VIF values are below the threshold of 5, ranging from 2.984 to 4.699. This indicates that there are no serious symptoms of multicollinearity between indicators in the model, so parameter estimates can be considered stable and accurate. Overall, the results of the measurement model evaluation in this study show that all constructs meet the validity and reliability criteria, so it can be concluded that the measurement model used is feasible to proceed to the structural model testing stage. Collinearity evaluation is conducted before analyzing structural relationships to ensure that regression results are unbiased. This test uses the Variance Inflation Factor (VIF) value. All VIF values are below the threshold of 5, with a range between 1,000 and 4,699, so there is no multicollinearity problem in the model (Hair et al., 2022).

Furthermore, the structural model is evaluated through four main indicators, namely the coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and path coefficients. The R^2 value shows that the Access to Digital Finance Tools construct can be explained by Entrepreneurial Financial Literacy by 0.035, and the Green Intellectual Capital construct is explained by EFL by 0.014. Meanwhile, the SME Financial Performance construct is explained by other exogenous constructs by 0.585, which shows a strong explanatory power. The effect size (f^2) shows that Access to Digital Finance Tools has a large effect on SME Financial Performance (f^2 = 0.509), and Entrepreneurial Financial Literacy also has a large effect on SME Financial Performance (f^2 = 0.469). Financial Constraints had a moderate effect (f^2 = 0.154), while Green Intellectual Capital (f^2 = 0.131) was close to moderate. The moderating relationship showed a very small effect ($f^2 < 0.02$). Predictive relevance (Q^2) was also tested through crossed redundancy. The Q^2 value for the Access to Digital Finance Tools construct is 0.027, Green Intellectual Capital is 0.011, and SME Financial Performance is 0.432. Because all Q^2 values > 0, this model has a fairly good predictive ability for endogenous constructs (Hair et al., 2022).

Table 3. Hypothesis Testing Results

Hypothesis	Construct Relationship	Coefficient (β)	T-Statistic	VIF	p-value	Supported?
H1	Entrepreneurial Financial Literacy → Access to Digital Finance Tools	0,186	2,112	3,856	0,035	Yes
H2	Entrepreneurial Financial Literacy → Green Intellectual Capital	-0,120	1,013	4,537	0,312	No
H3	Entrepreneurial Financial Literacy → SME Financial Performance	0,468	5,989	4,202	0,000	Yes
H4	Access to Digital Finance Tools → SME Financial Performance	0,469	6,502	4,699	0,000	Yes
H5	Financial Constraints → SME Financial Performance	0,278	3,459	4,352	0,001	Yes
H6	Green Intellectual Capital → SME Financial Performance	0,240	3,078	4,091	0,002	Yes

H7	ADFT × FC → SME Financial Performance	0,052	0,654	1,000	0,514	No
H8	GIC × FC → SME Financial Performance	-0,006	0,090	1,000	0,929	No

Source: SmartPLS output, 2025

Path Coefficients

Path coefficient analysis was conducted using the bootstrapping method at the 95% significance level. The test results show that of the eight hypotheses proposed, five hypotheses are statistically supported ($t > 1.96$ and $p < 0.05$), while the other three hypotheses are not supported because they do not meet the significance threshold.

The direct relationship between Entrepreneurial Financial Literacy (EFL) and Access to Digital Finance Tools (ADFT) shows a significant positive effect (β = 0.186; t = 2.112; p = 0.035). This indicates that the higher the level of financial literacy of entrepreneurs, the greater the likelihood of MSME actors to utilize digital financial technology. Good financial literacy promotes understanding of the risks and benefits of digital tools, and increases the confidence to use them (Addo & Asante, 2023; Hermawan et al., 2022). These findings support the view that financial literacy is not only important for internal financial management, but also in the adaptation of financial technology, especially among MSME actors who often face limited information and access.

EFL also has a significant effect on SME Financial Performance (β = 0.468; t = 5.989; p < 0.001), indicating that improved financial literacy capacity has a direct impact on SME financial performance. Adequate knowledge in managing cash flow, budgeting and investment decision-making is key in creating efficiency and profitability. This result is in line with previous studies that confirm that financial literacy is one of the determining factors in achieving financial success, especially in small-scale business entities that tend to rely on internal capabilities in financial management (Elouaourti & Ezzahid, 2022; Mabula & Dong, 2018).

Meanwhile, Access to Digital Finance Tools has a significant influence on SME Financial Performance (β = 0.469; t = 6.502; p = 0.000). This indicates that the higher the utilization of digital finance tools, such as e-wallets or mobile banking, the greater the likelihood of achieving optimal financial performance. This is because financial technology supports efficiency, transparency and speed of transactions, which in turn improves firms' liquidity and financial control (Bakashaba et al., 2024a; Lu et al., 2021; Yu et al., 2023). These results strengthen the evidence that digitization of financial services positively contributes to MSMEs' competitiveness in managing resources effectively.

A positive effect was also found for Financial Constraints on SME Financial Performance (β = 0.278; t = 3.459; p = 0.001), which is somewhat unusual when compared to previous literature. In this context, the finding could be interpreted that financial constraints encourage higher internal efficiency or adaptive strategies in business management, for example through strict cost control or increased labor productivity. However, this still requires further investigation, as most previous studies generally show a negative effect of financial constraints on performance (Herawansyah et al., 2024).

Furthermore, Green Intellectual Capital (GIC) also shows a significant positive effect on SME Financial Performance (β = 0.240; t = 3.078; p = 0.002). This finding suggests that the integration of sustainable values and environmental sustainability in the firm's managerial system supports the achievement of operational efficiency and positive reputation, which ultimately impacts on performance improvement (Ang & Mon, 2022; Sahid & Henny, 2023). This is in line with the triple bottom line approach to business management, where environmental and social aspects add value to financial performance.

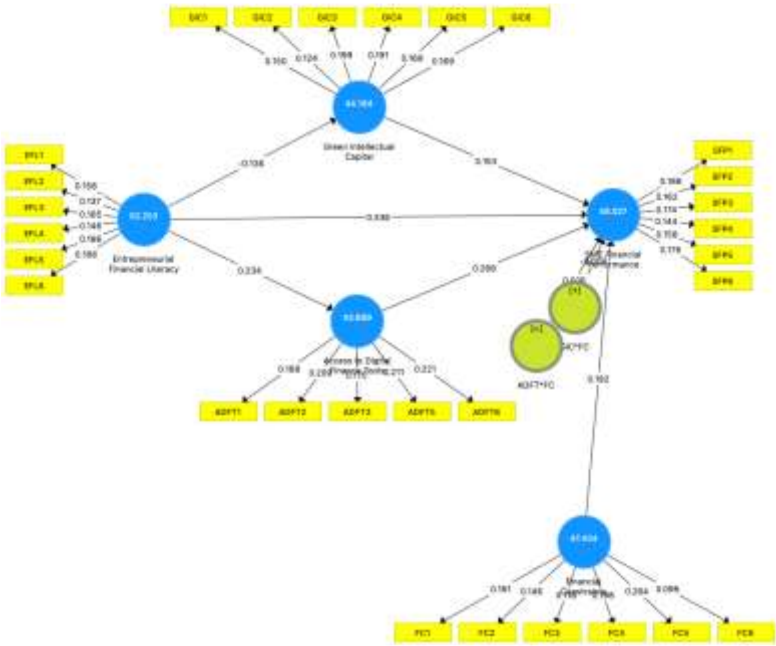
In contrast, EFL has no significant effect on GIC (β = -0.120; t = 1.013; p = 0.312), indicating that the financial capability of businesses has not directly translated into environmentally oriented intellectual capital. This could be due to low awareness or incentives to integrate green principles in business management, or a lack of understanding that financial literacy can also include sustainability dimensions.

The test results of moderation interaction also show that:

a) ADFT × FC on SME Financial Performance is not significant (β = 0.052; t = 0.654; p = 0.514),
b) GIC × FC on SME Financial Performance is also not significant (β = -0.006; t = 0.090; p = 0.929).

This means that under the conditions of this study, the interaction between access to digital finance and green intellectual capital with financial constraints does not have a significant additional effect on financial performance. This may reflect that financial constraints are not sufficient to make the effects of these factors statistically clear. As noted by (Aguinis et al., 2005), moderating effects are often small and difficult to detect in PLS-SEM structural models, except with very large sample sizes or robust experimental designs.

Thus, of the eight hypotheses tested, five (H1, H3, H4, H5, and H6) were statistically supported, while the other three (H2, H7, and H8) did not receive empirical support.



(Source: SmartPLS output, 2025, processed by the author)

Figure 2. Visualization of the Structural Model

IPMA

Importance-Performance Matrix Analysis (IPMA) is used in this study to identify constructs that have a major influence (high importance) on the financial performance of MSMEs but still show an unoptimal level of performance. This analysis is useful for providing strategic direction for targeted performance improvement efforts (Hair et al., 2021). The target construct in this IPMA is SME Financial Performance (Y).

Based on the IPMA results, the construct with the highest importance value to SME Financial Performance is Entrepreneurial Financial Literacy (EFL) at 0.378, followed by Access to Digital Finance Tools (ADFT) at 0.268, Financial Constraints (FC) at 0.192, and Green Intellectual Capital (GIC) at 0.153. On the other hand, in terms of performance, the construct with the highest score was achieved by Entrepreneurial Financial Literacy (52.203), followed by Financial Constraints (47.434), Green Intellectual Capital (44.184), and Access to Digital Finance Tools (43.699).

The combination of high importance and low performance on constructs such as Access to Digital Finance Tools and Green Intellectual Capital suggests that these areas are strategic opportunities for improvement interventions. Improvements to these two constructs have the potential to have a significant impact on strengthening the financial performance of MSMEs. Meanwhile, while Entrepreneurial Financial Literacy is already the highest performing construct, its high importance suggests that further improvements on this construct will remain relevant to strengthen overall performance outcomes.

On the other hand, although Financial Constraints has a smaller effect than other constructs, its suboptimal performance still indicates that there is room for policy improvement, especially in terms of reducing barriers to access to finance. Overall, these findings provide strategic inputs for policy makers and MSME actors to prioritize resource allocation and strengthening programs in areas that have a high impact but have not yet achieved ideal performance.

Table 4. Results of IPMA on SME Financial Performance (Y)

Construct	Importance	Performance
Access to Digital Finance Tools	0,268	43,699
Entrepreneurial Financial Literacy	0,378	52,203
Financial Constraints	0,192	47,434
Green Intellectual Capital	0,153	44,184

Source: IPMA SmartPLS output (2025), processed by the author

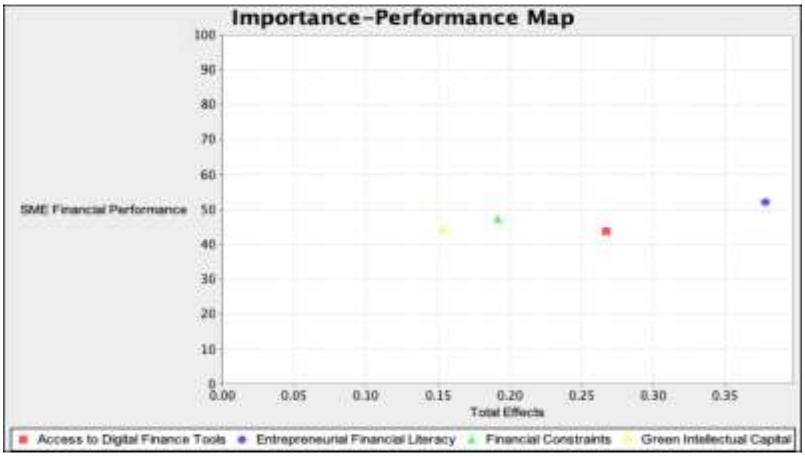


Figure 3. Visualization of IPMA

The IPMA scatter plot map in Figure 2 shows the relationship between the total effects (importance) on the X-axis and the average construct performance scores on the Y-axis. The dotted line marks the average of the two dimensions, dividing the area into four quadrants. The Entrepreneurial Financial Literacy construct is in the upper right quadrant, indicating that it is a top strategic priority. The Access to Digital Finance Tools and Green Intellectual Capital constructs are in the high importance - low performance zone, signaling the need for improvement. Meanwhile, Financial Constraints lies in an area that remains relevant to mitigate in order to avoid negative impacts on the financial performance of MSMEs.

CONCLUSION

This study integrates the constructs of Entrepreneurial Financial Literacy, Access to Digital Finance Tools, Green Intellectual Capital, Financial Constraints, and Financial Resilience in a conceptual model to explain the key factors that influence the financial performance of MSMEs. The main focus is on how financial literacy, access to digital financial services, and green intellectual capital can strengthen the financial resilience of MSMEs, especially in the face of increasingly complex financing pressures.

The findings show that Financial Constraints have a significant negative impact on financial performance, reinforcing the assumption that funding constraints remain a major challenge for MSMEs. In contrast, Entrepreneurial Financial Literacy, Access to Digital Finance Tools, and Green Intellectual Capital have a significant positive impact on improving financial performance, signaling the importance of strengthening the internal aspects of MSMEs to build more resilient financial competitiveness.

Meanwhile, Financial Resilience is proven to have a significant role in influencing financial performance directly. However, the moderation test shows that Financial Resilience does not strengthen the relationship between Access to Digital Finance Tools or Green Intellectual Capital on financial performance. Interestingly, the interaction between Financial Resilience and Financial Constraints actually strengthens the negative impact on financial performance, indicating that in situations of severe financial stress, financial resilience has not been able to fully offset the burden caused by limited access to funding.

Quantitatively, the model showed good explanatory power, with an R^2 value of 0.585 for financial performance, as well as a Q^2 of 0.432 indicating strong predictive relevance of the endogenous constructs. The IPMA results also confirmed that Entrepreneurial Financial Literacy has the highest importance with relatively good performance, while Access to Digital Finance Tools and Green Intellectual Capital are priority areas for improvement due to their low performance but significant impact on performance.

Thus, this study provides theoretical and practical contributions. Theoretically, this model enriches the literature on MSME financial strategies with a multidimensional approach. Practically, the results of this study can be used as a basis for policy formulation that focuses on improving financial literacy, digitizing financial services, and strengthening sustainability-based intellectual capital to improve the financial resilience of MSMEs amid challenging economic dynamics.

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