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Influence Financial Technology, E-Commerce Adoption, and Entrepreneurial Skills on Financial Performance MSMEs With Financial Literacy and Trust As Variables Mediation Studies Cases in North Sulawesi MSMEs

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ABSTRACT
The present investigation seeks to analyze the impact of financial technology, e-commerce adoption, and entrepreneurial capability on the financial performance of Micro, Small, and Medium Enterprises (MSMEs) in North Sulawesi Province, considering both direct effects and indirect effects mediated by financial literacy and trust. A quantitative methodology characterized by a causal research design was utilized, employing a cross-sectional survey approach with a sample of 400 MSME participants selected via purposive sampling. The data were subjected to analysis through descriptive statistics and Partial Least Squares-Structural Equation Modeling (PLS-SEM), facilitated by the SmartPLS 4 software. The results demonstrate that financial technology, e-commerce adoption, and entrepreneurial competencies exert a positive and statistically significant direct influence on MSME financial performance, with financial technology identified as the most influential predictor. Additionally, financial literacy and trust were found to significantly mediate the associations between these three independent variables and MSME financial outcomes. The proposed model accounts for 60.3% of the variance observed in MSME financial performance. These findings highlight the critical necessity of enhancing fintech and e-commerce adoption, alongside fostering improvements in financial literacy and the trust of MSME actors in digital platforms, to maximize financial performance.

***Keywords:* E-Commerce Adoption, Financial Technology Entrepreneurial Skills, Financial Literacy, Trust MSME Financial Performance**

INTRODUCTION

The role of Micro, Small, and Medium Enterprises (MSMEs) is crucial as the main driving force of the Indonesian economy. Based on data published by the Ministry of Cooperatives and SMEs, this sector encompasses 64.2 million business units and contributes 61.07% to the national Gross Domestic Product (GDP), while absorbing approximately 97%

of the total workforce throughout Indonesia (Coordinating Ministry for Economic Affairs, 2021). In North Sulawesi Province, the number of MSMEs reached 380,610 micro-business units in 2023 (Diskopukm Sulut, 2025). Despite the significant contribution of MSMEs, their financial performance still faces various obstacles, particularly pada in terms of manual financial management (Tribun Manado, 2023) and the high rate of *non- performing loans. Loan* (NPL) of MSMEs reached 4.33% in December 2025 (Kontan.co.id, 2026).

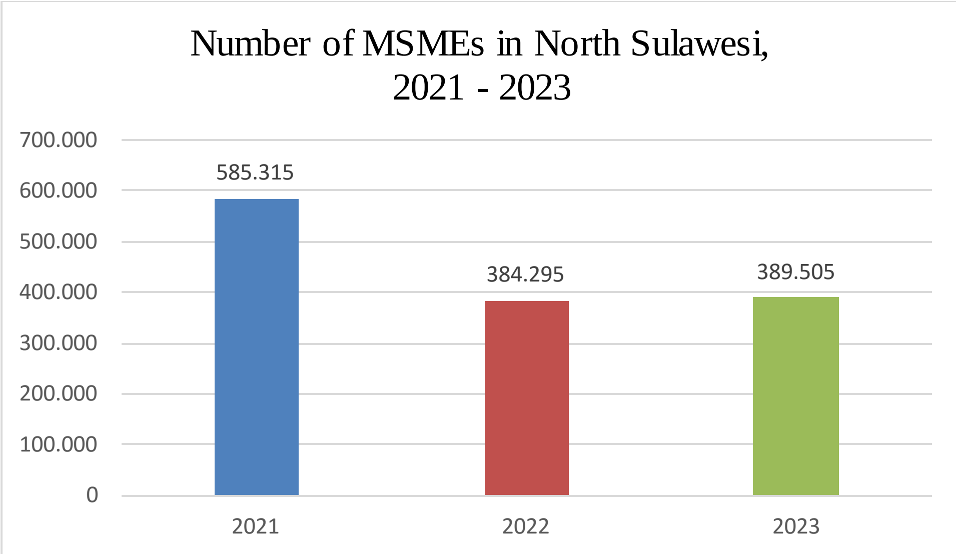

Figure 1*Development of MSMEs in North Sulawesi*

Source: Ministry of Cooperatives and SMEs, North Sulawesi Province

Data on the development of North Sulawesi MSMEs shows existence decline significant on the number of MSMEs during 2022. In total, the number of MSME units decreased from 585,315 in 2021 to 384,295 in 2022, representing contraction by 34.35%. The sharpest decline recorded in the category business micro , namely by 34.72%, followed by business medium with 13.85%, and business small with 12.77%. Digital development opens up opportunities through three main channels: adoption of *financial technology* (*fintech*) that expands access to capital (Surya Putra & Mukti Soma, 2025), the use of *e- commerce* that expands market reach (Lailiyah, 2025), and entrepreneurial skills (*entrepreneurial skills) skills*) which are positively correlated with the performance of MSMEs (Soomro et al. , 2025). However, although 38.96% of MSMEs in North Sulawesi have used *e- commerce* , only 23.40% have financial reports (BPS, 2025). On the other hand, the financial literacy index in North Sulawesi is still at 50.13%, far below the financial inclusion index of 86.23% (Bank Dana Raya, 2023), making trust *in* digital platforms a critical factor (Akhnes Noviyanti, 2021). On the other hand , financial literacy finance own role crucial in form habit good finance (Aby Maulana et all, 2025) .

Research that integrates *fintech* , *e- commerce adoption* , and *entrepreneurial skills* simultaneously with financial mediation Literacy and trust are still very limited in the context of North Sulawesi MSMEs. This gap is the basis for conducting research that aims to: (1)

examine the direct impact of fintech , e- commerce adoption , and entrepreneurial skills on MSME financial performance; (2) evaluate the function of financial literacy as a mediating variable; and (3) examine the role of trust as a mediator in this context.

RESEARCH METHODS

In this study, a quantitative approach was applied through the use of a causal design and a cross-sectional survey method as explained by Sekaran and Bougie (2019). The population was all 380,610 MSMEs in North Sulawesi. The sample was determined using the Slovin formula (e = 5%), resulting in 400 respondents selected through purposive sampling with the following criteria: (1) MSME owners/managers in North Sulawesi; (2) using fintech services ; (3) using e- commerce platforms ; and (4) businesses running for at least one year.

Instrument study in the form of questionnaire with 40 statement items Likert scale 1–5 which includes six Variables : Financial Technology/X1 (7 items), E-Commerce Adoption/X2 (7 items), Entrepreneurial Skills/X3 (4 items), *Financial Literacy* /M1 (8 items), Trust/M2 (7 items), and MSME Financial Performance /Y (7 items). Validity measured through Pearson correlation with r criteria $\geq$ 0.361 in the sample as many as 30 respondents and the level significance α of 5%. Reliability tested using Cronbach Alpha with minimum value of 0.60. Data analyzed use statistics descriptive through device SPSS software version 26 and PLS-SEM method with SmartPLS version 4. Outer model evaluation is performed based on the outer loading parameter of at least 0.708, AVE is not not enough of 0.50, CR of at least 0.70, as well HTMT value is below 0.90. Meanwhile for inner model , Criteria applied covers VIF value below 3, R^2 value not not enough from 0.25, and classified GOF interpretation based on threshold of 0.1 for category small , 0.25 for category moderate , and 0.36 for category big . Testing hypothesis done with method *bootstrapping* using 5,000 subsamples , with the t-value criteria exceed 1.645 (one-tailed) and the p-value is below 0.05.

RESULTS AND DISCUSSION

Descriptive Analysis of Respondent Profiles

The results of the analysis of 400 MSMEs in North Sulawesi Province show that the culinary/food and beverage sector dominates the business structure with a percentage of 42.8%. The handicraft sector *is* in second place with 18.8%, while the services, trade, fashion , and agriculture/fisheries sectors each contribute less than 10%. Most businesses (79.5%) have been running for 3–10 years with turnover generally falling into the micro-small category, namely IDR 5–15 million per month (42.0%) and IDR 15–50 million per month (34.2%). The education level of entrepreneurs is relatively high, where 63.2% have a Diploma or above. Cross-analysis shows a positive relationship between the length of business establishment and achieving high turnover (≥IDR 15 million/month), with the proportion increasing drastically from 12.5% in businesses aged 1–2 years to 91.2% in businesses older terbentuk than 10 years. In addition, the education level of business owners is also positively correlated with high turnover, namely 27.3% for high school/vocational school graduates compared to 64.1–66.7% for undergraduate and postgraduate graduates. Sectorally, although culinary is the sector with the largest number of businesses, the proportion of culinary businesses achieving high turnover is actually the lowest (35.7%) compared to the crafts sector (57.3%) and agriculture/fisheries (57.7%). This indicates that business sustainability (length of establishment) and managerial ability (education level) play a greater role in determining MSME turnover performance than the type of business sector. Manado City and North Minahasa Regency are recorded as areas with the highest concentration of MSMEs in North Sulawesi Province.

Description of Research Variables

From the results of the descriptive analysis, in general, all variables in this study received positive assessments from respondents. Entrepreneurial Variable Skills accounted for the highest percentage , at 70.83%, indicating that respondents' entrepreneurial abilities were in the High/Agree category. Next, the variables for Financial Performance (69.61%), Trust (69.35%), and *Financial Awareness (69.35%) were also included. literacy* (69.16%), and *financial technology* (69.08%) also falls into the high/agree category. On the other hand, the e- commerce variable adoption obtained a percentage of 67.44%, so it is classified in the sufficient/uncertain category, which indicates that the level of *e- commerce adoption* by respondents still needs to be improved compared to other variables. Overall, the descriptive analysis conducted indicates that the majority of respondents showed a positive attitude towards the variables studied, so the data is considered sufficient to proceed to the inferential analysis stage and hypothesis testing.

***Outer Model* Test Results**

The measurement model describes how the construct is measured and ensures that the construct is valid . Validity and reliability are identified through observations of convergent validity, discriminant validity, and construct reliability (Hair et al. , 2017). The outer model image in Smart PLS is presented as follows :

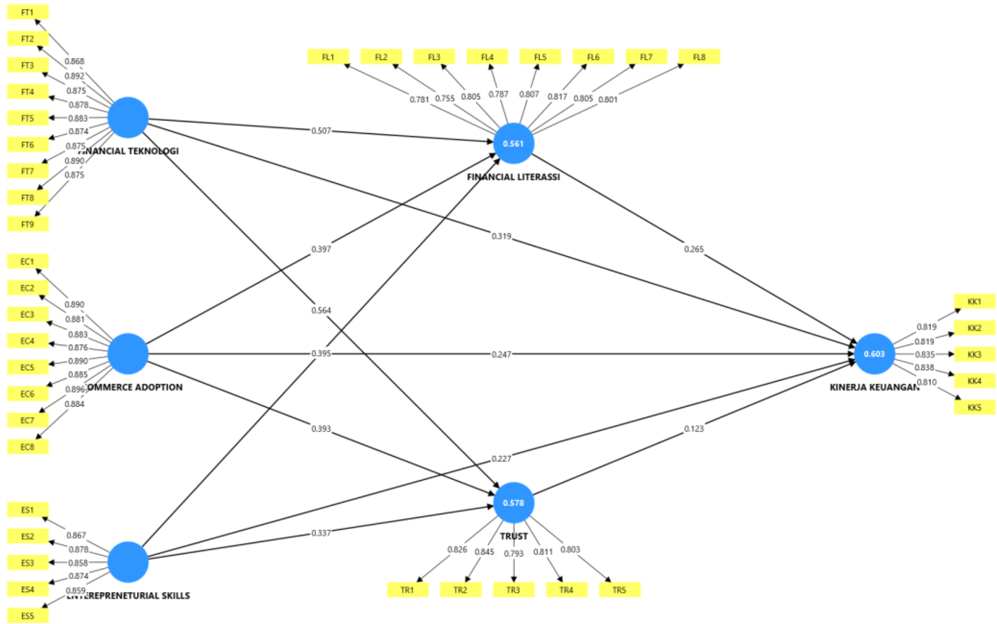

Figure 2. Outer Model Research in SEM PLS 4
Source: *PLS 4 SEM Output*

Structural Model Test Results (*Inner Model*)

Ghozali (2015) explains that the deep model is a test that functions to identify the relationship between latent variables that act as independent variables with latent variables that function as dependent variables analyzed in this structural model. This model is often referred to as a hypothesis testing method or influence evaluation. In this study, model testing is explained through the R- Square test (coefficient of determination) and the F- square test .

a. R–Square Value

Table 1*R* **-** *Square* Value

	R-square	*R- square adjusted*
Financial Literacy	0.561	0.558
FINANCIAL PERFORMANCE	0.603	0.598
TRUST	0.578	0.575

Source : *SEM PLS 4 Output*

Financial Literacy (0.561): The variables *e- commerce* adoption , entrepreneurial skills, and financial technology collectively explain 56.1% of the variation in financial literacy , while the remaining 43.9% is explained by other variables not included in the model.

Financial Performance (0.603) : All exogenous and mediator variables (*e- commerce adoption* , *entrepreneurial skills* , *financial technology* , financial literacy , trust) is able to explain 60.3% of the variation in MSME financial performance — the highest value among the three endogenous variables, indicating that this model is quite good at explaining financial performance.

Trust (0.578) : The three exogenous variables are able to explain 57.8% of the variation in trust .

Validity & Reliability Construct

Criteria: *Cronbach's alpha* and *composite Reliability* is declared reliable if the value is > 0.70 .

Table 2*Construct Reliability & Validity*

	Cronbach's Alpha	*Composite Reliability (rho_a)*	*Composite Reliability (rho_c)*	*Average Variance Extracted (AVE)*
E-Commerce Adoption	0,961	0,963	0,967	0,784
Entrepreneurial Skills	0,918	0,921	0,938	0,752
Financial Literacy	0,917	0,917	0,932	0,632
Financial Technology	0,963	0,964	0,968	0,773
Financial Performance	0,882	0,883	0,914	0,680
Trust	0,874	0,875	0,909	0,666

Source : *SEM PLS 4 Output*

All constructs have *Cronbach's values alpha* and *composite reliability* above 0.70 (even the majority > 0.90), which indicates very good internal consistency. This means that the indicators in each construct consistently measure the same concept, so that the research instrument is reliable for use .

b. F–Square (f ² *effect size*)

The f-square values used as guidelines in evaluation effect consists of above 0.02, 0.15, and 0.35, which is beruntun represent effect small , medium , and large . In addition that , if mark effect is below 0.02 , the variable in question considered No give contribution significant influence (Hair et al., 2017) .

Table 3- square value

	f-square
E-Commerce Adoption -> Financial Literacy	0,357
E-Commerce Adoption -> Financial Performance	0,092
E-Commerce Adoption -> Trust	0,364
Entrepreneurial Skills -> Financial Literacy	0,354
Entrepreneurial Skills -> Financial Performance	0,082
Entrepreneurial Skills -> Trust	0,268
Financial Literacy -> Financial Performance	0,077
Financial Technology -> Financial Literacy	0,586
Financial Technology -> Financial Performance	0,115
Financial Technology -> Trust	0,753
Trust -> Financial Performance	0,016

Source : *SEM PLS 4 Output*

Based on the f² value (*effect size*), Financial Technology is proven to be the variable with the most dominant influence in the model, especially on *trust*. (f² = 0.753) and *financial literacy* (f² = 0.586) both of which are in the large category, so removing this variable from the model will greatly reduce the model's ability to explain *trust* and *financial literacy* ; a similar major contribution is also shown by *e- ccommerce adoption* and *entrepreneurship skills* on the two mediator variables (f^2 ranges from 0.268 to 0.364), while the direct influence of the three exogenous variables and mediators on Financial Performance is relatively small (f^2 ranges from 0.077 to 0.115) although it remains statistically significant, which is normal considering that Financial Performance is influenced by many paths at once, both directly and indirectly, so that the contribution of each predictor individually becomes smaller, and the smallest among all paths is the influence of Trust on Financial Performance (f^2 = 0.016), which shows that although the mediation path of trust (Hypothesis 7–9) is statistically significant, the practical contribution (*practical significance*) trust directly on financial performance is very minimal compared to other paths in the model .

Hypothesis Testing Results & Discussion

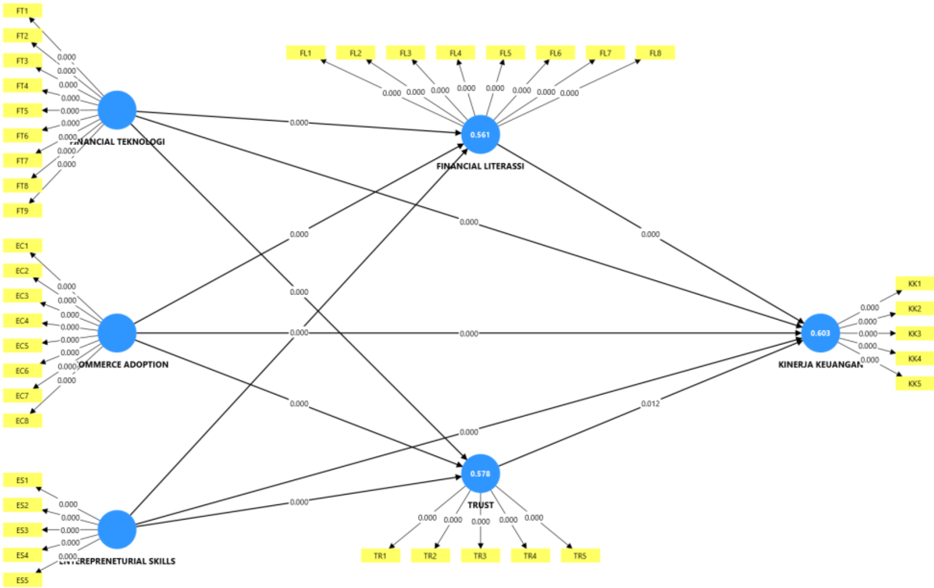

Figure 3*Bootstrapping*

Source: *PLS 4 SEM Output*

The impact that appears directly (*Direct) Effect*) along with the impacts that arise indirectly (Indirect) Effect)

Table 4*Direct* Results *Effect* and *Indirect Effect*

Hypothesis	Relationship	Path	T Statistics	P Values	Conclusion
	Direct Effect				
1	E-Commerce Adoption -> Financial Performance	0.247	5.470	0.000	Accepted
2	Entrepreneurial Skills -> Financial Performance	0.227	5.652	0.000	Accepted
3	Financial Technology -> Financial Performance	0.319	6.624	0.000	Accepted
	Indirect Effect				
4	Financial Technology -> Financial Literacy -> Financial Performance of MSMEs	0.105	5.050	0.000	Accepted
5	E-Commerce Adoption -> Financial Literacy -> Financial Performance of MSMEs	0.069	2.521	0.012	Accepted
6	Entrepreneurial Skills -> Financial Literacy -> Financial Performance of MSMEs	0.105	5.094	0.000	Accepted
7	Financial Technology -> Trust -> Financial Performance of MSMEs	0.134	5.273	0.000	Accepted
8	E-Commerce Adoption -> Trust -> Financial Performance of MSMEs	0.048	2.468	0.014	Accepted
9	Entrepreneurial Skills -> Trust -> Financial Performance of MSMEs	0.041	2.458	0.014	Accepted

a. Influence Direct *Effect*

Hypothesis 1: *E-Commerce Adoption* On Financial Performance

Coefficient track of 0.247 with a t- statistic of 5.470 and a p-value of 0.000 (< 0.05) indicating that e-commerce adoption has an impact positive and significant to performance MSME finance . This means that the more tall level adoption of e-commerce by MSMEs is increasing good performance too financial performance achieved . Hypothesis 1 is accepted .

Hypothesis 2: *Entrepreneurial Skills* On Financial Performance

Coefficient path 0.227, t- statistic 5.652, and p-value 0.000 indicate influence positive and significant skills entrepreneurship to performance finance . MSME actors with ability more entrepreneurs good (innovation , decision making) risk , orientation opportunities) tend to own performance more finances high . Hypothesis 2 is accepted .

Hypothesis 3: *Financial Technology* On Financial Performance

The path coefficient of 0.319 is the largest among the three direct influences, with a t-statistic of 6.624 and a p- value of 0.000. This indicates that financial Technology (fintech) provides the most dominant contribution to improving the financial performance of MSMEs compared to e- commerce adoption and entrepreneurial skills . Hypothesis 3 is accepted .

b. Influence No Direct (*Indirect Effect*)

Hypothesis 4: *Financial Technology* To *Financial Literacy* On the Financial Performance of MSMEs

Coefficient path 0.105, t- statistic 5.050, p-value 0.000. Financial literacy is proven mediate in a way significant the influence of financial technology on performance finance .

This means that fintech does not only impact directly , but also increase literacy finance MSME actors who in turn push performance finance . Hypothesis 4 is accepted .

Hypothesis 5: *E-Commerce Adoption* To *Financial Literacy* On the Financial Performance of MSMEs

Coefficient path 0.069, t- statistic 2.521, p-value 0.012. Although mark the coefficient relatively small compared to track mediation other , results This still significant ($t > 1.96$; $p < 0.05$). Financial literacy plays a role as a partial mediator between e-commerce adoption and performance finance . Hypothesis 5 is accepted .

Hypothesis 6: *Entrepreneurial Skills* To *Financial Literacy* On the Financial Performance of MSMEs

Path coefficient 0.105, t-statistic 5.094, p- value 0.000. High entrepreneurial skills encourage increased financial literacy, which then impacts the financial performance of MSMEs. Hypothesis 6 is accepted .

Hypothesis Hypothesis 7: *Financial Technology* To *Trust* On the Financial Performance of MSMEs

Coefficient path 0.134, t- statistic 5.273, p-value 0.000. This is track mediation with coefficient the largest among trust - mediated pathways , indicating that trust in the use of fintech plays role important in bridge the influence of fintech on performance finance . Hypothesis 7 is accepted **.**

Hypothesis 8: *E-Commerce Adoption* To *Trust* On the Financial Performance of MSMEs

Coefficient path 0.048, t- statistic 2.468, p-value 0.014. Trust mediates in a way significant connection between e-commerce adoption and performance finance , although magnitude its influence classified as small . Hypothesis 8 is accepted .

Hypothesis 9: *Entrepreneurial Skills* To *Trust* On the Financial Performance of MSMEs

Coefficient path 0.041, t- statistic 2.458, p-value 0.014. This is coefficient mediation smallest from all models, however still significant in a way statistics . Trust mediates the influence of entrepreneurial skills on performance finance , even though his contribution relatively limited. Hypothesis 9 can accepted.

CONCLUSION AND SUGGESTIONS

a. Conclusion

Based on PLS-SEM analysis was performed towards 400 MSME actors in North Sulawesi, so that Can concluded that technology financial , e-commerce adoption , and skills entrepreneurship give influence positive as well as significant in a way direct to performance financial management in MSMEs (Hypotheses 1, 2, and 3 are accepted). with financial technology as predictor most dominant direct (coefficient path 0.319), followed by e-commerce adoption (0.247) and entrepreneurial skills (0.227).

Financial literacy and *trust* are also proven play a role as a significant mediator (Hypotheses 4–9 in their entirety) accepted). Financial literacy mediates influence third variables exogenous to performance finance , Contribution the most significant mediation originate from *financial technology* and entrepreneurial skills, each at 0.105. In addition that , trust also plays a role as a mediator in influence third variables exogenous to performance finance , with track mediation through financial technology shows contribution the biggest of 0.134. The results of the study This confirm that improvement performance MSME finances are not solely can obtained through implementation technology and skills entrepreneurship in a way directly, but also through strengthening literacy finance as well as trust perpetrator business towards digital platforms.

financial performance of MSMEs, 56.1 ... *literacy* , and 57.8% variation in trust , which indicates that the model built based on the Resource -Based View and Technology Acceptance Model is quite good in explaining the phenomenon of financial performance of MSMEs in North Sulawesi. However, the direct effect of trust on financial performance is relatively small ($f^2 = 0.016$), so that the role of trust is more felt as a bridge (mediator) than as a direct determinant .

b. Suggestion

For MSMEs, it is recommended to continue to increase the use of fintech services (for example for digital payments, capital loans, and transaction recording) considering that this variable provides the most dominant contribution to financial performance. literacy , and trust . Business actors also need to increase the intensity and optimization of e- commerce adoption , considering that this variable is still in the Sufficient/Undecided category (67.44%) and is the variable with the lowest score compared to other variables. For local governments and related institutions (Diskopukm , OJK, fintech and e- commerce platform providers), it is recommended to expand financial literacy education and training programs as well as digital financial management assistance for MSMEs, especially in the culinary sector which dominates the number of businesses but has the lowest proportion of high turnover. Programs to strengthen trust in digital platforms, for example through socialization of transaction security and consumer protection, also need to be continuously encouraged because trust has been proven to mediate the influence of fintech , e- commerce , and entrepreneurship. skills on the financial performance of MSMEs. In future research, it is recommended that the scope of the region and MSME sector be expanded beyond North Sulawesi, and additional variables that have the potential to influence MSME financial performance be included in the analysis (e.g., financial inclusion or digital marketing), and using a longitudinal research design to capture the dynamics of technology adoption and changes in MSME performance over time.

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