

ANALYSIS OF FINTECH IMPLEMENTATION AND THE PENTUPLE BOTTOM LINE ON MSME BUSINESS SUSTAINABILITY IN LANGSA CITY

Muh Rifai Arsyad^{1*}, Abdur Rahman Hakim², Ade Faujiah Putri³

Accounting, Universitas Samudra, Indonesia

Muh.rifaiarsyad@unsam.ac.id^{1*}, rangkutyrhman97@unsam.ac.id²,

faujia5471@gmail.com³

**Corresponding author*

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ABSTRACT

Although MSMEs are a major driver of economic growth, staying in business has become harder for them as technology evolves quickly and expectations for sustainable practice keep rising. Two strategies that may help small enterprises remain viable and expand are the use of Financial Technology (FinTech) and the application of the Pentuple Bottom Line (PBL). This study investigates whether these two factors shape the business sustainability of MSMEs in Langsa City. A quantitative survey design was employed, and questionnaires were completed by MSME owners in the city. The responses were analyzed using multiple linear regression, t-tests, and the coefficient of determination. The results show that FinTech is positively and significantly related to MSME business sustainability, with a regression coefficient of 0.252 and a significance value of 0.028. The PBL shows the same pattern and a stronger effect, with a regression coefficient of 0.709 and a significance value below 0.001. The F-test confirms that both variables, when entered together, significantly influence MSME business sustainability ($F = 46.898$). The R^2 value of 0.492 means that the two variables jointly explain 49.2% of the variation in sustainability outcomes. Overall, the study concludes that MSMEs in Langsa City can strengthen their long-term sustainability by making greater use of FinTech and by putting the Pentuple Bottom Line into practice.

Keywords: *Financial technology, Pentuple Bottom Line, business sustainability, MSMEs, Langsa City.*

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are one of the strategic sectors that play an important role in driving both national and regional economic growth. MSMEs not only contribute to job creation and increased community income but also serve as an important instrument for promoting economic equity and increasing Gross Regional Domestic Product (GRDP) (Syata, W. M. 2025). Langsa City indicates that the use of E-Money still faces several technical obstacles, including unstable electricity, unreliable internet connectivity, and system maintenance disruptions. These problems can hinder the smoothness and efficiency of digital transactions and indicate that digital infrastructure and technology adoption remain challenges for local MSMEs. These conditions pose challenges for MSMEs in maintaining their existence and business sustainability amid an increasingly dynamic business environment (Manalu, J. P., Meutia, T., & Murni, M. 2024).



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Micro, small, and medium enterprises (MSMEs) hold a strategic position in driving economic growth at both the national and regional levels. Their role goes beyond creating jobs and lifting community incomes: they also work as a tool for spreading economic benefits more evenly and for raising Gross Regional Domestic Product (GRDP) (Syata, 2025). In Langsa City, the use of e-money still runs into several technical barriers, namely an unstable electricity supply, unreliable internet connections, and disruptions caused by system maintenance. Such barriers can slow digital transactions and lower their efficiency. They also show that digital infrastructure and technology adoption remain unresolved issues for local MSMEs. In a business environment that keeps changing, these conditions make it harder for MSMEs to stay in existence and sustain their businesses (Manalu et al., 2024).

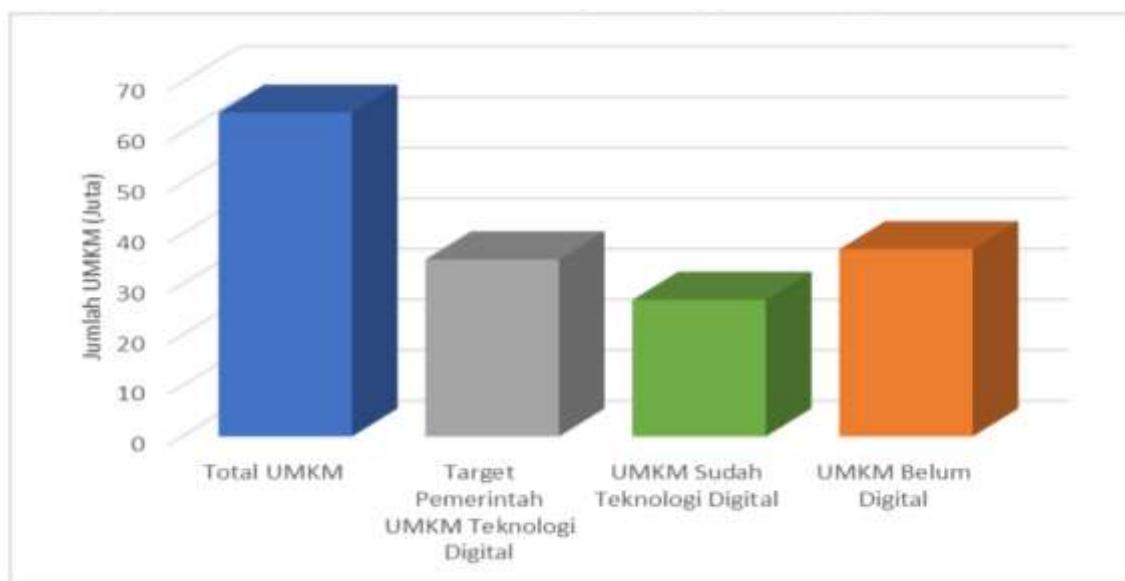


Figure 1. Digitalization of MSMEs in Indonesia (2025)

As shown in Figure 1, the government has promoted the strengthening of MSMEs through various policies and programs aimed at digitalization, improving access to financing, and developing a sustainable business ecosystem. The MSME development strategy for 2025–2029 focuses on three main pillars: digitalization, access to financing, and the strengthening of a sustainable business ecosystem, (Manalu, et all 2024). One form of policy implementation is the MSME Go Digital program, which targets connecting at least 35 million MSME actors to the digital ecosystem by 2025 through collaboration with various digital platforms (Nazara et all, 2025). However, the implementation of digitalization has not yet been evenly distributed. Of the more than 65 million MSMEs in Indonesia, only approximately 27 million have utilized digital technology, indicating that a substantial proportion of MSMEs have not yet been optimally integrated into the digital ecosystem (Hapiz, M., et all 2025). This condition demonstrates a gap between government policies and digitalization targets and the actual capacity of MSMEs to adopt technology.

These challenges are also relevant to the condition of MSMEs in Langsa City. Based on data from the Department of Industry, Trade, Cooperatives, and MSMEs of Langsa City, there are 24,864 MSMEs distributed across five subdistricts: 4,400 MSMEs in Langsa Timur, 4,564 MSMEs in Langsa Lama, 5,150 MSMEs in Langsa Barat, 4,200 MSMEs in Langsa Baro, and 6,550 MSMEs in Langsa Kota. This number demonstrates the strategic position of MSMEs in supporting the economic activities of the people of Langsa City. However, the large number of MSMEs does not automatically guarantee business sustainability in the long term. MSME actors continue to face the need to improve financial management efficiency, expand market access, strengthen competitiveness, and adapt their business activities to technological developments and increasing sustainability demands, (Eliza, N. 2025).

Accordingly, this study offers practical value for advancing sustainable MSME development in Langsa City. It shows that fintech is useful not just for widening access to financial services and making operations more efficient, but also as a strategic means of strengthening MSMEs' long-term sustainability and competitiveness. These results align with recent research reporting that fintech adoption, financial literacy, and financial inclusion are positively linked to the sustainability and performance of MSMEs in Indonesia (Tan & Syahwildan, 2022; Cahyawati et al., 2023; Zunairoh & Wijaya, 2024). The results therefore provide useful implications for MSME owners to strengthen fintech utilization, improve digital and financial literacy, and integrate digital financial practices into sustainable business management. For policymakers, the findings emphasize the importance of developing an inclusive digital financial ecosystem through accessible fintech services, MSME digital-literacy programs, improved digital infrastructure, and supportive financing policies. Recent evidence further indicates that the positive contribution of fintech to MSME sustainability is strengthened through financial inclusion, suggesting that policy interventions should focus not only on fintech adoption itself but also on ensuring equitable access to digital financial services (Kolefiyan, 2026). Thus, the findings of this study can serve as empirical input for MSME development policies in Langsa City by supporting a more inclusive, adaptive, and sustainable MSME ecosystem that integrates economic performance with broader sustainability objectives.

In addition to technological and financial aspects, MSME sustainability requires a comprehensive approach that considers economic, social, environmental, business purpose, and policy dimensions. In this context, the Pentuple Bottom Line (PBL) concept is highly relevant because it encompasses five key dimensions: profit, people, planet, purpose, and policy. The profit dimension emphasizes economic viability and business profitability; people concerns social welfare and social responsibility; planet emphasizes environmental responsibility and sustainability; purpose relates to the clarity of business objectives and orientation; while policy emphasizes compliance with applicable policies and regulations. The integration of these five dimensions enables MSMEs not only to focus on achieving profits but also to create social value, protect the environment, establish clear business objectives, and operate in accordance with applicable regulations. Previous research has demonstrated that the Pentuple Bottom Line has a positive effect

on MSME sustainability (Purnomo et al., 2023), while other studies have also indicated that its implementation can strengthen MSME business sustainability (Wardokhi et al., 2023; Fadlilah et al., 2024).

Although research on FinTech and MSME sustainability has continued to develop, studies integrating FinTech with the Pentuple Bottom Line to explain MSME sustainability in a specific regional context remain limited. This study therefore extends the existing literature by integrating FinTech and the Pentuple Bottom Line as complementary perspectives in examining MSME business sustainability in Langsa City. The novelty of this study lies in demonstrating how technological and financial capabilities through FinTech can be examined together with the multidimensional sustainability principles of the PBL framework, encompassing profit, people, planet, purpose, and policy, within a specific regional MSME context. This integrated approach provides a broader explanation of MSME sustainability than studies focusing solely on financial or technological factors and contributes empirical evidence from Langsa City, where MSMEs may face distinctive conditions related to digitalization, financing access, business management, social responsibility, environmental awareness, business objectives, and policy compliance. Thus, the findings strengthen the existing literature by providing empirical evidence on the complementary role of FinTech and the Pentuple Bottom Line in explaining MSME business sustainability at the regional level.

Given these circumstances, it is important to study how fintech and the Pentuple Bottom Line are applied to MSME business sustainability in Langsa City. This research aims to supply empirical evidence on how financial technology and the adoption of sustainability principles can help MSMEs survive and grow as the business environment changes. Beyond its academic contribution to the literature on MSME sustainability, the results are also intended to inform local government policy on strengthening digitalization, access to financing, and competitiveness, as well as on building a sustainable MSME ecosystem in Langsa City.

RESEARCH METHOD

A quantitative research design with a survey method was adopted. This approach suited the study because its purpose was to test empirically how FinTech implementation and the Pentuple Bottom Line influence MSME business sustainability. Primary data came straight from MSME owners or managers, who completed a structured questionnaire.

The study followed a sequence of stages. First, the researchers defined the problem, which centered on the growing pressure on MSMEs to digitalize and to operate in a sustainable way. Second, they built a conceptual framework and formulated hypotheses that connect FinTech, the Pentuple Bottom Line, and business sustainability. Third, each variable and its indicators were rewritten as items in a questionnaire. Fourth, the questionnaire was given to MSME respondents who satisfied the sampling criteria fixed at the outset. Finally, the collected data were coded and statistically analyzed in the Statistical Package for the Social Sciences (SPSS) version 26. Answers were scored on a

five-point Likert scale, where 1 meant strongly disagree and 5 meant strongly agree. This scale allowed respondents' views on FinTech implementation, the Pentuple Bottom Line, and MSME business sustainability to be turned into numerical values.

Population and Sample

The population of this study consisted of MSMEs that operate in Langsa City, Aceh, Indonesia. MSMEs were used as the unit of analysis since they are an essential pillar of the local economy and are under growing pressure to adapt to digital technology and to sustainable business practices.

Respondents were selected through purposive sampling, meaning that participants were picked on the basis of specific criteria linked to the research objectives. The researchers applied three criteria: (1) the MSME had to be actively running its business during the research period; (2) the business had to fall within the food and beverage, local product processing, or construction subsectors; and (3) the MSME had to carry out financial recording as part of its business activities.

To justify the sample size, the researchers followed the guideline of Hair et al. (2010), which advises that an adequate sample for multivariate analysis should take into account how many indicators the research model contains. As a general rule, this guideline recommends about five to ten observations for every indicator. The study employed 20 indicators to measure its variables. Applying the lower bound of five observations per indicator, the minimum sample size was computed as: $\text{Sample size} = \text{Number of indicators} \times 5 = 20 \times 5 = 100$ respondents. This calculation showed that at least 100 respondents were needed, so 100 MSMEs that fulfilled every predetermined eligibility criterion were chosen as the final research sample.

Data Collection Procedure

Primary data were collected using a structured questionnaire. Before distributing the questionnaire, the researchers developed the instrument based on the operational definitions and indicators of each research variable. The Financial Technology indicators were adapted from Arsyad et al. (2023), the Pentuple Bottom Line indicators were adapted from Fadlilah et al. (2024), and the MSME Business Sustainability indicators were adapted from Cahyono and Suarantalla (2024). Each indicator was translated into statements that could be understood by MSME owners or managers.

The questionnaire was subsequently handed out in person to respondents who satisfied the sampling criteria. The researchers described the aim of the study and gave guidance on how to fill in the questionnaire. Respondents were requested to answer in line with the real circumstances of their businesses.

After all questionnaires were collected, the researchers examined the responses to ensure that the questionnaires were properly completed. Incomplete or unusable responses were excluded from further analysis. The valid responses were subsequently coded and entered into SPSS version 26 for statistical processing.

Research Variables and Measurement

This study involved three variables: two independent variables and one dependent variable. The independent variables were FinTech (X1) and the Pentuple Bottom Line (X2), and the dependent variable was MSME Business Sustainability (Y).

FinTech (X1) was operationalized as the extent to which MSMEs utilize financial technology to support their business activities. The measurement focused on the utilization of digital financial services, including digital payments, financial transactions, financial management, and access to financial services.

Pentuple Bottom Line (X2) was measured using five dimensions: Profit, People, Planet, Purpose, and Policy. The *Profit* dimension represents the economic sustainability of the business; *People* concerns the welfare and interests of employees, customers, and the surrounding community; *Planet* concerns environmental responsibility; *Purpose* reflects the business's long-term objectives and values; and *Policy* relates to compliance with applicable rules and policies.

MSME Business Sustainability (Y) was assessed through the capacity of MSMEs to keep their business activities running, adjust to shifts in the business environment, sustain their business performance, and remain in operation over the long run.

Data Analysis

SPSS version 26 was used to process the data, which went through several ordered stages of analysis. The first stage was descriptive statistics, intended to depict the characteristics of respondents and how their answers were distributed for each research variable, using the minimum, maximum, mean, and standard deviation. In the second stage, the questionnaire's quality was evaluated through instrument testing. For validity, each item's correlation coefficient was compared with the critical value, and an item counted as valid when its calculated correlation was larger than that value. Reliability was assessed with Cronbach's Alpha, which indicates how internally consistent the questionnaire is.

The third stage consisted of classical assumption tests, which were performed before the regression model was estimated. To check normality, a Normal P-P Plot of Regression Standardized Residual was inspected for signs that the residuals were roughly normally distributed. Multicollinearity was diagnosed using the Tolerance and Variance Inflation Factor (VIF) statistics. For heteroscedasticity, standardized residuals were plotted against standardized predicted values, and the assumption was considered met if the points were scattered at random on both sides of zero without forming any identifiable pattern. The fourth stage applied multiple linear regression to examine the effects of FinTech and the Pentuple Bottom Line on MSME business sustainability. The regression model is specified as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + e$$

where:

Y = MSME Business Sustainability

α = Constant

X_1 = FinTech

X_2 = Pentuple Bottom Line

β_1 = Regression coefficient of FinTech

β_2 = Regression coefficient of Pentuple Bottom Line

e = Error term

Two statistical tests were used to test the hypotheses: the t-test and the F-test. The t-test measured how much FinTech and the Pentuple Bottom Line each contribute, individually, to business sustainability. The F-test checked whether the two independent variables exert a joint influence on MSME business sustainability when considered as a set. In addition, the coefficient of determination (R^2) was examined to find out how large a portion of the variation in MSME business sustainability is explained by the independent variables in the model.

Every test used a 5% significance level ($\alpha = 0.05$). A hypothesis was treated as supported when its significance value was lower than 0.05 and the sign of the regression coefficient agreed with the direction stated in the hypothesis.

Research Hypotheses

Drawing on the research framework and the variables under investigation, this study tested the following hypotheses:

H1: The implementation of FinTech exerts a significant positive effect on MSME business sustainability.

H2: The Pentuple Bottom Line exerts a significant positive effect on MSME business sustainability.

H3: FinTech implementation and the Pentuple Bottom Line, taken together, exert a significant positive effect on MSME business sustainability.

RESULTS AND DISCUSSION

Results

Descriptive Statistical Test Results

This study examined three variables: Financial Technology, the Pentuple Bottom Line, and MSME Business Sustainability. Descriptive statistical analysis was applied to these variables to summarize their minimum and maximum values, means, and standard deviations. The outcomes of this analysis are displayed in Table 1 below.

Table 1. Results of the Descriptive Statistical Analysis

	Descriptive Statistics				
	N	Minimum	Maximum	Mean	Std. Deviation
Financial Technology	100	2.00	5.00	4.0180	.78732
Pentuple Bottom Line	100	2.00	5.00	4.2182	.64387

MSME Business Sustainability	100	2.29	5.00	4.2531	.69824
Valid N (listwise)	100				

Source: Primary data processed, 2026

Table 1 reports the descriptive statistics for the variables in this study, as follows:

Financial Technology

According to Table 1, the Financial Technology variable ranges from a minimum of 2.00 to a maximum of 5.00, with a mean of 4.0180. This mean suggests that respondents, on the whole, agreed with the statements about the use of Financial Technology in their business activities. The standard deviation of 0.78732 shows that respondents' answers deviated from the mean by that amount.

Pentuple Bottom Line

The Pentuple Bottom Line variable has a minimum of 2.00, a maximum of 5.00, and a mean of 4.2182. This mean suggests that respondents generally agreed with applying Pentuple Bottom Line principles in running their businesses. The standard deviation of 0.64387 reflects how much respondents' answers varied around the mean.

MSME Business Sustainability

The MSME Business Sustainability variable ranges from a minimum of 2.29 to a maximum of 5.00, with a mean of 4.2531. This mean suggests that respondents, in general, agreed that their businesses have conditions supporting business sustainability. The standard deviation of 0.69824 indicates the degree to which respondents' answers varied from the mean.

Validity Test Results

A validity test is run to establish how well the research instrument represents the variables it was designed to measure. It allows every questionnaire item to be labeled valid or invalid. To be valid, an item must reflect the construct under study and correlate significantly with the total score of its variable. In this study, the calculated r-value (corrected item-total correlation) for each item was checked against the critical r-value (r-table). Items whose calculated value is larger than the r-table value are treated as valid, whereas items whose calculated value equals or falls below the r-table value are treated as invalid.

The results of this test for Financial Technology (Fintech), the Pentuple Bottom Line, and MSME Business Sustainability are given in Table 2 below.

Table 2. Validity Test Results

Question Item	Calculated r-value	Critical r-value	Description
X1.1	0.768**	0.1946	Valid
X1.2	0.862**	0.1946	Valid
X1.3	0.909**	0.1946	Valid
X1.4	0.854**	0.1946	Valid

	X1.5	0.818**	0.1946	Valid
	X2.1	0.767**	0.1946	Valid
	X2.2	0.709**	0.1946	Valid
X2	X2.3	0.817**	0.1946	Valid
	X2.4	0.761**	0.1946	Valid
	X2.5	0.800**	0.1946	Valid
	X2.6	0.739**	0.1946	Valid
	Y1	0.810**	0.1946	Valid
	Y2	0.893**	0.1946	Valid
	Y3	0.907**	0.1946	Valid
Y	Y4	0.839**	0.1946	Valid
	Y5	0.822**	0.1946	Valid
	Y6	0.843**	0.1946	Valid
	Y7	0.769**	0.1946	Valid

Source: Primary data processed, 2026

Table 2 shows that each questionnaire item measuring Financial Technology (FinTech), the Pentuple Bottom Line, and MSME Business Sustainability has a calculated r-value higher than the critical r-value of 0.1946. All items can therefore be regarded as valid, and the instrument is suitable for gathering the study's data.

Reliability Test Results

The reliability test assesses whether a questionnaire gives consistent measurements of a variable or construct. In this study, it was used to see how stable respondents' answers were across the questions, with Cronbach's Alpha as the method and a cutoff of more than 0.6. Table 3 below presents the results of the reliability test.

Table 3. Reliability Test Results

Variabel	Cronbach's Alpha	Ketentuan Nilai Alpha	Keterangan
Financial Technology	0,897	0,6	Reliabel
Pentuple Bottom Line	0,850	0,6	Reliabel
MSME Business Sustainability	0,913	0,6	Reliabel

Source: Primary data processed, 2026

Table 3 indicates that Financial Technology, the Pentuple Bottom Line, and MSME Business Sustainability all have Cronbach's Alpha values above 0.6, which means the question items used in this study are reliable. Each item is therefore able to yield consistent data, and if the questionnaire were administered again, respondents' answers would be expected to remain fairly consistent with their earlier ones.

Classical Assumption Test Results

Normality Test Results

The goal of the normality test is to find out if the residuals from the regression model are normally distributed. Here, a Normal P-P Plot of Regression Standardized Residual was used to assess this assumption. The plot is presented in the figure below.

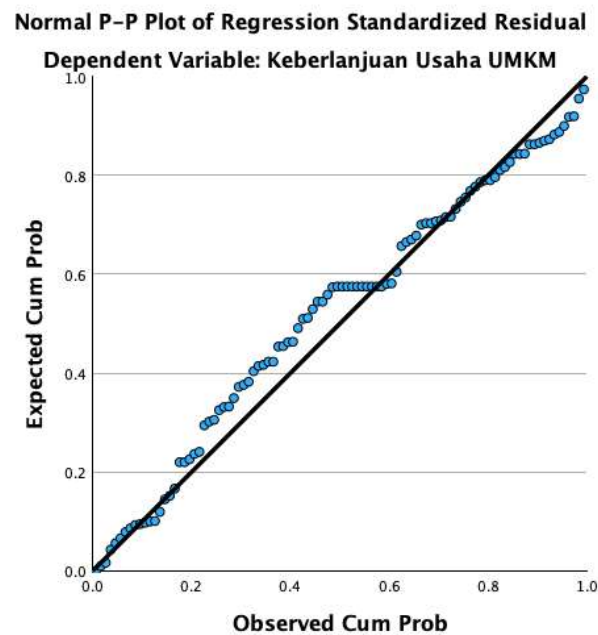


Figure 2. Normality Test Results
Source: Primary data processed, 2026

Figure 2 shows the residual points sitting near the diagonal reference line and tracking its direction. From this pattern, the residuals can be taken as approximately normal, which means the regression model fulfills the normality assumption and is fit for use.

Multicollinearity Test Results

This test looks at whether the independent variables in a multiple linear regression model are strongly related to one another. If they are, the association between the independent variables and the dependent variable may be biased. Two indicators are used for detection, namely tolerance and the Variance Inflation Factor (VIF). Multicollinearity is considered absent when the VIF stays at or below 10 and the tolerance stays at or above 0.1 (Sunjoyo et al., 2013). Table 4 below shows what the test found.

Table 4. Multicollinearity Test Results

Model		Coefficients ^a	
		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Financial Technology	.634	1.577
	Pentuple Bottom Line	.634	1.577

a. Dependent Variable: MSME Business Sustainability

Source: Primary data processed, 2026

The values in Table 4 show that the independent variables have tolerance above 0.1 and VIF below 10 (tolerance 0.634 and VIF 1.577 for both). No multicollinearity is

therefore present, the model satisfies this assumption, and the data can go forward to the next stage of analysis.

Heteroscedasticity Test Results

The heteroscedasticity test examines whether the residuals have unequal variance across observations. The scatterplot method is used for this: the absence of heteroscedasticity is indicated when the points are spread randomly, show no clear pattern, and fall on both sides of zero on the Y-axis. The figure below presents the outcome of the test.

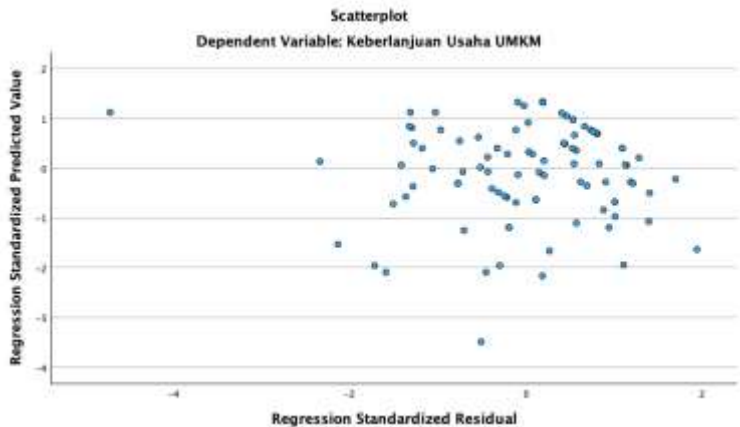


Figure 3. Heteroscedasticity Test Results

Source: Data processed, 2026

The scatterplot in Figure 3 shows points dispersed around the Y-axis with no obvious or systematic shape. This points to the absence of heteroscedasticity in the regression model, so the model can be used to predict MSME Business Sustainability (Y) from its two independent variables, Financial Technology (X1) and the Pentuple Bottom Line (X2).

Hypothesis Testing Results

Multiple Linear Regression Analysis

Once the classical assumption tests had been completed and their results showed, on the whole, that the regression model fulfilled the classical assumptions, the next step was to assess and interpret the multiple linear regression model. The analysis results are presented in the following table:

Table 5. Regression Equation Model

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	6.766	2.402		2.817	.006

Financial Technology	.252	.113	.203	2.234	.028
Pentuple Bottom Line	.709	.115	.559	6.152	<.001
a. Dependent Variable: MSME Business Sustainability					

Source: Primary data processed, 2026

Table 5 gives the multiple linear regression equation estimated from the analysis:

$$Y = 6.766 + 0.252X_1 + 0.709X_2$$

The regression model can be interpreted as follows:

Constant

The constant of 6.766 means that when Financial Technology (X₁) and the Pentuple Bottom Line (X₂) are both assumed to be zero, MSME Business Sustainability (Y) is predicted to be 6.766 units.

Financial Technology (X₁)

Financial Technology (X₁) carries a positive regression coefficient of 0.252. Holding the Pentuple Bottom Line at a fixed level, each additional unit of Financial Technology corresponds to a 0.252-unit gain in MSME Business Sustainability (Y). Because the sign is positive, the two variables move in the same direction: MSMEs that implement Financial Technology more fully tend to show higher business sustainability.

Pentuple Bottom Line (X₂)

The Pentuple Bottom Line (X₂) has a coefficient of 0.709, which is also positive. If Financial Technology is kept constant, every one-unit increase in the Pentuple Bottom Line lifts MSME Business Sustainability (Y) by 0.709 units. The positive sign reflects a same-direction relationship, so MSMEs that apply the Pentuple Bottom Line more effectively tend to achieve higher business sustainability.

Coefficient of Determination Test (R²)

The coefficient of determination test is used to measure what proportion of the dependent variable can be explained by the independent variables. Its results appear in the table below.

Table 6. Coefficient of Determination Test Results

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.701 ^a	.492	.481	3.52274

a. Predictors: (Constant), Pentuple Bottom Line, Financial Technology

Source: Primary data processed, 2026

In Table 6, the multiple correlation (R) is 0.701, a value that signals a strong link between MSME Business Sustainability (Y) and the combination of Financial Technology (X1) and the Pentuple Bottom Line (X2). The R Square of 0.492 tells us that these two variables together explain 49.2% of the differences in MSME Business Sustainability; the other 50.8% is due to factors that the model does not cover. Overall, the findings suggest that Financial Technology and the Pentuple Bottom Line, taken as a pair, add substantially to our understanding of why sustainability varies from one MSME to another.

Partial Test Results (t-Test)

The partial test looks at the effect of every independent variable on the dependent variable one at a time. It relies on the t-test and on the significance value as the decision rule: when that value is smaller than 0.05, the independent variable is said to have a significant effect on the dependent variable. The partial test results are shown below.

Table 7. Partial Test Results (t-Test)

Model		Coefficients ^a		Standardized Coefficients	t	Sig.
		Unstandardized Coefficients				
		B	Std. Error	Beta		
1	(Constant)	6.766	2.402		2.817	.006
	Financial Technology	.252	.113	.203	2.234	.028
	Pentuple Bottom Line	.709	.115	.559	6.152	<.001
a. Dependent Variable: MSME Business Sustainability						

a. Dependent Variable: MSME Business Sustainability

Source: Data processed, 2026

The t-test results below describe how Financial Technology and the Pentuple Bottom Line each relate to MSME Business Sustainability.

Hypothesis Testing 1 (H1)

As Table 7 indicates, the significance value for Financial Technology (X1) is 0.028, which is smaller than 0.05. The coefficient of 0.252 is positive, so higher use of Financial Technology goes together with higher MSME Business Sustainability, and the t-value of 2.234 supports the conclusion that this relationship is statistically significant. H1 is thus accepted: Financial Technology has a positive and significant effect on MSME Business Sustainability.

Hypothesis Testing 2 (H2)

Table 7 further shows a significance value of <0.001 for the Pentuple Bottom Line (X2), far below the 0.05 limit. Its coefficient of 0.709 is positive, and the t-value of 6.152 confirms statistical significance. H2 is therefore accepted, meaning the Pentuple Bottom Line has a positive and significant effect on MSME Business Sustainability.

Simultaneous Test Results (F-Test)

The simultaneous test, or F-test, is applied to find out whether Financial Technology (X1) and the Pentuple Bottom Line (X2) together have a significant effect on MSME Business Sustainability (Y). The criterion is the significance value: if it is under 0.05, the independent variables are judged to have a significant joint effect on the dependent variable.

Table 8. Test Results (F-Test)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1163.969	2	581.985	46.898	<.001 ^b
	Residual	1203.741	97	12.410		
	Total	2367.710	99			
a. Dependent Variable: MSME Business Sustainability						
b. Predictors: (Constant), Pentuple Bottom Line, Financial Technology						

Source: Data processed, 2026

The F-value in Table 8 is 46.898, and its significance value of <0.001 lies well below the 0.05 cutoff. Financial Technology (X1) and the Pentuple Bottom Line (X2) therefore have a statistically significant combined effect on MSME Business Sustainability (Y). On this basis, Hypothesis 3, which states that the two variables jointly exert a significant effect on MSME Business Sustainability in Langsa City, is accepted. The outcome implies that pairing financial technology use with the five Pentuple Bottom Line dimensions helps meaningfully to explain the business sustainability of MSMEs in Langsa City.

Discussion

The Effect of Financial Technology on MSME Business Sustainability

The study's findings reveal that Financial Technology (FinTech) exerts a positive and significant influence on MSME Business Sustainability. Supporting evidence comes from a regression coefficient of 0.252, a t-value of 2.234, and a significance value of 0.028, which falls below the 0.05 threshold. In practical terms, the more extensively MSMEs implement Financial Technology, the higher their business sustainability tends to be. H1 is therefore accepted.

This positive influence can be interpreted through the lens of the Technology Acceptance Model (TAM), which argues that whether people accept and use a technology depends on how useful they believe it is and how easy they believe it is to use. For MSMEs, FinTech can support a wide range of activities, including financial transactions, payments, access to financial services, financial management, and business financing. The more convenient and beneficial owners consider financial technology to be, the more likely they are to adopt it in their day-to-day business. Regular use of digital financial services can make operations more efficient and flexible, reinforce the way finances are managed, and open up broader access to financial resources. Such conditions enhance the

capacity of MSMEs to sustain and grow their businesses over the long term.

These results are in line with earlier empirical research. In Langsa City specifically, the study finds that FinTech has a significant positive effect on MSME Business Sustainability. This suggests that wider use of financial technology can help MSMEs keep their business activities running and expanding, thanks to better access to financial services, more efficient digital transactions, and stronger financial management. Agustin and Ibrahim (2024) reported that FinTech improves MSME sustainability performance by way of financial inclusion, which implies that digital financial technology can widen MSMEs' access to financial resources and underpin sustainable business performance. In a similar vein, Cahyono and Suarantalla (2024) showed that financial literacy, digital literacy, and financial technology are all relevant to MSME business sustainability. Kisin and Setyahuni (2024) also concluded that financial technology, financial literacy, and financial inclusion are linked to MSME sustainability. Taken together, these earlier findings back up the present results and indicate that using FinTech can reinforce MSME sustainability through better financial access, stronger digital capabilities, more efficient transactions, and improved business performance.

The outcome also agrees with research on Indonesian SMEs, which shows that financial and technological factors, FinTech digital adoption among them, matter for long-term business performance and sustainability. The findings of this study thus strengthen the argument that FinTech is not simply a means of payment but can serve as a strategic resource that helps MSMEs adjust to changes in their business environment. For MSMEs in Langsa City, growing use of digital financial technology can consequently become a significant factor in reinforcing business continuity, raising operational efficiency, and supporting sustainable business development.

The Effect of Pentuple Bottom Line on MSME Business Sustainability

The study's results show that the Pentuple Bottom Line (PBL) exerts a positive and significant influence on MSME Business Sustainability. The evidence is a regression coefficient of 0.709, a t-value of 6.152, and a significance value of <0.001 , well under the 0.05 threshold. Because the coefficient is positive, stronger implementation of the Pentuple Bottom Line goes together with higher MSME Business Sustainability, and H2 is therefore accepted. In comparison with Financial Technology, PBL also has the larger standardized regression coefficient ($\beta = 0.559$), which means it makes a greater relative contribution to MSME Business Sustainability within this research model.

This finding can be interpreted through the PBL perspective, which looks at business sustainability more broadly than financial performance alone. PBL widens the sustainability lens by taking several dimensions into account, namely economic, social, environmental, technological, and spiritual aspects. The underlying idea is that a business cannot remain sustainable merely by chasing profit; it must balance its economic aims against social responsibility, environmental awareness, technological progress, and ethical or spiritual values. Earlier literature presents PBL as an extension of the Triple Bottom Line that offers a fuller framework for understanding business sustainability.

The positive relationship found here implies that MSMEs giving more attention to the different dimensions of the Pentuple Bottom Line are better able to keep their businesses going. Economically, MSMEs need to preserve profitability and financial viability. Socially, caring for employees, customers, and the surrounding community can build stronger relationships with stakeholders. Environmentally, using resources responsibly and managing waste properly can limit negative environmental effects. The technological and spiritual dimensions, meanwhile, can foster innovation, responsible business conduct, and ethical decision-making. Bringing these dimensions together creates a more holistic base for long-term business sustainability.

The novelty of this study lies in combining Financial Technology (FinTech) and the Pentuple Bottom Line (PBL) as complementary perspectives for explaining MSME Business Sustainability. FinTech highlights how digital financial technology improves financial access, transaction efficiency, and business capabilities, whereas PBL takes the sustainability perspective beyond financial performance by adding Profit, People, Planet, Purpose, and Policy. The study finds that PBL has a positive and significant effect on MSME Business Sustainability in Langsa City. This indicates that sustainability is shaped not only by economic or financial performance but also by how well a business considers the interests of people, its environmental responsibility, its long-term purpose, and its compliance with relevant policies. The finding is consistent with earlier research by Wardokhi, Ruhayat, and Suripto (2023), who examined how the Pentuple Bottom Line is applied among MSMEs in South Tangerang and pointed to its relevance for achieving business sustainability. In a similar vein, Purnomo et al. (2023) showed that SME sustainability can be assessed through comprehensive economic, environmental, social, technological, and spiritual dimensions, which supports the broader sustainability outlook behind the Pentuple Bottom Line approach. The significant effect of PBL in this study therefore reinforces the view that MSME sustainability calls for a multidimensional approach that goes beyond financial performance.

The wider implications of these findings reach beyond the empirical setting of Langsa City. From a managerial standpoint, MSME owners can use FinTech to ease financial transactions, improve access to financial services, strengthen financial management, and raise operational efficiency, while also building PBL principles into their business decisions. Recent evidence from Indonesian MSMEs shows that FinTech and related digital capabilities are positively associated with business sustainability, and studies on green finance, financial literacy, and social capital likewise stress the value of combining financial capabilities with broader sustainability practices. Accordingly, MSME development programs should not handle digital financial transformation and sustainability practices as separate matters. Training and mentoring can instead bring together FinTech adoption, financial literacy, financial inclusion, environmental responsibility, social considerations, and long-term business objectives. From a policy standpoint, this integrated approach can help policymakers and MSME-support institutions design programs that strengthen digital financial capabilities and multidimensional sustainability at the same time. Nonetheless, because this study

concentrates on MSMEs in Langsa City, applying the findings to other regions should take into account differences in local economic conditions, digital infrastructure, institutional environments, and MSME characteristics. Within these limits, the integrated FinTech–PBL framework can serve as a useful reference for MSMEs and other stakeholders in regions facing similar challenges in digitalization, financial access, business resilience, and multidimensional sustainability.

The Simultaneous Effect of Financial Technology and Pentuple Bottom Line on MSME Business Sustainability

The simultaneous test indicates that Financial Technology (FinTech) and the Pentuple Bottom Line (PBL), when considered together, exert a positive and statistically significant influence on MSME Business Sustainability in Langsa City. Table 8 reports an F-value of 46.898 with a significance value of <0.001 , well under the 0.05 level. Hypothesis 3, which proposes that the two variables jointly have a significant effect on MSME Business Sustainability in Langsa City, is therefore accepted. The result shows that FinTech and PBL together help explain differences in MSME Business Sustainability. It also shows that sustainability cannot be understood from a financial standpoint alone; it has to be viewed through the interplay between technological-financial capability and the wider dimensions of sound business practice.

PBL complements FinTech by adding a multidimensional view of business sustainability. The framework rests on five dimensions: Profit, People, Planet, Purpose, and Policy. Profit stresses the economic viability and financial durability of the business. People addresses the interests and welfare of employees, customers, and the surrounding community. Planet highlights environmental responsibility and the reduction of harmful environmental effects. Purpose concerns the long-term aims, values, and direction of the business, while Policy concerns the business's capacity to comply with regulations and respond to government policy. Taken together, these dimensions imply that sustainable development requires MSMEs to balance economic goals against social, environmental, strategic, and regulatory concerns.

The joint significance of the two variables suggests that technological-financial capability and multidimensional sustainability considerations can strengthen one another in supporting MSME sustainability. FinTech can supply the technological infrastructure and financial mechanisms that make business activities more efficient, whereas PBL offers a broader framework that keeps business development from being driven solely by short-term financial gain. Digital payment systems, for instance, may raise transaction efficiency and widen financial access, and the PBL perspective then prompts owners to ask whether those gains also benefit stakeholders, the environment, long-term business goals, and compliance with relevant policies. The two variables therefore address different but complementary aspects of MSME sustainability.

This result agrees with earlier empirical work on the role of FinTech in MSME sustainability. Agustin and Ibrahim (2024) found that FinTech enhances sustainability performance through financial inclusion, which implies that digital financial technology

can broaden access to financial resources and underpin sustainable business performance. Cahyono and Suarantalla (2024) likewise showed that financial literacy, digital literacy, and financial technology bear on MSME business sustainability. Kisin and Setyahuni (2024) further demonstrated that financial technology, financial literacy, and financial inclusion are relevant to MSME sustainability. These studies lend empirical weight to the argument that technological and financial capabilities are important building blocks of MSME sustainability.

Research on the Pentuple Bottom Line also supports the finding. Wardokhi et al. (2023) studied the application of the Pentuple Bottom Line among MSMEs in South Tangerang and underscored its relevance for achieving business sustainability. Fadlilah et al. (2024) applied the concept to green accounting and sustainability, showing why economic, social, environmental, purpose-related, and policy considerations should be integrated into sustainability practice. Juliansyah et al. (2025) examined the role of the Pentuple Bottom Line in MSME sustainability and stressed its wider function in addressing sustainability beyond conventional financial indicators. Together, these findings strengthen the case for PBL as a framework for understanding MSME sustainability from a multidimensional angle.

By examining FinTech and PBL together, the significant simultaneous effect found here extends the discussion beyond studies that treat technological-financial capability and multidimensional sustainability as separate matters. FinTech mainly concerns how MSMEs can use technology to improve financial access, transaction processes, and business management, while PBL concerns the broader dimensions that determine whether a business can be sustained over the long term. Combining these perspectives yields a fuller explanation of MSME Business Sustainability, because sustainable businesses need both the capacity to adapt to technological and financial change and the ability to manage wider economic, social, environmental, purpose-related, and policy considerations.

CONCLUSION

This study concludes that combining Financial Technology with the Pentuple Bottom Line (PBL) lays an important groundwork for strengthening the business sustainability of MSMEs in Langsa City. The results show that digital financial capabilities and multidimensional sustainability practices reinforce one another, helping MSMEs keep their businesses running and adjust to shifting economic and business conditions. Financial Technology contributes by making financial activities more efficient and by opening access to digital financial services, whereas the PBL perspective extends sustainability beyond economic performance to cover People, Planet, Purpose, and Policy. These findings fulfill the research objective by showing that sustainable MSME development calls for more than technological and financial adaptation; it also requires the adoption of comprehensive, sustainability-oriented business practices. Accordingly, the study underscores the importance of integrating digital financial

transformation with the PBL approach as a basis for reinforcing the long-term sustainability of MSMEs in Langsa City.

REFERENCES

- Agustin, A. D., & Ibrahim, M. H. (2024). From exclusion to inclusion: The role of financial technology in enhancing sustainability performance in Indonesian Muslim MSMEs. *Journal of Finance, Economics and Business*, 3(2), 122–142. <https://doi.org/10.59827/jfeb.v3i2.147>
- Amory, J. D. S., J, R., & Hayadin, M. R. (2024). Integrasi teknologi informasi dan komunikasi dalam model bisnis UMKM: Kajian literatur tentang inovasi dan keberlanjutan. *Jurnal Minfo Polgan*, 13(2), 2455–2462. <https://doi.org/10.33395/jmp.v13i2.14519>
- Arsyad, M. R., Nurwanah, A., & Nur, M. (2023). Pengaruh transformasi sistem pencatatan keuangan dan digital marketing dengan Financial Technology sebagai variabel moderasi terhadap profitabilitas UKM Kota Makassar. *Jurnal Ilmiah Akuntansi Peradaban*, 9(2), 342–355. <https://doi.org/10.24252/jiap.v9i2.43398>
- Badan Pusat Statistik Kota Langsa. (2025). *Kota Langsa dalam angka 2025*. Badan Pusat Statistik Kota Langsa. <https://langsakota.bps.go.id/id/publication/2025/02/28/aaf04f61bb3ab5502fca2a35/langsa-municipality-in-figures-2025.html>.
- Budiandriani, Arifuddin, M., & Hamzah, F. F. (2025). Pengaruh FinTech, literasi keuangan, dan inklusi keuangan terhadap keberlangsungan usaha pelaku usaha kecil di Kota Makassar. *YUME: Journal of Management*, 8(2), 1170–1178. <https://doi.org/10.37531/yum.v8i2.9207>
- Cahyono, T. D., & Suarantalla, R. (2024). Dampak literasi keuangan, literasi digital dan finansial teknologi terhadap keberlanjutan bisnis pelaku UMKM di Kabupaten Sumbawa. *Jurnal Ilmiah Raflesia Akuntansi*, 10(2), 804–813. <https://doi.org/10.53494/jira.v10i2.604>
- Eliza, N. (2025). BRIDGING RURAL DIGITAL DIVIDES: Obstacles to E-Money Transactions in Langsa City's Micro-Businesses and Pathways to ASEAN Inclusive Finance. *Journal of Progressive Islamic Economics and Social Inquiry in Asia*, 1(1). 1-14. <https://journal.ccula.org/index.php/suluq/article/view/64>
- Fadlilah, M., Alam, S., & Tenriwaru. (2024). Green accounting: Penerapan Pentuple Bottom Line pada industri pengolahan rumput laut menuju sustainability development. *Indonesian Journal of Humanities and Social Sciences*, 5(3), 1391–1404. <https://doi.org/10.33367/ijhass.v5i3.5995>.
- Ghozali, I. (2018). *Aplikasi analisis multivariate dengan program IBM SPSS* (Edisi 9). Semarang: Badan Penerbit Universitas Diponegoro.
- Hapiz, M., Septia, L. P., Aprilianti, D., Aprilianto, D., Maulida, I., Muhammad, F., Shaafia, A., Maulana, M. H., & Herdiana, D. (2025). Analisis kebijakan pengembangan UMKM digital di Indonesia: Tantangan dan peluang. *Madani: Jurnal Ilmiah Multidisiplin*, 3(5), 36–44. <https://doi.org/10.5281/zenodo.15538100>.

- Ibnumasy, R. (2025). Stafsus Presiden dorong kemajuan UMKM di Depok lewat optimalisasi AI dan digital marketing. *Tribunnews Depok*. <https://depok.tribunnews.com/margonda-update/47224/stafsus-presiden-dorong-kemajuan-umkm-di-depok-lewat-optimalisasi-ai-dan-digital-marketing>.
- Juliansyah, E., Agoes, S., & Ahmar, N. (2025). Development of the Pentuple Bottom Line model in moderating the influence of financial literacy and financial inclusion on the sustainability of MSMEs in West Java. *Greenation International Journal of Economics and Accounting*, 3(2), 304–315. <https://doi.org/10.38035/gijea.v3i2.468>.
- Kisin, D. L., & Setyahuni, S. W. (2024). Pengaruh literasi keuangan, inklusi keuangan dan teknologi finansial (FinTech) terhadap keberlanjutan UMKM di Kota Semarang. *Jurnal Ekonomi Bisnis, Manajemen dan Akuntansi (JEBMA)*, 4(1), 116–129. <https://doi.org/10.47709/jebma.v4i1.3478>.
- Li, H., Lu, Z., & Yin, Q. (2023). The development of FinTech and SME innovation: Empirical evidence from China. *Sustainability*, 15(3), 2541–2551. <https://doi.org/10.3390/su15032541>.
- Manalu, J. P., Meutia, T., & Murni, M. (2024). Pengaruh Penerapan Ekonomi Digital, Ketersediaan Modal Kerja, Literasi Keuangan, Terhadap Kinerja UMKM di Kota Langsa. *EKOMA: Jurnal Ekonomi, Manajemen, Akuntansi*, 4(1), 1029–1047. <https://doi.org/10.56799/ekoma.v4i1.5383>.
- Nazara, D. S., Haryono, A., & Anas, Z. (2025). *UMKM cerdas di era digital: Panduan praktis menjadi unggul di pasar*. Padang: Takaza Innovatix Labs. ISBN 978-634-7130-68-6.
- Purnomo, E. G. S., Sukoharsono, E. G., Yanuwadi, B., Koderi, & Sukaton, O. Z. S. (2023). Sustainability criteria for SMEs using the Pentuple Bottom Line approach with the AHP method. *Jurnal Akuntansi dan Bisnis Indonesia*, 21(2), 663–675. https://doi.org/10.2991/978-2-38476-124-1_34
- Sugiyono. (2017). *Metode penelitian kuantitatif, kualitatif dan R&D* (Edisi ke-25). Bandung: Alfabeta.
- Syata, W. M. (2025). Peran usaha mikro kecil dan menengah (UMKM) dalam mendorong pertumbuhan ekonomi. *Ekopedia: Jurnal Ilmiah Ekonomi*, 1(2), 63–70. <https://doi.org/10.63822/sdsh9b41>.
- Wardokhi, W., Ruhayat, E., & Suripto, S. (2023). Penerapan konsep Pentuple Bottom Line pada UMKM di Kota Tangerang Selatan dalam mewujudkan keberlanjutan usaha. *Jurnal Akuntansi dan Bisnis Indonesia (JABISI)*, 4(2), 105–117. <https://doi.org/10.55122/jabisi.v4i2.1009>.