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Tax Knowledge, Tax Administration System Modernization, Tax Service Quality, and Taxpayer Satisfaction among MSMEs in Medan Area District, Indonesia

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ABSTRACT

This study examined the relationships of tax knowledge, tax administration system modernization and tax service quality with taxpayer satisfaction among industrial MSMEs in Medan Area District. The study employed a quantitative research design using primary data collected through a survey. The study population consisted of 112 industrial MSMEs in Medan Area District, of which 78 MSMEs were selected based on eligibility criteria. The analysis and statistical tests employed in this study consisted of validity and reliability, descriptive analysis, classical assumption testing, multiple linear regression, hypothesis testing and variable contribution. All research instruments were found to be valid and reliable based on data from 30 respondents. Based on data from 78 respondents, multiple regression showed positive associations for tax knowledge (B = 0.715; $p < 0.001$) and tax administration system modernization (B = 0.153; $p = 0.003$), and a negative association for service quality (B = −0.185; $p = 0.001$). The joint model was significant, $F(3,74) = 46.490$; $p < 0.001$, indicating that the predictor coefficients are not all zero. The model had $R^2 = 0.653$ and adjusted $R^2 = 0.639$. Tax knowledge and administrative modernization were positively related to taxpayer satisfaction, while the negative service-quality relationship requires further examination.

Keywords: Tax Knowledge, Tax Administration System Modernization, Tax Service Quality, Taxpayer Satisfaction, MSMEs.

INTRODUCTION

According to (Tiara & Wahyuni, 2023), taxes are the largest source of state revenue for financing social development and improving public welfare. MSMEs also contributes to the economy. (Santoso & Wulandari, 2023) stated that taxes paid by MSME owners contribute to state revenue in Indonesia. For MSME taxpayers, fulfilling tax obligations requires a simple administrative system and responsive tax services.

According to (Murdiati, 2024), taxpayer satisfaction is an important factor in tax product marketing activities, reflecting the alignment between taxpayer expectations, government services and tax products implementation in national development. Taxpayer satisfaction also reflects how well tax services and administration meet public needs. For MSME, satisfaction may depend on experiences with tax provisions, administration system, and services. Thus, taxpayer satisfaction needs to be examined alongside fulfillment tax obligations.

According to the 2024 Performance Report of KPP Pratama Medan Barat (Direktorat Jenderal Pajak, 2024), the tax office achieved its service satisfaction and tax education effectiveness targets but identified challenges requiring service optimization, satisfaction survey monitoring, and follow-up on unsatisfactory services. Medan Area District falls within the tax office's administrative jurisdiction under Directorate General of Taxes Regulation No. PER-06/PJ/2021 (Direktorat Jenderal Pajak, 2021). However, the report covers the broader jurisdiction and does not provide specific evidence of satisfaction among industrial MSME taxpayers in Medan Area District.

Tax knowledge may influence MSME taxpayer satisfaction in fulfilling tax obligations. According to (Aji et al., 2024), tax knowledge represents taxpayers' understanding of tax regulations. Taxpayers with higher education levels tend to have greater awareness of tax obligations. According to (Sunita et al., 2023), taxpayers need to understand the applicable tax system, rates, and penalties. Greater tax knowledge can improve their ability to fulfill tax obligations.

Taxpayer satisfaction may also be influenced by tax administration system modernization. According to (Primastiwi & Dwi, 2021), modernization improves administrative performance at the individual, group, and institutional levels to achieve efficiency, economy, and speed. (Nadapdap et al., 2026) stated that e-filing facilitates online tax return submission, making reporting faster and easier. Modernization enables MSME taxpayers to access tax services and fulfill obligations more effectively, potentially improving their satisfaction.

In addition to tax knowledge and modernization, tax service quality plays an important role in taxpayer satisfaction. According to (Hapsari, 2023), tax service quality refers to evaluations of tax officers, infrastructure, and supporting facilities in meeting taxpayers' administrative needs. High-quality tax services are expected to provide convenience, comfort, and certainty in paying taxes. (Herliani et al., 2025), stated that less responsive tax officers may cause confusion and discourage taxpayers from fulfilling their obligations. Therefore, services that meet taxpayers' expectations may increase satisfaction and strengthen relationships with tax authorities.

Accordingly, previous studies have examined taxpayer satisfaction in different contexts. (Handayani & Lie, 2022), examined individual taxpayers at KPP Pratama Medan Timur, focusing on tax service quality and tax knowledge. Meanwhile, (Sutanto et al., 2026) examined MSME taxpayers using Coretax in Medan Petisah District, focusing on online tutorial availability and tax knowledge. In the latter study, satisfaction was measured through content, accuracy, format, ease of use, and timeliness. Both studies found significant positive effects of their respective variables on taxpayer satisfaction. However, their respondent and service contexts differed. These studies have not established how tax knowledge, tax administration system modernization, and tax service quality are jointly associated with taxpayer satisfaction among industrial MSMEs holding a Taxpayer Identification Number (NPWP) and operating for at least one year. This study examines taxpayer satisfaction in relation to technology utilization, e-Filing, administrative efficiency, reliability, responsiveness, assurance, and data security among industrial MSMEs in Medan Area District. Taxpayer satisfaction concerns evaluations of tax services and administrative processes, whereas compliance concerns fulfilling tax obligations. MSMEs may comply while dissatisfied with tax services, or be satisfied without fully complying. This study is expected to expand evidence on industrial MSME taxpayer satisfaction and inform improvements in tax knowledge, tax administration system modernization, and tax service quality.

LITERATURE REVIEW

Tax Knowledge

According to (Malau et al., 2021), tax knowledge refers to information that enables taxpayers to determine appropriate actions in exercising their rights and fulfilling tax obligations. According to (Hendrawati et al., 2021), tax knowledge is taxpayers' ability to understand applicable tax regulations, acquired through education, training, or socialization. According to (Naradiasari & Wahyudi, 2022), tax knowledge refers to understanding developed through education or training aimed at changing behavior. Taxpayers are more likely to voluntarily comply when they understand basic taxation concepts. For MSME taxpayers, tax knowledge may help them understand tax regulations, rates, and reporting procedures. Understanding tax requirements may also reduce confusion when taxpayers using tax services. The Tax Knowledge indicators were adapted from (Nasiroh & Afiqoh, 2023):

1. Knowledge of tax functions
2. Understanding of tax regulations
3. Knowledge of tax rates and tax reporting procedures

Tax Administration System Modernization

According to (A. R. Amalia & Anwar, 2023), tax administration system modernization is a government effort to use advances in science and technology to maximize tax revenue targets. According to (Kewo et al., 2024), tax administration system modernization refers to renewing tax administration to make it more efficient, economical, and easier for individual taxpayers, thereby achieving taxpayer compliance. According to (D. Amalia et al., 2024), administrative system modernization is a reform aimed at improving services and efficiency. For MSME taxpayers, modernization may make tax procedures easier, faster, and more accessible. Technology and electronic facilities may reduce the time and effort required for administrative procedures. These improvements may provide more convenient tax services and be associated with taxpayer satisfaction. According to (Sukoyo & Sopiyana, 2023), the indicators of Tax Administration System Modernization are:

1. Utilization of technology
2. Utilization of e-filing facilities
3. Improvement or enhancement of administrative performance

Tax Service Quality

According to (Handoyo et al., 2024), tax service quality is the capacity of tax institutions to provide services that meet taxpayer expectations and promote satisfaction and trust. According to (Qhoirunnisa & Budiantara, 2023), tax service quality refers to tax authorities' effort to provide comfort when paying their taxes, thereby improving compliance. According to (Rohmah et al., 2021), tax service quality refers to service provide by government and tax authorities to fulfill taxpayers needs through positive attitudes and achieve satisfaction. Tax service quality may shape taxpayers' experiences when interacting with tax authorities. Reliable services may provide assistance, while responsive services may reduce difficulties in tax procedures. Assurance and data security may increase taxpayers' confidence. When services meet expectations, satisfaction may be higher. According to (Rohmah et al., 2021), the indicators of Tax Service Quality are:

1. Reliability
2. Responsiveness
3. Assurance
4. Data security

Taxpayer Satisfaction

According to (Mardikaningsih & Lestari, 2022), taxpayer satisfaction is an affective aspect experienced by taxpayers from fulfilling tax payment obligations. According to (Deva & Triyono, 2021), taxpayer satisfaction is a feeling of satisfied or dissatisfied with tax officials' services. According to (Kribiyantara et al., 2024), taxpayer satisfaction refers to taxpayers' feelings after comparing received outcomes with expectations. Taxpayer satisfaction in this study is grounded in the Expectancy-Disconfirmation Model. (Zhang et al., 2022) explain that this model compares expected and perceived service performance. Satisfaction is more likely when perceived performance meets or exceeds expectations. Thus, MSME taxpayers evaluate satisfaction based on their experiences and expectations. This study focuses on general tax service satisfaction rather than a particular service or electronic system. Satisfaction concerns service evaluations, whereas compliance concerns fulfill tax obligations. In this study, efficiency in taxpayer satisfaction refers to the effectiveness and efficiency of tax services within the overall service experience. According to (Kribiyantara et al., 2024), the indicators of Taxpayer Satisfaction are:

1. User Satisfaction
2. Effectiveness and efficiency
3. Fulfillment of expectations

The efficiency-related items in Tax Administration System Modernization (X2) and Taxpayer Satisfaction (Y) have different measurement focuses. X2 assesses the practicality and speed of tax administration processes, including e-Filing, whereas Y assesses perceived service benefits, such as saving time, costs, and effort. X2 emphasizes administrative-process performance, while Y evaluates service outcomes. All items were retained as administered to respondents.

Table 1.
Measurement of Research Variables

Variable	Indicator and Item Code	Source	Adaptation
Tax Knowledge (X1)	1. Knowledge of tax functions (X1.1–X1.2) 2. Understanding of tax regulations (X1.3–X1.4) 3. Knowledge of tax rates and tax reporting procedures (X1.5–X1.6)	(Nasiroh & Afiqoh, 2023)	Applied to industrial MSME taxpayers
Tax Administration System Modernization (X2)	1. Utilization of technology (X2.1–X2.2) 2. Utilization of e-filing facilities (X2.3–X2.4) 3. Improvement or enhancement of administrative performance (X2.5–X2.6)	(Sukoyo & Sopiyana, 2023)	Applied to industrial MSME taxpayers
Tax Service Quality (X3)	1. Reliability (X3.1–X3.2) 2. Responsiveness (X3.3–X3.4) 3. Assurance (X3.5–X3.6) 4. Data security (X3.7–X3.8)	(Rohmah et al., 2021)	Applied to tax services evaluated by industrial MSMEs
Taxpayer Satisfaction (Y)	1. User satisfaction (Y1–Y2) 2. Effectiveness and efficiency (Y3–Y4) 3. Fulfillment of expectations (Y5–Y6)	(Kribiyantara et al., 2024)	Adapted from e-system satisfaction to general tax-service satisfaction

Source: Processed research data, 2026

In Table 1, all items were measured using a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Item codes follow the administered questionnaire, while sources refer to the indicators used. Variable scores were calculated by summing item responses, ranging from 6 to 30 for tax knowledge, tax administration system modernization, and taxpayer satisfaction, and 8 to 40 for tax service quality. Higher scores indicated higher constructs level. All items were positively worded, requiring no reverse coding and all questionnaires were complete with no missing responses.
Based of the foregoing discussion and previous studies, the research framework is presented below:

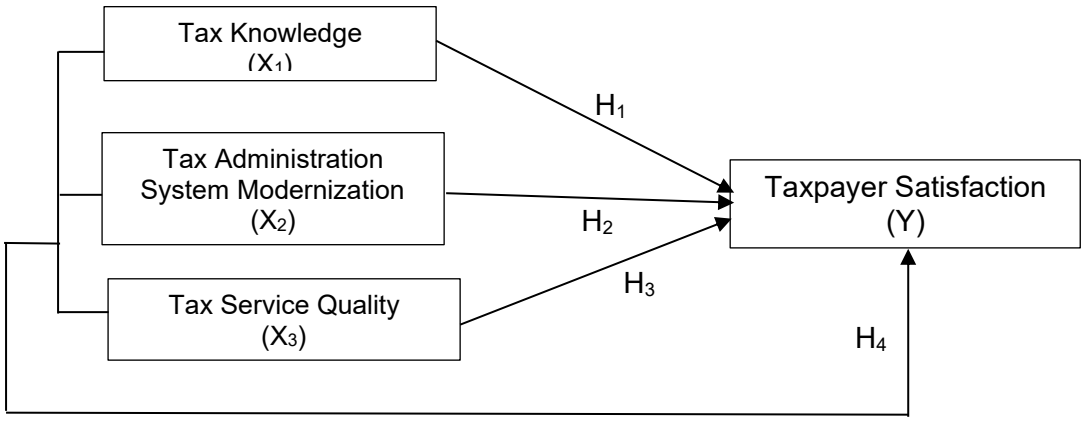


Figure 1. Conceptual Framework

Figure 1 presents Tax Knowledge, Tax Administration System Modernization, and Tax Service Quality as independent variables predicting Taxpayer Satisfaction. Based on the Expectancy-Disconfirmation Model (Zhang et al., 2022), satisfaction depends on how well tax services meet expectations. Tax knowledge may improve understanding of tax obligations, modernization may enchance administrative efficiency, and service quality may improve taxpayers' experiences. Previous studies by (Handayani & Lie, 2022) found a positive relationship between tax knowledge, tax service quality and taxpayer satisfaction among individual taxpayers at KPP Pratama Medan Timur. (Nurdiawanti & Akibah, 2021) reported a significant positive relationship between tax administration system modernization and taxpayer satisfaction among individual taxpayers in Central Jakarta. H1–H3 represent individual regression coefficient tests accounting for the other predictors, whereas H4 represents the joint significance through the F-test, not an additional independent relationship or interaction.

The proposed hypotheses are:
H_1: Tax Knowledge affects Taxpayer Satisfaction of MSMEs in Medan Area District.
H_2: Tax Administration System Modernization affects Taxpayer Satisfaction of MSMEs in Medan Area District.
H_3: Tax Service Quality affects Taxpayer Satisfaction of MSMEs in Medan Area District.
H_4: Tax Knowledge, Tax Administration System Modernization, and Tax Service Quality jointly affect Taxpayer Satisfaction of MSMEs in Medan Area District.

RESEARCH METHOD

This study uses a quantitative design with primary data collected through a survey of industrial MSMEs in Medan Area District from June to September 2026. According to (Sulung & Muspawi, 2024), primary data are obtained directly through surveys or experiments. Based on 2024 Central Statistics Agency (BPS) data, the population

comprises 112 industrial MSMEs, consisting of 52 small and 60 household industries, excluding seven medium and large industries. During field visits, the researchers identified 112 industrial MSMEs using BPS figures as a reference and screened to verify industrial activities, NPWP ownership, and operating duration. Eligibility required NPWP ownership and at least one year of operation. The sample was selected using purposive sampling. According to (Sulistiyo, 2023), purposive sampling selects data sources based on specific criteria.

Table 2.
Number of Large/Medium/Small Industrial Enterprises and Households by Subdistricts in Medan Area District, 2024

Subdistrict	Large/Medium Industry	Small Industry	Household Industry	Total
Pasar Merah Timur	1	2	15	18
Tegal Sari II	2	10	1	13
Tegal Sari III	–	1	5	6
Tegal Sari I	–	4	3	7
Sukaramai I	–	9	8	17
Kota Matsum II	4	1	2	7
Kota Matsum IV	–	–	–	–
Kota Matsum I	–	2	5	7
Sei Rengas Permata	–	3	10	13
Sukaramai II	–	–	–	–
Sei Rengas II	–	14	10	24
Pandau Hulu II	–	6	1	7
Medan Area	**7**	**52**	**60**	**119**

Source: (Badan Pusat Statistik Kota Medan, 2025)

Table 2 shows the distribution of industries in Medan Area District in 2024. Questionnaires were administered to MSMEs that met the following criteria:
1. MSMEs that have a Taxpayer Identification Number (NPWP).
2. MSMEs that have been operating for at least one year.

Table 3.
Sample Criteria

	Total
Industrial MSMEs located in Medan Area	112
MSMEs without a Taxpayer Identification Number (NPWP)	(26)
MSMEs operating for less than one year	(8)
MSMEs selected as the sample	78

Source: Processed research data, 2026

The screening excluded 26 MSMEs without an NPWP and eight other MSMEs operating for less than one year, resulting in 78 eligible MSMEs. All 78 questionnaires were completed by MSME owners involved in tax-related matters and analyzed. Participation was voluntary, and respondent information remained confidential. Before the main study, instrument testing involved 30 respondents outside the main sample, including individuals from MSMEs without an NPWP or employees not directly involved in tax matters. Although ineligible for the main sample, they had prior knowledge and experience with tax administration systems and tax services, allowing them to evaluate questionnaire items related to the research variables. These respondents were used only for validity and reliability testing. Data were analyzed using IBM SPSS Statistics 25. The analyses included:
1. Validity Test
2. Reliability Test
3. Descriptive Statistics

4. Classical Assumption Tests:
   a. Normality Test
   b. Heteroscedasticity Test
   c. Multicollinearity Test
5. Multiple Linear Regression Analysis
6. Hypothesis Test
   a. T-Test (Partial)
   b. F-Test (Simultaneous)
   c. Coefficient of Determination Test (R^2)
7. Variable Contribution Analysis

RESULTS

Validity Test

According to (Ghozali, 2018), validity testing assesses whether a questionnaire measures the intended variables. Pearson item-total correlations were calculated using data from 30 respondents. Each questionnaire item was correlated with its variable's total score, including the evaluated item. The critical r-value was 0.361, with 28 degrees of freedom (n − 2 = 30 − 2) at α = 0.05 (two-tailed). The results are presented in Table 4:

Table 4.
Validity Test Results

Number	Calculated r	Table r	Result
X1.1	0.757	0,361	Valid
X1.2	0.890	0,361	Valid
X1.3	0.809	0,361	Valid
X1.4	0.806	0,361	Valid
X1.5	0.876	0,361	Valid
X1.6	0.836	0,361	Valid
X2.1	0.843	0,361	Valid
X2.2	0.835	0,361	Valid
X2.3	0.691	0,361	Valid
X2.4	0.820	0,361	Valid
X2.5	0.822	0,361	Valid
X2.6	0.861	0,361	Valid
X3.1	0.444	0,361	Valid
X3.2	0.736	0,361	Valid
X3.3	0.850	0,361	Valid
X3.4	0.855	0,361	Valid
X3.5	0.818	0,361	Valid
X3.6	0.797	0,361	Valid
X3.7	0.780	0,361	Valid
X3.8	0.816	0,361	Valid
Y.1	0.649	0,361	Valid
Y.2	0.791	0,361	Valid
Y.3	0.809	0,361	Valid
Y.4	0.713	0,361	Valid
Y.5	0.902	0,361	Valid
Y.6	0.856	0,361	Valid

Source: Processed research data, 2026

Table 4 shows that all 26 questionnaire items exceeded the critical r-value of 0.361. Thus, all independent and dependent variable items met the validity criterion.

Reliability Test

According to (Ghozali, 2018), reliability testing assesses the internal consistency of questionnaire items. The test used 30 respondents, while the main analysis involved 78 MSME taxpayers. Cronbach's Alpha was calculated separately for the independent and dependent variables. Total scores were excluded. The results are presented in Table 5:

Table 5.
Reliability Test Results

Variable	Cronbach's Alpha	Description
Tax Knowledge (X_1)	0.907	Reliable
Tax Administration System Modernization (X_2)	0.896	Reliable
Tax Service Quality (X_3)	0.903	Reliable
Taxpayer Satisfaction (Y)	0.876	Reliable

Source: Processed research data, 2026

Table 5 shows that all Cronbach's Alpha values exceeded the 0.60 criterion, indicating that the instruments are reliable.

Descriptive Statistics

According to (Ghozali, 2018), descriptive statistics summarize data characteristics and distribution using measures such as mean, standard deviation, variance, maximum, minimum, sum, range, kurtosis, and skewness. Table 6 presents the descriptive statistics for the four research variables.

Table 6.
Descriptive Statistics Test Results

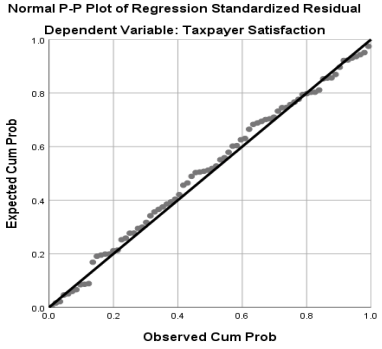
Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Tax Knowledge	78	9	29	22.76	4.510
Tax Administration System Modernization	78	8	30	21.38	6.091
Tax Service Quality	78	10	40	31.09	5.820
Taxpayer Satisfaction	78	9	26	19.46	4.287
Valid N (listwise)	78				

Source: Processed research data, 2026

Table 6 shows variations in the minimum, maximum, mean, and standard deviation values across the four research variables, with Tax Service Quality having the highest mean score.

Normality Test

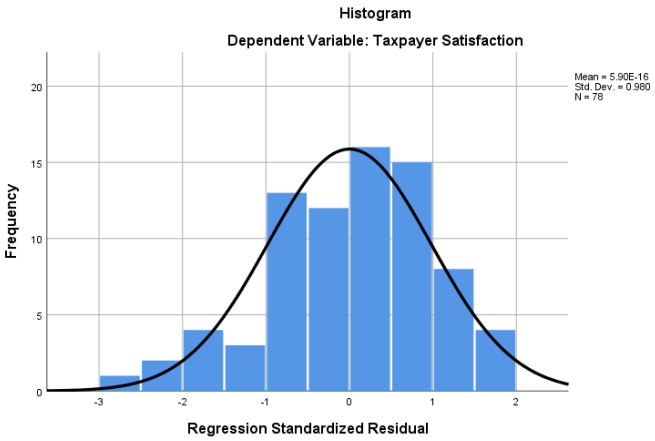
According to (Ghozali, 2018), the normality test assesses whether residuals in the regression model follow a normal distribution. The results are presented below:



Source: Processed research data, 2026

Figure 2. Plot of Normal Probability of Regression

Figure 2 shows that the residuals generally follow the reference line, suggesting no substantial departure from normality.



Source: Processed research data, 2026

Figure 3. Histogram Graph

Figure 3 shows an approximately symmetrical residual distribution, suggesting no substantial departure from normality.

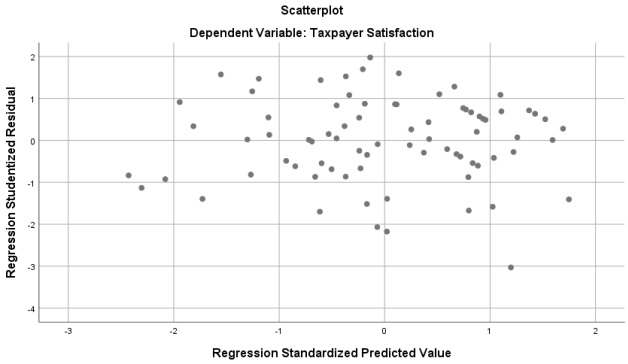
Table 7.
One-Sample Kolmogorov-Smirnov Test Result

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		78
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	2.52428416
Most Extreme Differences	Absolute	.058
	Positive	.044
	Negative	-.058
Test Statistic		.058
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.
Source: Processed research data, 2026

Table 7 shows that the normality test did not detect a significant departure of the residuals from normality at the 5% level.

Heteroscedasticity Test
According to (Ghozali, 2018), the heteroscedasticity test determines whether residual variance differs across observations in the regression model. The results are presented in Figure 4:



Source: Processed research data, 2026

Figure 4. Scatterplot

Figure 4 shows that the scatterplot are randomly distributed on the both side of the origin point (0) on the Y-axis with no clear pattern, indicating that the regression model is not heteroscedasticity.

Multicollinearity Test

According to (Ghozali, 2018), the commonly used cutoffs indicating multicollinearity are VIF ≥ 10 or Tolerance ≤ 0.10. The results are presented in Table 8:

Table 8.
Multicollinearity Test Result

Coefficients[a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Tax Knowledge	.939	1.065
	Tax Administration System Modernization	.951	1.051
	Tax Service Quality	.953	1.049

Source: Processed research data, 2026

Table 8 shows that all independent variables have Tolerance values above 0.10 and VIF values below 10, indicating no evidence of problematic multicollinearity in the regression model.

Multiple Linear Regression Analysis

According to (Ghodang & Hantono, 2020), multiple linear regression is a model involving more than one independent variable or predictor.
The regression equation is presented below:

$$\hat{Y} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

Remarks:
$\hat{Y}$: Taxpayer Satisfaction
X_1 : Tax Knowledge
X_2 : Tax Administration System Modernization
X_3 : Tax Service Quality
α : Constant
$\beta_1..\beta_2..\beta_3$: Regression Coefficients
e : Error

Table 9.
Multiple Linear Regression Analysis Result

Coefficients[a]				
Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	5.658	2.095	
	Tax Knowledge	.715	.067	.753
	Tax Administration System Modernization	.153	.049	.218
	Tax Service Quality	-.185	.052	-.251

Source: Processed research data, 2026

$$\hat{Y} = 5.658 + 0.715 \text{ Tax Knowledge} + 0.153 \text{ Tax Administration System Modernization} - 0.185 \text{ Tax Service Quality}$$

The equation can be interpreted as follows:

1. The constant (α) value is 5.658, representing predicted taxpayer satisfaction when tax knowledge, tax administration system modernization, and tax service quality are equal to zero. Since a value of zero is outside the observed measurement ranges of the variables, the constant does not represent an actual condition among the respondents.
2. The tax knowledge coefficient is 0.715, indicating that a 1-unit increase in its score is associated with a 0.715-unit increase in predicted taxpayer satisfaction, holding the other predictors constant.
3. The tax administration system modernization coefficient is 0.153, indicating that a 1-unit increase in its score is associated with a 0.153-unit increase in predicted taxpayer satisfaction, holding the other predictors constant.
4. The tax service quality coefficient is -0.185, indicating that a 1-unit increase in its score is associated with a 0.185-unit decrease in predicted taxpayer satisfaction, holding the other predictors constant.

T-Test (Partial)
According to (Ghozali, 2018), the t-test assesses the individual contribution of each independent variable to the dependent variable. The results are presented in Table 10:

Table 10.
T-Test Result

Coefficients[a]			
Model		t	Sig.
1	(Constant)	2.700	.009
	Tax Knowledge	10.653	<.001
	Tax Administration System Modernization	3.108	.003
	Tax Service Quality	-3.587	.001

a. Dependent Variable: Taxpayer Satisfaction
Source: Processed research data, 2026

Table 10 shows a critical t-value of 1.99254 at α = 0.05 (two-tailed), with 74 degrees of freedom (78 − 3 − 1). Tax knowledge has a t-value of 10.653, $p < 0.001$. This indicates that tax knowledge has a significant positive effect on taxpayer satisfaction among MSMEs in Medan Area District. The analysis results show that tax administration system modernization has a t-value of 3.108, $p = 0.003$. This indicates that tax administration system modernization has a significant positive effect on taxpayer satisfaction among MSMEs in Medan Area District. The analysis results show that tax service quality has a t-value of -3.587, with an absolute t-value of 3.587, $p = 0.001$. This indicates that tax

service quality has a significant negative effect on taxpayer satisfaction among MSMEs in Medan Area District.

F-Test (Simultaneous)
According to (Kurniawati, 2024), the F-test assesses the joint significance of independent variables by comparing the calculated F-value with the critical F-value. The results are presented in Table 11:

Table 11.
F-Test Result

ANOVA[a]				
Model		df	F	Sig.
1	Regression	3	46.490	<.001[b]
	Residual	74		
	Total	77		

a. Dependent Variable: Taxpayer Satisfaction
b. Predictors: (Constant), Tax Service Quality , Tax Administration System Modernization , Tax Knowledge
Source: Processed research data, 2026

Table 11 shows that F(3,74) = 46.490 exceeds the critical F-value of 2.73 at α = 0.05 ($p < 0.001$). Thus, tax knowledge, tax administration system modernization, and tax service quality are jointly affect taxpayer satisfaction among MSMEs in Medan Area District.

Coefficient of Determination Test (R^2)
According to (Ghozali, 2018), this measure assesses how well the regression model explains variation in the outcome variable. The results of the Coefficient of Determination (R^2) are presented in Table 12:

Table 12.
Coefficient of Determination (R^2) Result

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.808[a]	.653	.639	2.575

Source: Processed research data, 2026

Table 12 shows that R^2 is 0.653, indicating that 65.3% of the variation in Taxpayer Satisfaction scores is explained by Tax Knowledge, Tax Administration System Modernization, and Tax Service Quality. The Adjusted R^2 of 0.639 represents the adjusted explanatory value of the model considering the number of predictors and sample size. The remaining variation may reflect other factors, unexplained variation, or measurement error.

Variable Contribution Analysis
According to (Irianto et al., 2025), the share of each independent variable in explaining the dependent variable is determined by its effective and relative contributions. Table 13 presents zero-order Pearson correlations based on data 78 respondents.

Table 13.
Zero-order Pearson Correlation

Independent Variable	Zero-order Pearson Correlation
Tax Knowledge	0.747
Tax Administration System Modernization	0.324
Tax Service Quality	-0.080

Source: Processed research data, 2026

Pearson correlation coefficient in Table 13 were used to calculate each variable contribution by multiplying its standardized regression coefficient (Beta) by its zero-order Pearson correlation coefficient with Taxpayer Satisfaction (Y), then multiplying the result by 100% (Rahmadani & Sari, 2024). The results are presented in Table 14:

Table 14.
Variable Contribution Analysis Result

Independent Variable	Standardized Coefficients Beta	Zero-order Pearson Correlation with Y	*100%	Variable Contribution (%)
Tax Knowledge	0.753	0.747	*100%	56.25%
Tax Administration System Modernization	0.218	0.324	*100%	7.06%
Tax Service Quality	-0.251	-0.080	*100%	2.01%

Source: Processed research data, 2026

These effective contributions represent shares of the variation explained by the regression model, not causal effect percentages. Table 14 shows that tax knowledge contributed 56.25%. Tax administration system modernization contributed 7.06%. Tax service quality contributed 2.01%. Their total of 65.32% is consistent with R^2 = 65.3%, allowing for rounding.

DISCUSSION

The Influence of Tax Knowledge on Taxpayer Satisfaction

According to the partial test results, Tax Knowledge has a t-value of 10.653, $p < 0.001$, indicating a significant positive effect on Taxpayer Satisfaction among MSMEs in Medan Area District. Thus, H_1 is accepted. Prior studies by (Handayani & Lie, 2022) and (Sutanto et al., 2026) found that tax knowledge has a significant positive effect on taxpayer satisfaction. This finding differs from (Sunita et al., 2023), who found that tax knowledge has no significant effect on taxpayer satisfaction in partial test. This difference may reflect variations in respondents and research contexts The results suggest that MSME taxpayers with higher Tax Knowledge tend to report higher Taxpayer Satisfaction.

The Effect of Tax Administration System Modernization on Taxpayer Satisfaction

According to the partial test results, Tax Administration System Modernization has a t-value of 3.108, $p = 0.003$, indicating a significant positive effect on Taxpayer Satisfaction among MSMEs in Medan Area District. Thus, H_2 is accepted. Prior studies by (Nurdiawanti & Akibah, 2021) found that tax administration system modernization has a significant positive effect on taxpayer satisfaction and (Ramadhan & Nurhayati, 2023) found a significant positive direct effect even when tax service quality as an intervening variable. The results suggest that continued tax administration system modernization may support greater administrative efficiency.

The Effect of Tax Service Quality on Taxpayer Satisfaction

According to the partial test results, Tax Service Quality has an absolute t-value of 3.587, $p = 0.001$, indicating a significant negative effect on Taxpayer Satisfaction among MSMEs in Medan Area District. Since H3 proposed an effect without specifying its direction, the significant negative result supports H3. Higher scores indicate better perceived tax service quality and greater taxpayer satisfaction, respectively. This negative direction differs from the expected positive relationship. Prior studies by (Erwansyahi & Barusman, 2023) reported a significant positive effect of tax service quality on taxpayer satisfaction. While, (Nurdiawanti & Akibah, 2021) found a significant

negative effect of tax service quality on taxpayer satisfaction, consistent with this study. Tax Service Quality was measured through four indicators: reliability, responsiveness, assurance, and data security. The negative result may be related to differences in service experiences, respondent characteristics, or measurement context. However, these factors were not examined and require further investigation. The results suggest that improvements in tax services should consider the specific service dimensions and experiences of MSME taxpayers.

The Effect of Tax Knowledge, Tax Administration System Modernization and Tax Service Quality on Taxpayer Satisfaction

According to the simultaneous test of Tax Knowledge, Tax Administration System Modernization, and Tax Service Quality, $F(3,74) = 46.490 > 2.73$; $p < 0.001$. Indicating that the three variables jointly affects Taxpayer Satisfaction among MSMEs in Medan Area District. Thus, H_4 is accepted. The significant joint result does not mean that each predictor has the same direction or is individually significant. (Sunita et al., 2023) found that the application of E-Filling and tax knowledge simultaneously had a significant effect on Taxpayer Satisfaction, although tax knowledge was not significant in their partial test, while (Nurdiawanti & Akibah, 2021) examined the joint effects of tax socialization, tax administration system modernization, and tax service quality on taxpayer satisfaction. In contrast, this study jointly examined tax knowledge, tax administration system modernization, and tax service quality. The results suggest that tax knowledge supports understanding of tax obligations, modernization supports administrative efficiency, and service quality concerns access to tax-related information.

CONCLUSION

This study finds that tax knowledge ($B = 0.715$; $p < 0.001$) and tax administration system modernization ($B = 0.153$; $p = 0.003$) are positively and significantly associated with taxpayer satisfaction, whereas service quality has a significant negative association with satisfaction ($B = -0.185$; $p = 0.001$), accounting for the other predictors. The joint model is significant, $F(3,74) = 46.490$; $p < 0.001$, indicating that the predictor coefficients are not all zero. $R^2 = 0.653$ means that the model explains 65.3% of variation in sample satisfaction scores; adjusted $R^2 = 0.639$ accounts for predictor count and sample size. The findings describe associations in the study sample and do not establish changes in satisfaction caused by an intervention.

RECOMMENDATION

This study is limited to 78 MSMEs in Medan Area District selected from a specific business list based on NPWP ownership and business-age criteria, limiting the generalizability of the findings to other MSMEs. Questionnaire data were collected during one period, so the results describe associations rather than changes over time or causal effects. Since the same respondents assessed knowledge, modernization, service quality, and satisfaction general perceptions or response tendencies may affect the observed relationships, although this does not necessarily indicate biased responses. The negative relationship between Tax Service Quality and Taxpayer Satisfaction should be interpreted carefully after confirming the coding and analysis. It does not establish that better service causes lower satisfaction or justify reducing service quality. Practical recommendations should consider the tax service context, measurement, and respondents' experiences. Future studies could expand business and geographic coverage, clarify respondents' prior service experiences, and collect data at multiple times. Service-use records or complaints could complement questionnaire responses to assess whether the negative relationship persists across contexts and measurements. Practical suggestions such as tax training or service improvements should also be evaluated through future research, as their effectiveness was not tested in this study.

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