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Tax Knowledge, Tax Sanctions, and Perceived Tax Administration Modernization in Relation to MSME Taxpayer Compliance in Tangerang City

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Abstract: Taxpayer compliance among micro, small, and medium enterprises (MSMEs) remains a challenge due to differences in tax knowledge, perceptions of sanctions, and experiences with digital tax administration. Previous studies have reported inconsistent findings regarding these determinants, highlighting the need for context-specific investigation. **Objective:** This study aimed to examine the individual and simultaneous associations of tax knowledge, tax sanctions, and perceptions of tax administration modernization with MSME taxpayer compliance in Tangerang City, Indonesia. **Method:** A quantitative cross-sectional survey involved 153 MSME operators selected through purposive sampling. Data were collected using structured questionnaires and analyzed using multiple linear regression in SPSS version 30. **Findings:** All three predictors demonstrated positive and statistically significant associations with taxpayer compliance: tax knowledge ($\beta = 0.482$; $t = 8.113$; $p < 0.001$), tax sanctions ($\beta = 0.235$; $t = 4.151$; $p < 0.001$), and perceptions of tax administration modernization ($\beta = 0.280$; $t = 5.279$; $p < 0.001$). The overall regression model was statistically significant ($F = 138.504$; $p < 0.001$), with an adjusted R^2 of 0.731. **Implications:** The findings support consideration of taxpayer education, transparent communication of tax sanctions, and accessible digital taxation services in MSME taxpayer assistance programs. **Originality:** This study compares the relative associations of cognitive, regulatory, and technological determinants within a single regression model involving registered MSME taxpayers in Tangerang City.
Keywords: Tax Knowledge; Tax Sanctions; Tax Administration Modernization; Taxpayer Compliance; MSMEs.

INTRODUCTION

Taxation represents a fundamental source of government revenue and plays a strategic role in financing public infrastructure, providing essential services, and supporting sustainable economic development. In Indonesia, Micro, Small, and Medium Enterprises (MSMEs) constitute an important segment of the national economy; however, ensuring consistent tax compliance among MSME operators remains a significant administrative challenge. Tax compliance requires not only formal business registration but also adequate knowledge of tax regulations, awareness of reporting and payment obligations, and the ability to utilize increasingly digitalized tax administration services. Previous studies have identified tax knowledge, sanctions, administrative procedures, and technological accessibility as relevant factors associated with MSME taxpayer compliance (Putra, 2020; Gulo, 2021; Nugroho & Apriladiestya, 2023; Yanti & Wijaya, 2023). The increasing digitalization of tax administration has introduced opportunities to simplify compliance procedures, improve service accessibility, and reduce administrative burdens, although technological transformation also requires sufficient taxpayer capabilities and institutional support (Organisation for Economic Co-operation and Development [OECD], 2023, 2025). In Tangerang City, the expansion and formalization of MSME activities have increased the importance of understanding whether taxpayers possess sufficient knowledge, perceive tax sanctions as meaningful, and consider modern tax administration systems accessible and beneficial. Consequently, examining the relationship between these factors and MSME taxpayer compliance is essential for developing evidence-informed strategies to strengthen voluntary compliance and improve the effectiveness of tax administration.

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Previous empirical studies have examined the determinants of MSME taxpayer compliance from cognitive, regulatory, and technological perspectives, although their findings have not always been consistent. Tax knowledge is generally associated with taxpayers' understanding of regulations, reporting procedures, payment mechanisms, and statutory obligations. Putra (2020), Nugroho and Apriladiestya (2023), and Saputri et al. (2025) emphasized the relevance of tax knowledge to compliance, while Nisa and Subagio (2024) reported contrasting evidence regarding the significance of tax understanding. Research by Nabila and Rahajeng (2023) also identified positive relationships between tax knowledge, modernization of tax administration, and MSME taxpayer compliance. Regarding regulatory enforcement, Gulo (2021), Fadhila et al. (2026), and Yanti and Wijaya (2023) examined the role of tax sanctions in encouraging taxpayers to fulfill their obligations, whereas Maulida and Chairina (2026) highlighted the importance of considering other factors, including tax literacy and digitalization. Furthermore, Novita et al. (2024) investigated the relationship between modernization of tax administration, tax knowledge, tax sanctions, and taxpayer compliance among MSMEs in East Jakarta. Ainiyah and Febriani (2023) similarly examined these determinants while considering tax socialization, whereas Pratama and Urumsah (2024) investigated modernization of tax administration as a moderating variable. These empirical relationships can be interpreted through the Theory of Planned Behavior, which explains behavioral intentions through attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991); the economic deterrence perspective, which emphasizes the consequences of noncompliance (Allingham & Sandmo, 1972); and the Technology Acceptance Model, which identifies perceived usefulness and perceived ease of use as important determinants of technology acceptance (Davis, 1989). Collectively, these studies suggest that taxpayer compliance is associated with multiple behavioral and institutional factors, although the relative importance of individual determinants may vary across research settings.

Despite the substantial literature on MSME taxpayer compliance, several empirical and contextual issues remain relevant for further investigation. First, previous studies have reported differences in the statistical significance and relative importance of tax knowledge, sanctions, and tax administration modernization, suggesting that their associations with compliance may depend on taxpayer characteristics, institutional conditions, and research settings (Nisa & Subagio, 2024; Novita et al., 2024; Maulida & Chairina, 2026; Saputri et al., 2025). Second, although prior research has examined these variables individually and jointly, their relative contributions require further assessment in specific local MSME populations, particularly where taxpayers differ in business experience, regulatory understanding, and familiarity with digital taxation services. Third, studies conducted in different Indonesian regions provide valuable evidence but do not necessarily establish that the same patterns apply to registered MSME taxpayers in Tangerang City (Nabila & Rahajeng, 2023; Ainiyah & Febriani, 2023; Pratama & Urumsah, 2024). Therefore, the research gap addressed in the present study concerns the need for additional context-specific evidence regarding the relative associations of cognitive, regulatory, and technological factors with MSME taxpayer compliance. The contribution of this study does not lie in introducing an entirely new combination of variables, since comparable models have already been investigated. Rather, its empirical contribution lies in examining the three determinants within a common multiple-regression framework among MSME taxpayers in Tangerang City and comparing their standardized associations with compliance. By integrating these factors, the study provides a context-specific assessment that may complement existing findings and inform the development of more targeted taxpayer assistance and administrative strategies.

Based on the identified research problem and empirical gap, this study aims to examine the relationships between Tax Knowledge, Tax Sanctions, Perceptions of Tax Administration Modernization, and MSME Taxpayer Compliance in Tangerang City, Indonesia. Specifically, the study seeks to determine the individual associations of tax knowledge, tax sanctions, and perceptions of tax administration modernization with taxpayer compliance; evaluate their joint statistical significance; and compare their relative contributions within the estimated regression model. The research employs a quantitative associative approach using questionnaire data obtained from 153 purposively selected MSME operators who possess Taxpayer Identification Numbers (NPWP) and have previous tax-reporting experience. Multiple linear regression analysis is used to evaluate the proposed relationships. From a theoretical perspective, the study draws on the Theory of Planned Behavior, Deterrence Theory, and Technology Acceptance Model to interpret the cognitive, regulatory, and technological dimensions of taxpayer compliance without claiming to directly test the full mechanisms of these theories. From a practical perspective, the findings are expected to provide empirical considerations for tax authorities, particularly local tax service offices, in designing taxpayer education initiatives, communicating tax enforcement policies, and improving the accessibility and usability

of digital tax administration services. The study also contributes additional evidence to the literature on MSME taxpayer compliance while acknowledging that its cross-sectional design and purposive sampling approach limit causal inference and broader statistical generalization.

RESEARCH METHOD

Research Design

This study employed a quantitative, cross-sectional research design to examine the relationships between Tax Knowledge, Tax Sanctions, Perceptions of Tax Administration Modernization, and MSME Taxpayer Compliance in Tangerang City, Indonesia. The research adopted an associative approach to assess the statistical relationships between the independent and dependent variables. Tax Knowledge (X_1), Tax Sanctions (X_2), and Perceptions of Tax Administration Modernization (X_3) were specified as the independent variables, while MSME Taxpayer Compliance (Y) was the dependent variable. The study examined both the individual associations of the predictors and their collective relationship with taxpayer compliance. Given the observational design, the analysis was intended to identify statistical associations rather than establish causal effects.

Population and Sampling

The target population comprised MSME operators registered in Tangerang City. The original research document reported 58,692 MSME operators holding a Business Identification Number (*Nomor Induk Berusaha*, NIB), although the source and reference year of this population figure require confirmation. Respondents were selected using non-probability purposive sampling. The eligibility criteria included operating an active MSME in Tangerang City, possessing a Taxpayer Identification Number (*Nomor Pokok Wajib Pajak*, NPWP), having at least one year of experience in tax reporting, and agreeing to participate in the study. A total of 153 respondents who met the specified criteria were included in the analysis. Because the sampling procedure was non-probabilistic, the findings should not be interpreted as statistically representative of all MSME taxpayers in Tangerang City.

Research Instruments and Operational Definitions

Primary data were collected using a structured questionnaire with Likert-type response items. The instrument measured four research constructs: Tax Knowledge, Tax Sanctions, Perceptions of Tax Administration Modernization, and MSME Taxpayer Compliance. Tax Knowledge referred to respondents' understanding of taxation rules and obligations. Tax Sanctions represented respondents' perceptions of the consequences associated with non-compliance. Perceptions of Tax Administration Modernization concerned respondents' evaluations of modernized taxation procedures and services, particularly those involving digital administration. MSME Taxpayer Compliance referred to respondents' reported fulfillment of applicable taxation obligations. The original validity-testing table contained 28 questionnaire items distributed across the four constructs. However, the methodology section separately reported 20 indicators. This discrepancy must be reconciled against the original questionnaire and item coding before the final number of measurement indicators is stated.

Data Collection and Instrument Quality Assessment

Questionnaires were administered to eligible MSME operators in Tangerang City, and responses from 153 participants were included in the statistical analysis. Instrument quality was assessed through validity and reliability testing using SPSS version 30. Internal consistency was evaluated using Cronbach's alpha, with reported coefficients of 0.654 for Tax Knowledge, 0.728 for Tax Sanctions, 0.744 for Perceptions of Tax Administration Modernization, and 0.683 for MSME Taxpayer Compliance. These coefficients were interpreted with consideration of the study context and the measurement characteristics of each construct. Before regression analysis, the original study also assessed classical regression assumptions, including normality, multicollinearity, and heteroscedasticity. Normality was examined using the One-Sample Kolmogorov–Smirnov test and Normal P–P Plot, while heteroscedasticity was evaluated using the Glejser test and a scatterplot. The exact data collection period, response scale categories, and questionnaire administration procedures require confirmation from the research records

Data Analysis and Hypothesis Testing

Data were analyzed using multiple linear regression in SPSS version 30 to evaluate the relationships between the three independent variables and MSME Taxpayer Compliance. The regression model was specified as follows:

$$Y = \alpha + b_1X_1 + b_2X_2 + b_3X_3 + \varepsilon \quad (1)$$

where Y denotes MSME Taxpayer Compliance; α represents the regression intercept; b_1, b_2, and b_3 are the unstandardized regression coefficients; X_1 denotes Tax Knowledge; X_2 denotes Tax Sanctions; X_3 denotes Perceptions of Tax Administration Modernization; and ε represents the error term. Individual regression coefficients were evaluated using t-tests, while the overall model was assessed using the F-test. The coefficient of determination (R^2) and adjusted R^2 were used to evaluate the proportion of variation in taxpayer compliance explained by the regression model. Statistical significance was evaluated at the 5% level ($\alpha = 0.05$). Standardized regression coefficients were also considered to compare the relative magnitudes of the associations between the predictors and taxpayer compliance.

RESULTS AND DISCUSSION

Results

Overview of the Research Object

This study examined the effects of Tax Knowledge, Tax Sanctions, and Perceptions of Tax Administration Modernization on the Taxpayer Compliance of Micro, Small, and Medium Enterprises (MSMEs) in Tangerang City, Indonesia. MSMEs contribute significantly to local economic development through employment generation, business activities, and tax revenue. Nevertheless, taxpayer compliance among MSME operators remains a concern, particularly regarding their understanding of tax regulations, perceptions of tax enforcement, and ability to utilize digital tax administration services.

The research employed a quantitative approach using primary data collected through questionnaires distributed both directly and online. A total of 153 MSME operators who met the predetermined sampling criteria participated in the study. All respondents possessed a Taxpayer Identification Number (NPWP), ensuring their relevance to the research objectives. The collected data were analyzed using multiple linear regression with SPSS version 30 to determine the relationships between the independent variables and MSME taxpayer compliance.

Respondent Characteristics

Table 1. Respondent Characteristics

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	72	47.1
	Female	81	52.9
Age	< 25 years	1	0.7
	25–35 years	94	61.4
	36–45 years	56	36.6
	> 45 years	2	1.3
Business Duration	< 1 year	3	2.0
	1–3 years	45	29.4
	4–6 years	72	47.1
	> 6 years	33	21.6
Business Sector	Culinary	53	34.6
	Trading	44	28.8
	Services	37	24.2
	Manufacturing	19	12.4
	Others	0	0.0
Taxpayer Identification Number (NPWP) Ownership	Has NPWP	153	100.0
	Does not have NPWP	0	0.0

Source: Primary data processed, 2026.

Table 1 presents the demographic and business characteristics of the 153 respondents. Based on gender, 72 respondents (47.1%) were male, while 81 respondents (52.9%) were female. This distribution indicates a relatively balanced representation of male and female MSME operators, with a slightly higher proportion of female respondents.

Regarding age, most respondents belonged to the 25–35-year age group, accounting for 94 individuals (61.4%), followed by the 36–45-year age group with 56 individuals (36.6%). Only one respondent (0.7%) was younger than 25 years, while two respondents (1.3%) were older than 45 years. These findings indicate that the sample was predominantly composed of MSME operators within the economically productive age range.

In terms of business duration, 72 respondents (47.1%) had operated their businesses for 4–6 years, followed by 45 respondents (29.4%) with 1–3 years of business experience and 33 respondents (21.6%) with more than six years of experience. Only three respondents (2.0%) had operated their businesses for less than one year. This distribution suggests that most respondents had accumulated sufficient business experience to provide informed assessments of their taxation practices.

Regarding business sectors, culinary enterprises represented the largest category, comprising 53 respondents (34.6%), followed by trading businesses with 44 respondents (28.8%), service enterprises with 37 respondents (24.2%), and manufacturing or production businesses with 19 respondents (12.4%). All 153 respondents (100%) possessed an NPWP, consistent with the inclusion criteria established in the research methodology.

Overall, the respondent characteristics demonstrate that the sample included MSME operators from various business sectors and levels of business experience. However, the findings should be interpreted within the characteristics of the purposively selected sample rather than generalized to all MSMEs in Tangerang City.

Descriptive Statistical Analysis

Table 2. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Standard Deviation
Tax Knowledge (X_1)	153	10.00	33.00	28.37	3.645
Tax Sanctions (X_2)	153	10.00	33.00	27.31	4.220
Perceptions of Tax Administration Modernization (X_3)	153	11.00	34.00	26.58	4.636
MSME Taxpayer Compliance (Y)	153	10.00	33.00	28.33	3.692

Source: Primary data processed using SPSS version 30 (2026).

Table 2 summarizes the descriptive statistics of the four research variables based on 153 valid observations. Tax Knowledge (PP) recorded a mean score of 28.37, with a standard deviation of 3.645 and observed scores ranging from 10.00 to 33.00. This indicates that respondents generally reported relatively high levels of tax knowledge, although variations remained among individual respondents.

Tax Sanctions (SP) had a mean score of 27.31 and a standard deviation of 4.220, with scores ranging from 10.00 to 33.00. These results indicate differences in respondents' perceptions of the application and consequences of tax sanctions.

Perceptions of Tax Administration Modernization (PSM) recorded a mean score of 26.58 and the highest standard deviation among the independent variables, at 4.636. The observed scores ranged from 11.00 to 34.00. The relatively higher dispersion suggests that respondents had more varied perceptions of modern tax administration systems, potentially reflecting differences in their experiences with digital taxation services.
Meanwhile, Taxpayer Compliance (KP) recorded a mean score of 28.33, with a standard deviation of 3.692 and scores ranging from 10.00 to 33.00. This finding indicates that respondents generally reported relatively high levels of taxpayer compliance.

Among the four variables, Perceptions of Tax Administration Modernization exhibited the greatest variability. This result highlights the importance of examining differences in how MSME operators perceive the accessibility, convenience, and usefulness of digital tax administration services.

Validity and Reliability Tests
Table 3. Validity Test Results

Variable	Item Code	Calculated r	Critical r	Sig.	Classification
Tax Knowledge (X_1)	PP.1	0.574	0.159	0.000	Valid
	PP.2	0.569	0.159	0.000	Valid
	PP.3	0.618	0.159	0.000	Valid
	PP.4	0.602	0.159	0.000	Valid
	PP.5	0.474	0.159	0.000	Valid
	PP.6	0.559	0.159	0.000	Valid
	PP.7	0.601	0.159	0.000	Valid
Tax Sanctions (X_2)	SP.1	0.607	0.159	0.000	Valid
	SP.2	0.591	0.159	0.000	Valid
	SP.3	0.669	0.159	0.000	Valid
	SP.4	0.517	0.159	0.000	Valid
	SP.5	0.662	0.159	0.000	Valid
	SP.6	0.590	0.159	0.000	Valid
	SP.7	0.664	0.159	0.000	Valid
Perceptions of Tax Administration Modernization (X_3)	PSM.1	0.746	0.159	0.000	Valid
	PSM.2	0.612	0.159	0.000	Valid
	PSM.3	0.588	0.159	0.000	Valid
	PSM.4	0.639	0.159	0.000	Valid
	PSM.5	0.603	0.159	0.000	Valid
	PSM.6	0.640	0.159	0.000	Valid
	PSM.7	0.687	0.159	0.000	Valid
MSME Taxpayer Compliance (Y)	KP.1	0.657	0.159	0.000	Valid
	KP.2	0.521	0.159	0.000	Valid
	KP.3	0.588	0.159	0.000	Valid
	KP.4	0.523	0.159	0.000	Valid
	KP.5	0.571	0.159	0.000	Valid
	KP.6	0.595	0.159	0.000	Valid
	KP.7	0.700	0.159	0.000	Valid

Source: Primary data processed using SPSS version 30 (2026).

Table 3 presents the validity test results for the questionnaire items used to measure the four research variables. The validity assessment was conducted by comparing the calculated correlation coefficient (r-count) with the critical correlation value (r-table) of 0.159 at the 5% significance level.

For Tax Knowledge, the calculated correlation coefficients ranged from 0.474 to 0.618. Tax Sanctions produced correlation coefficients ranging from 0.517 to 0.669, while Perceptions of Tax Administration Modernization recorded values between 0.588 and 0.746. Taxpayer Compliance exhibited correlation coefficients ranging from 0.521 to 0.700.

All questionnaire items had calculated correlation coefficients greater than the critical value of 0.159, with reported significance values of 0.000. These findings indicate that all questionnaire items satisfied the validity criteria applied in this study and were therefore retained for subsequent statistical analysis.

Table 4. Reliability Test Results

Variable	Cronbach's Alpha	Reliability Threshold	Classification
Tax Knowledge (X_1)	0.654	0.60	Reliable
Tax Sanctions (X_2)	0.728	0.60	Reliable
Perceptions of Tax Administration Modernization (X_3)	0.744	0.60	Reliable
MSME Taxpayer Compliance (Y)	0.683	0.60	Reliable

Source: Primary data processed using SPSS version 30 (2026).

Table 4 presents the reliability test results based on Cronbach's Alpha coefficients. Tax Knowledge obtained a Cronbach's Alpha value of 0.654, while Tax Sanctions recorded a value of 0.728. Perceptions of Tax Administration Modernization demonstrated the highest reliability coefficient, at 0.744, followed by Taxpayer Compliance, at 0.683.

All variables exceeded the minimum reliability threshold of 0.60 adopted in this study. Accordingly, the instruments were considered to demonstrate acceptable internal consistency under the selected criterion. Nevertheless, the coefficients for Tax Knowledge and Taxpayer Compliance indicate relatively modest internal consistency compared with those for Tax Sanctions and Perceptions of Tax Administration Modernization.

Classical Assumption Tests

Normality Test

Table 5. Normality Test Results

Parameter	Statistic	Unstandardized Residual
N		153
Normal Parameters[ab]	Mean	0.0000000
	Std. Deviation	1.89683374
Most Extreme Differences	Absolute	0.039
	Positive	0.033
	Negative	−0.039
Test Statistic		0.039
Asymp. Sig. (2-tailed)[cd]		0.200

Source: SPSS version 30 output, as presented in the original manuscript.

The normality test was performed using the One-Sample Kolmogorov–Smirnov test on the unstandardized residuals of the regression model. As presented in Table 5, the analysis involved 153 observations and produced an Asymptotic Significance (2-tailed) value of 0.200.

Because the reported significance value exceeded the conventional threshold of 0.05, the null hypothesis of the normality test was not rejected. Thus, the results did not provide sufficient statistical evidence of a departure from the normality assumption.

This finding supports the use of the subsequent regression inference procedures with respect to the residual normality assumption.

Multicollinearity Test

Table 6. Multicollinearity Test Results

Independent Variable	Tolerance	Variance Inflation Factor (VIF)	Classification
Tax Knowledge (X_1)	0.502	1.991	No Multicollinearity
Tax Sanctions (X_2)	0.552	1.810	No Multicollinearity
Perceptions of Tax Administration Modernization (X_3)	0.630	1.588	No Multicollinearity

Source: Primary data processed using SPSS version 30 (2026).

Table 6 presents the multicollinearity test results for the three independent variables. Tax Knowledge had a Tolerance value of 0.502 and a VIF of 1.991. Tax Sanctions recorded a Tolerance value of 0.552 and a VIF of 1.810, while Perceptions of Tax Administration Modernization had a Tolerance value of 0.630 and a VIF of 1.588.

All Tolerance values exceeded 0.10, and all VIF values were below 10. These findings indicate that the independent variables did not exhibit problematic multicollinearity according to the criteria adopted in this study.

Therefore, the three independent variables could be included simultaneously in the multiple linear regression model without evidence of severe multicollinearity.

Heteroscedasticity Test
Table 7. Heteroscedasticity Test Results

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	3.180	.766		4.153	.000
	TOTAL_PP	-.001	.036	-.004	-.032	.975
	TOTAL_SP	-.047	.030	-.171	-1.585	.115
	TOTAL_PSM	-.014	.026	-.054	-.537	.592

a. Dependent Variable: ABS_RES4

The heteroscedasticity test was conducted using the Glejser procedure to examine whether the absolute regression residuals were systematically associated with the independent variables.

As shown in Table 7, the reported significance values for Tax Knowledge, Tax Sanctions, and Perceptions of Tax Administration Modernization were greater than 0.05. Accordingly, none of the independent variables demonstrated a statistically significant relationship with the absolute residuals under the Glejser test.

These findings indicate that the analysis did not identify statistically significant evidence of heteroscedasticity based on the selected test. Therefore, the regression model was considered to satisfy the homoscedasticity assumption under the diagnostic procedure employed.

Multiple Linear Regression Analysis
Table 8. Multiple Linear Regression Results

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	2.944	1.266		2.325	.021
	TOTAL_PP	.488	.060	.482	8.113	.000
	TOTAL_SP	.206	.050	.235	4.151	.000
	TOTAL_PSM	.223	.042	.280	5.279	.000

a. Dependent Variable: TOTAL_KP

Multiple linear regression analysis was conducted to examine the associations between Tax Knowledge, Tax Sanctions, Perceptions of Tax Administration Modernization, and MSME Taxpayer Compliance.

Based on the unstandardized regression coefficients presented in Table 8, the estimated regression equation was:

$$Y = 2.944 + 0.488PP + 0.206SP + 0.223PSM$$

Where:

- Y = MSME Taxpayer Compliance
- PP = Tax Knowledge
- SP = Tax Sanctions
- PSM = Perceptions of Tax Administration Modernization

The constant of 2.944 represents the predicted value of Taxpayer Compliance when all independent variables equal zero. Because zero may fall outside the observed measurement ranges, the intercept should primarily be interpreted as a mathematical component of the estimated regression equation.

The regression coefficient for Tax Knowledge was 0.488, indicating that a one-unit increase in the Tax Knowledge score was associated with an estimated 0.488-unit increase in the Taxpayer Compliance score, holding the other independent variables constant.

Tax Sanctions had a regression coefficient of 0.206, indicating a positive conditional association with Taxpayer Compliance. Similarly, Perceptions of Tax Administration Modernization had a coefficient of 0.223, suggesting that more favorable perceptions of modern tax administration systems were associated with higher reported taxpayer compliance.

The standardized regression coefficients were 0.482 for Tax Knowledge, 0.235 for Tax Sanctions, and 0.280 for Perceptions of Tax Administration Modernization. Tax Knowledge exhibited the largest standardized coefficient, followed by Perceptions of Tax Administration Modernization and Tax Sanctions.

The partial significance tests also indicated statistically significant positive coefficients for all three independent variables. Tax Knowledge recorded a t-statistic of 8.113, Tax Sanctions recorded 4.151, and Perceptions of Tax Administration Modernization recorded 5.279. All three variables had reported significance values of 0.000, conventionally interpreted as $p < 0.001$.

These results support the three partial research hypotheses and indicate that Tax Knowledge had the strongest standardized association with MSME Taxpayer Compliance among the variables included in the model.
Simultaneous Significance Test (F-Test)

Table 9. ANOVA and F-Test Results

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1525.107	3	508.369	138.504	.000[b]
	Residual	546.893	149	3.670		
	Total	2072.000	152			

a. Dependent Variable: TOTAL_KP

b. Predictors: (Constant), TOTAL_PSM, TOTAL_SP, TOTAL_PP

Table 9 presents the results of the simultaneous significance test used to evaluate the overall regression model. The ANOVA results showed a regression sum of squares of 1,525.107 and a residual sum of squares of 546.893. The regression model had three degrees of freedom, while the residual component had 149 degrees of freedom.

The calculated F-statistic was 138.504, with a reported significance value of 0.000 ($p < 0.001$). Because this significance value was below 0.05, the null hypothesis that all three slope coefficients were simultaneously equal to zero was rejected.

Therefore, Tax Knowledge, Tax Sanctions, and Perceptions of Tax Administration Modernization were jointly associated with MSME Taxpayer Compliance in Tangerang City. This finding supports the fourth research hypothesis concerning the overall statistical significance of the regression model.

Coefficient of Determination
Table 10. Coefficient of Determination

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.858[a]	.736	.731	1.91583

a. Predictors: (Constant), TOTAL_PSM, TOTAL_SP, TOTAL_PP

b. Dependent Variable: TOTAL_KP

Table 10 presents the explanatory performance of the multiple linear regression model. The multiple correlation coefficient (R) was 0.858, while the coefficient of determination (R^2) was 0.736.

The R^2 value indicates that approximately 73.6% of the observed variation in Taxpayer Compliance scores within the sample was accounted for by the three independent variables included in the regression model.

The Adjusted R^2 value was 0.731, indicating that the model explained approximately 73.1% of the observed variation after adjustment for the number of predictors and sample size. The remaining 26.9% of variation was not explained by the adjusted model and may be associated with omitted variables, measurement error, or other unexplained factors.

The Standard Error of the Estimate was 1.91583, representing the estimated residual standard deviation in the units of the dependent variable.

Overall, the coefficient of determination suggests that the regression model had substantial explanatory power within the observed sample. However, these results should not be interpreted as evidence that the independent variables causally determined 73.1% of taxpayer compliance.

Discussion

The Relationship Between Tax Knowledge and MSME Taxpayer Compliance

The regression analysis revealed a positive and statistically significant relationship between Tax Knowledge and MSME Taxpayer Compliance in Tangerang City. The unstandardized regression coefficient was 0.488, with a standardized coefficient of 0.482, a t-statistic of 8.113, and a significance value below 0.001. Among the three independent variables, Tax Knowledge demonstrated the strongest standardized association with taxpayer compliance.

This finding indicates that MSME operators with higher levels of tax knowledge tended to report greater compliance with their tax obligations, after accounting for Tax Sanctions and Perceptions of Tax Administration Modernization. Knowledge of tax regulations, taxpayer rights and responsibilities, reporting procedures, payment mechanisms, and applicable tax provisions may facilitate the completion of tax-related administrative requirements.

The finding is consistent with the Theory of Planned Behavior (TPB), which emphasizes the role of attitudes, subjective norms, and perceived behavioral control in shaping behavioral intentions. Tax knowledge may contribute to more informed attitudes toward tax compliance and strengthen taxpayers' perceived ability to fulfill their obligations. Nevertheless, the present regression model did not directly measure the mediating constructs of TPB, and therefore the proposed theoretical mechanisms remain interpretive rather than empirically established.

The positive association also aligns with the research discussed in the manuscript, including Saputri et al. (2025), which examined tax knowledge in relation to taxpayer compliance. In contrast, the findings discussed by Nisa and Subagio (2024) suggest that tax understanding does not necessarily demonstrate a significant association with compliance in every research context.

Differences across studies may reflect variations in respondent characteristics, taxation experience, measurement instruments, and institutional environments. In the present sample, respondents were required to possess an NPWP and have previous experience reporting taxes, which may have influenced the observed relationship between knowledge and compliance.

From a practical perspective, the findings support the relevance of accessible taxation education for MSME operators. Educational initiatives may include practical guidance on tax reporting, payment procedures, regulatory updates, and the use of digital taxation services. Such initiatives should be evaluated further to establish their effectiveness in improving actual compliance behavior.

The Relationship Between Tax Sanctions and MSME Taxpayer Compliance
The results demonstrated that Tax Sanctions were positively and significantly associated with MSME Taxpayer Compliance. The unstandardized regression coefficient was 0.206, the standardized coefficient was 0.235, and the t-statistic was 4.151, with a reported significance value below 0.001.

These findings indicate that respondents who reported stronger perceptions of tax sanctions also tended to report higher taxpayer compliance, holding the other independent variables constant. The relationship suggests that awareness of potential consequences for noncompliance may be relevant to taxpayers' decisions concerning their obligations.

The result can be interpreted through Deterrence Theory, which emphasizes the potential influence of sanctions and enforcement mechanisms on compliance behavior. Taxpayers who perceive violations as carrying meaningful consequences may have stronger incentives to comply with tax regulations. However, the effectiveness of deterrence depends not only on the severity of sanctions but also on perceptions of enforcement certainty, consistency, and fairness.

The finding is consistent with the research by Gulo (2021) and the findings discussed by Fadhila et al. (2026), which identify tax sanctions as a relevant factor in taxpayer compliance. Nevertheless, the manuscript also discusses contrasting findings from Maulida and Chairina (2026), indicating that sanctions may not always demonstrate a significant relationship with compliance.

These differences suggest that the relationship between perceived sanctions and compliance may depend on contextual conditions, including the implementation of enforcement policies and taxpayers' perceptions of institutional credibility.

For MSME taxpayers, tax authorities may benefit from communicating sanction provisions clearly and consistently while maintaining accessible advisory services. A balanced approach combining regulatory enforcement and taxpayer assistance may help reduce uncertainty regarding tax obligations.

The Relationship Between Perceptions of Tax Administration Modernization and MSME Taxpayer Compliance
The analysis indicated that Perceptions of Tax Administration Modernization were positively and significantly associated with MSME Taxpayer Compliance. The unstandardized regression coefficient was 0.223, the standardized coefficient was 0.280, and the t-statistic was 5.279, with a reported significance value below 0.001.

The positive coefficient indicates that respondents with more favorable perceptions of modern tax administration systems tended to report higher taxpayer compliance after controlling for Tax Knowledge and Tax Sanctions. The standardized coefficient further indicates that this variable had the second-largest association with taxpayer compliance among the three predictors.

Modern tax administration systems, including e-Filing, e-Billing, and other digital services, are intended to simplify tax-related administrative processes. Such services may reduce the time and effort required to complete reporting and payment procedures while improving accessibility to tax information.

The finding is consistent with the Technology Acceptance Model (TAM), which emphasizes perceived usefulness and perceived ease of use as important factors in technology acceptance. MSME operators who consider digital taxation services accessible, useful, and convenient may be more willing to use these systems when fulfilling their tax obligations.
This interpretation is consistent with Novita et al. (2024), who examined modernization of tax administration in relation to MSME taxpayer compliance. However, as discussed in the manuscript, Maulida and Chairina

(2026) identified circumstances in which digital taxation systems did not demonstrate a significant relationship with compliance.

Such differences may arise because the availability of digital services does not necessarily ensure their effective use. Digital literacy, system reliability, accessibility, and taxpayer familiarity with online procedures may influence the practical value of modernization initiatives.

The descriptive findings in this study also showed that Perceptions of Tax Administration Modernization had the largest standard deviation among the independent variables. This indicates relatively greater variation in respondents' perceptions of the modernization system, reinforcing the importance of considering differences in taxpayer experiences.

Accordingly, tax administration modernization should be accompanied by clear user guidance, accessible technical support, and continued efforts to improve system usability and reliability.

The Joint Relationship of Tax Knowledge, Tax Sanctions, and Perceptions of Tax Administration Modernization with MSME Taxpayer Compliance

The simultaneous regression test demonstrated that Tax Knowledge, Tax Sanctions, and Perceptions of Tax Administration Modernization were jointly associated with MSME Taxpayer Compliance in Tangerang City. The model produced an F-statistic of 138.504, with a reported significance value below 0.001.

The coefficient of determination (R^2) was 0.736, while the Adjusted R^2 was 0.731. These findings indicate that the three predictors collectively accounted for a substantial proportion of the observed variation in taxpayer compliance scores within the sample.

The results can be interpreted through three complementary theoretical perspectives. The Theory of Planned Behavior provides a framework for understanding the potential relationship between knowledge, attitudes, and compliance-related intentions. Deterrence Theory highlights the possible role of perceived regulatory consequences in compliance decisions. Meanwhile, the Technology Acceptance Model offers an explanation for how perceived usefulness and ease of use may influence taxpayers' engagement with digital administration systems.

Together, these perspectives suggest that MSME taxpayer compliance is associated with cognitive, regulatory, and technological considerations. Tax Knowledge demonstrated the strongest standardized association with compliance, followed by Perceptions of Tax Administration Modernization and Tax Sanctions.

However, the simultaneous statistical significance of these variables does not establish that they interact with one another. The estimated regression model included three main-effect predictors and did not explicitly test interaction effects or mediation mechanisms.

From a policy perspective, the findings suggest that an integrated approach involving taxpayer education, transparent enforcement practices, and accessible digital tax administration services may be relevant to improving the taxation environment for MSMEs.

The results should also be considered in light of the study's limitations. First, the purposive sampling approach limits statistical generalization to the broader population of MSMEs in Tangerang City. Second, the analysis relied on self-reported questionnaire responses, which may be affected by response bias and shared measurement-method effects. Third, the cross-sectional research design does not establish temporal ordering or causal relationships among the variables.

Future research could incorporate objective measures of taxpayer compliance, probability-based sampling where feasible, and additional explanatory variables such as taxpayer awareness, business turnover, trust in government, perceived service quality, and tax morale. Longitudinal or intervention-based research designs could also provide stronger evidence regarding the mechanisms underlying MSME taxpayer compliance.

CONCLUSION

This study examined the individual and simultaneous associations of Tax Knowledge, Tax Sanctions, and Perceptions of Tax Administration Modernization with MSME Taxpayer Compliance in Tangerang City, Indonesia. Based on multiple linear regression analysis involving 153 respondents, all three independent variables demonstrated positive and statistically significant associations with taxpayer compliance. Tax Knowledge exhibited the largest standardized regression coefficient ($\beta = 0.482$; $p < 0.001$), followed by Perceptions of Tax Administration Modernization ($\beta = 0.280$; $p < 0.001$) and Tax Sanctions ($\beta = 0.235$; $p < 0.001$). The overall regression model was statistically significant ($F = 138.504$; $p < 0.001$), with an R^2 of 0.736 and an adjusted R^2 of 0.731. These findings indicate that the three predictors collectively explained a substantial proportion of the observed variation in taxpayer compliance within the study sample. Tax Knowledge showed the strongest conditional association among the variables examined, highlighting its relevance within the estimated regression model.

The findings provide context-specific empirical evidence regarding the relationships between cognitive, regulatory, and technological factors and MSME taxpayer compliance. From a practical perspective, the results suggest that taxpayer assistance initiatives may consider strengthening taxation education, improving communication regarding tax sanctions, and enhancing the accessibility and usability of digital tax administration services. However, the cross-sectional design and purposive sampling approach limit causal interpretation and the generalizability of the findings. Furthermore, the internal consistency coefficients for Tax Knowledge and Taxpayer Compliance indicate that measurement reliability warrants additional attention. Future research should consider broader and more representative samples, longitudinal research designs, additional explanatory variables, and independently verified compliance indicators to provide a more comprehensive understanding of MSME taxpayer compliance.

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