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Analysis of the Relationship Between Tax Service Digitalization and Tax Administration Effectiveness on the Level of Taxpayer Compliance in Indonesia (2009–2023)

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A B S T R A C T

This study explores the influence of tax service digitalization and administrative effectiveness on taxpayer compliance in Indonesia from 2009 to 2023. A quantitative descriptive approach was applied using secondary data from the Directorate General of Taxes' annual reports. The study focuses on how digital systems such as e-Filing, e-SPT, and e-Form improve compliance, while the effectiveness of tax administration ensures reliability and consistency in tax collection. The findings indicate that both digitalization and administrative efficiency play crucial roles in enhancing taxpayer compliance, demonstrating that Indonesia's digital transformation has been a significant driver of voluntary compliance and better governance in taxation

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INTRODUCTION

Tax is one of the main components of state revenue that supports national development and the provision of public services. As an instrument of fiscal policy, taxation not only serves to collect funds for the state treasury but also functions as a tool to regulate the direction of economic policy. Therefore, the level of taxpayer compliance is a crucial factor influencing the success of the tax administration system in Indonesia.

To improve the level of compliance, the government, through the Directorate General of Taxes (DGT), has implemented various reforms focusing on the digitalization of tax services and the strengthening of administrative effectiveness. Digitalization serves as a strategic measure to address long-standing issues in tax management, such as lengthy bureaucracy, reporting delays, and the risk of human error.

Research conducted by (Sinuhaji et al., 2024) indicates that digitalization within the tax system has a positive impact on the level of taxpayer compliance, as the implementation of such technology simplifies the processes of tax reporting and payment while reducing the administrative burden previously borne by taxpayers. Similarly, (Supriyati et al., 2025) emphasize that tax digitalization not only enhances system efficiency but also strengthens the perception of fairness and fosters tax awareness among taxpayers, which directly contributes to improved taxpayer compliance.

Furthermore, (Abdul Rosyid et al., 2024) explain that digitalization functions not only in the service aspect but also strengthens the enforcement of tax laws and governance, making them more transparent and accountable. Thus, the implementation of digital technology within the tax system can create a more efficient administrative mechanism while enhancing public trust in tax authorities.

In addition to digitalization, the effectiveness of tax administration also plays a major role in influencing the level of taxpayer compliance. An effective tax administration reflects the authority's ability to manage service, supervision, and law enforcement functions in a professional and systematic manner.

(Sari & Suwandi, 2022) state that the effectiveness of tax collection and audit processes is significantly related to the increase in state revenue, indicating the success of the tax administration system in improving taxpayer compliance. On the other hand, research by (Ningsih et al., 2025) shows that the digitalization of tax administration not only serves to enhance fiscal efficiency but also plays a role in reducing shadow economy activities, which have been a major factor contributing to low tax compliance in Indonesia to this day.

The 2009–2023 research period was chosen because, during this timeframe, Indonesia underwent several significant phases of tax reform, ranging from administrative modernization and the adoption of digital systems to the strengthening of fiscal policies. This period includes the initial phase of the tax system's transformation toward digitalization and its subsequent continuous development, which expanded implementation across various services. Therefore, this relatively longtime span is considered relevant for comprehensively assessing how the evolution of tax service digitalization and the improvement of administrative efficiency have influenced the level of taxpayer compliance in Indonesia.

Based on the preceding discussion, this study aims to empirically analyze the influence of tax service digitalization and administrative effectiveness on the level of taxpayer compliance in Indonesia during the 2009–2023 period. Furthermore, this research is expected to provide a scientific contribution by presenting empirical evidence that enhances the understanding of the relationship between digitalization, administrative effectiveness, and tax compliance within the framework of digital transformation.

LITERATURE REVIEW

The Digitalization of Tax Services

The digitalization of tax services is an essential part of modern tax system reform aimed at improving efficiency, transparency, and accessibility for taxpayers. Through various digital platforms such as e-Filing, e-SPT, and e-Form, taxpayers can report and make payments online without face-to-face interaction, thereby reducing administrative costs and minimizing the potential for errors.

(Mandasari, 2024) explains that the implementation of an electronic tax reporting system contributes significantly to improving taxpayer compliance, as the system simplifies administrative processes and accelerates the submission of tax reports. Similar results are shown by (Lannai, 2024), who found that the effectiveness of the e-Filing system helps expedite the submission of tax returns and enhances the accuracy of the data provided by taxpayers.

(Widyari et al., 2021) emphasize the importance of digital information system quality, as aspects of usability and system reliability influence user satisfaction and compliance behavior. Meanwhile, (Ardika et al., 2023) explain that the success of digitalization requires adequate socialization and outreach to ensure that taxpayers understand and are able to operate the system optimally.

In addition to technical aspects, (Alifvia & Kresnawati, 2023) highlight that the success of tax digitalization also depends on the level of public trust in tax authorities and data security. Thus, the digitalization of tax services is not solely related to the application of technology but also involves efforts to strengthen public trust and enhance digital literacy in the field of taxation.

H_1: Tax service digitalization through e-Filing, e-SPT, and e-Form has a positive effect on the level of taxpayer compliance in Indonesia.

Tax Administration Effectiveness

The effectiveness of tax administration reflects the capability of the tax system to manage service, supervision, and law enforcement functions efficiently. The digitalization of administration enables tax authorities to improve data accuracy, strengthen supervisory functions, and reduce the potential for non-compliance.

(Sibarani et al., 2024) found that digital policies in tax administration can expand the national tax base and reduce taxpayer non-compliance. (Pasek, 2024) adds that the effectiveness of tax administration will improve when accompanied by easier access to information and the implementation of transparent incentives.

(Yuliati & Fauzi, 2020) state that the quality of digital services and consistent enforcement of sanctions are key factors in promoting formal taxpayer compliance. (Ciptawan et al., 2025) emphasize that the implementation of online-based tax reporting platforms enhances data integrity and improves the effectiveness of state revenue supervision. (Judijanto, 2024) also asserts that digital-based administrative reforms can reduce the administrative burden through system automation, which ultimately strengthens the effectiveness of national tax revenue collection.
H_2: The effectiveness of tax administration has a positive effect on the level of taxpayer compliance in Indonesia.

Taxpayer Compliance

Taxpayer compliance reflects the responsibility toward tax obligations, and in the digital era, it largely depends on taxpayers' ability to adapt to and understand electronic reporting systems. According to (Setyowati & Imahda khoiri furqon, 2025), low tax literacy and administrative complexity are the main obstacles to MSME taxpayer compliance, while digitalization has the potential to simplify the tax reporting process.

(Anggraini et al., 2025) state that tax literacy, taxpayer awareness, and the use of digital applications such as M-Pajak have a significant influence on improving taxpayer compliance, particularly among MSME actors. This finding is consistent with the results of (Purba et al., 2024), who assert that a high level of tax literacy can encourage greater formal compliance among individual taxpayers.

Furthermore, (Aswat, 2025) shows that tax literacy among the younger generation, particularly Gen Z, has a significant influence on compliance behavior in the digital era. (Michael & Widjaja, 2024) also emphasize that the digitalization of the tax system creates procedural clarity, reduces compliance costs, and strengthens public trust in tax authorities.

Overall, the findings of this study indicate that the success of the digitalization process and the effectiveness of tax administration play a crucial role in enhancing the level of taxpayer compliance, both formally and substantively.
H_3: Tax service digitalization and tax administration effectiveness jointly have a positive effect on taxpayer compliance in Indonesia.

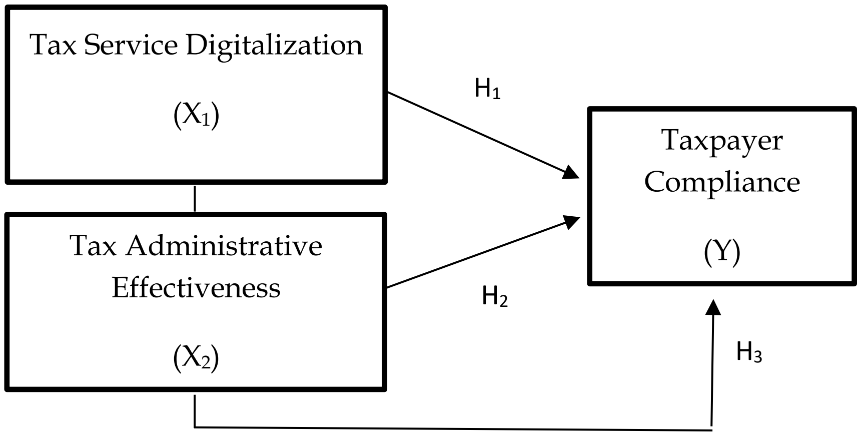

Figure 1. Conceptual Framework

METHODOLOGY

This study employs a quantitative descriptive approach to examine the influence of tax service digitalization and administrative effectiveness on taxpayer compliance in Indonesia from 2009 to 2023. The research uses secondary data obtained from the Annual Reports of the Directorate General of Taxes (DGT).

The study involves three main variables: the tax digitalization ratio (X_1), measured by the proportion of electronic system users (e-Filing, e-SPT, and e-Form) to total registered taxpayers; the tax administration effectiveness ratio (X_2), represented by the realization of non–oil and gas tax revenue compared to its target; and the taxpayer compliance ratio (Y), calculated from the number of taxpayers submitting annual returns (SPT) relative to total registered taxpayers.

Data analysis was conducted using descriptive statistics, correlation, and regression techniques to identify the strength and direction of the relationships among variables.

Table 1. Tax Digitalization and Compliance Data (2009–2023)

Tahun	X_1: Tax Digitalization Ratio	X_2: Tax Administration Effectiveness Ratio	Y: Taxpayer Compliance Ratio
2009	0.0039	0.9351	0.5415
2010	0.0035	0.9388	0.5816
2011	0.0059	0.9588	0.5274
2012	0.0056	0.9208	0.5370
2013	0.0133	0.9041	0.6086
2014	0.0492	0.9081	0.5913
2015	0.0921	0.8120	0.6042
2016	0.2237	0.8112	0.6075
2017	0.2348	0.8864	0.7258
2018	0.2399	0.9010	0.7110
2019	0.2486	0.8426	0.7306
2020	0.2413	0.8904	0.7763
2021	0.2100	1.0355	0.8407
2022	0.2825	1.1539	0.8680
2023	0.2305	1.0301	0.8697

Source: Annual Reports of the Directorate General of Taxes (2009–2023)

RESEARCH RESULT

A. Descriptive Analysis

Descriptive analysis was conducted to provide an overview of the data characteristics for each research variable, namely the digitalization of tax services, tax administration effectiveness, and taxpayer compliance during the 2009–2023 period.

Table 2. Descriptive Test Results

Statistics

		The Digitalization of Tax Services	Tax Administration Effectiveness	Taxpayer Compliance
N	Valid	15	15	15
	Missing	0	0	0
Mean		.138987	.928587	.674747
Median		.210000	.908100	.608600
Std. Deviation		.1137676	.0900023	.1219489
Minimum		.0035	.8112	.5274
Maximum		.2825	1.1539	.8697

Source: SPSS 25 Output

The results show that the digitalization of tax services has a mean value of 0.1389 with a standard deviation of 0.1138, indicating a relatively moderate level of variation among the data. The effectiveness of tax administration has a higher mean value of 0.9286 with a standard deviation of 0.0900, suggesting that administrative effectiveness remained relatively stable across the observed years. Meanwhile, taxpayer compliance has a mean value of 0.6747 and a standard deviation of 0.1219, showing moderate variability within the study period.

These descriptive results illustrate that improvements in digitalization and stable administrative performance were accompanied by a consistent increase in taxpayer compliance throughout 2009–2023.

B. Correlation Analysis

Correlation analysis was conducted to identify the strength and direction of the relationships among the research variables: the digitalization of tax services, the effectiveness of tax administration, and taxpayer compliance.

Table 3. Correlation Test Results

Correlations

		The Digitalization of Tax Services	Tax Administration Effectiveness	Taxpayer Compliance
The Digitalization of Tax Services	Pearson Correlation	1	.169	.847**
	Sig. (2-tailed)		.547	.000
	N	15	15	15
Tax Administration Effectiveness	Pearson Correlation	.169	1	.543*
	Sig. (2-tailed)	.547		.036
	N	15	15	15
Taxpayer Compliance	Pearson Correlation	.847**	.543*	1
	Sig. (2-tailed)	.000	.036	
	N	15	15	15

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS 25 Output

The results show that the digitalization of tax services has a very strong and positive correlation with taxpayer compliance ($r = 0.847$, $p = 0.000 < 0.01$). This indicates that improvements in tax digitalization are strongly associated with higher levels of taxpayer compliance. Meanwhile, the effectiveness of tax administration also shows a positive and moderate correlation with taxpayer compliance ($r = 0.543$, $p = 0.036 < 0.05$), suggesting that better administrative performance contributes to improved compliance.

In contrast, the correlation between digitalization of tax services and tax administration effectiveness is weak and statistically insignificant ($r = 0.169$, $p = 0.547 > 0.05$), indicating that both variables operate relatively independently in influencing taxpayer compliance.

Overall, these findings support the initial hypotheses (H1 and H2), showing that both digitalization and administrative effectiveness have positive associations with taxpayer compliance, with digitalization demonstrating the stronger relationship.

B. Classical Assumption Test

Normality Test

The normality test was conducted using the Kolmogorov–Smirnov method to determine whether the residuals in the regression model were normally distributed.

Table 4. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Standardized Residual
N		15
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.92582010
Most Extreme Differences	Absolute	.121
	Positive	.103
	Negative	-.121
Test Statistic		.121
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: SPSS 25 Output

The test results show a significance value (Asymp. Sig. 2-tailed) of 0.200, which is greater than the 0.05 threshold. This indicates that the residuals follow a normal distribution, and therefore, the regression model satisfies the normality assumption required for multiple linear regression analysis.

Multicollinearity Test

The multicollinearity test was conducted to assess whether there was a high correlation among the independent variables that could affect the accuracy of the regression estimates.

Table 5. Multicollinearity Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.041	.126		.324	.751					
	The Digitalization of Tax Services	.833	.108	.777	7.708	.000	.847	.912	.766	.971	1.029
	Tax Administration Effectiveness	.558	.137	.412	4.087	.002	.543	.763	.406	.971	1.029

a. Dependent Variable: Taxpayer Compliance

Source: SPSS 25 Output

The test results show that the Tolerance values for both independent variables are 0.971, and the corresponding Variance Inflation Factor (VIF) values are 1.029. Since the Tolerance values are greater than 0.10 and the VIF values are below 10, it can be concluded that there is no multicollinearity among the independent variables. This indicates that the digitalization of tax services and the effectiveness of tax administration contribute independently to the model, ensuring the validity of the regression results.

Hetereokedastisity Test

The heteroscedasticity test was conducted to determine whether the variance of the residuals in the regression model was constant across all observations. This test aims to ensure that the regression model meets the assumption of homoscedasticity, where the residuals are evenly distributed. The absence of heteroscedasticity indicates that the model produces unbiased and efficient estimates.

Table 6. Heterokedastisity Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.024	.060		-.396	.699					
	The Digitalization of Tax Services	.036	.052	.193	.701	.497	.235	.198	.191	.971	1.029
	Tax Administration Effectiveness	.058	.065	.244	.886	.393	.277	.248	.241	.971	1.029

a. Dependent Variable: ABRSEID

Source: SPSS 25 Output

The test results show that the significance values (Sig.) for both independent variables, the digitalization of tax services (p = 0.497) and tax administration effectiveness (p = 0.393), are greater than 0.05. These results indicate that there is no heteroscedasticity present in the model, as the residual variance remains consistent across all levels of the independent variables. Therefore, the regression model fulfills the homoscedasticity assumption, ensuring that the parameter estimates are unbiased and efficient.

Autocorrelation Test

The autocorrelation test was conducted using the Durbin–Watson (DW) statistic to examine the independence of residuals in the regression model.

Table 7. Autocorrelation Test Results

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.939[a]	.882	.862	.0453272	2.351

a. Predictors: (Constant), Tax Administration Effectiveness, The Digitalization of Tax Services

b. Dependent Variable: Taxpayer Compliance

Source: SPSS 25 Output

The test produced a Durbin–Watson value of 2.351, which lies within the acceptable range of 1.5 to 2.5. This indicates that there is no autocorrelation among the residuals, confirming that the model satisfies the independence assumption.

C. Multiple Linear Regression Analysis

Multiple linear regression analysis was conducted to examine the effect of tax service digitalization and tax administration effectiveness on taxpayer compliance.

Table 8. Multiple Linear Regression Test Results

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.041	.126		.324	.751
	The Digitalization of Tax Services	.833	.108	.777	7.708	.000
	Tax Administration Effectiveness	.558	.137	.412	4.087	.002

a. Dependent Variable: Taxpayer Compliance

Source: SPSS 25 Output

The results were incorporated into the multiple linear regression model, yielding the following equation:

$$\mathrm{Y} = 0{,}041 + 0{,}833\ (\mathrm{X1}) + 0{,}558\ (X2) + e$$

The above equation can be interpreted as follows:

1) The constant value of 0.041 indicates that when both independent variables tax service digitalization (X_1) and tax administration effectiveness (X_2) are assumed to be zero, the baseline level of taxpayer compliance (Y) is 0.041.
2) The regression coefficient for tax service digitalization (X_1) is 0.833, meaning that every one-unit increase in digitalization is expected to raise taxpayer compliance by 0.833 units, assuming the other variable remains constant. This shows that digitalization has a strong and positive impact on compliance.
3) The regression coefficient for tax administration effectiveness (X_2) is 0.558, indicating that a one-unit increase in administrative effectiveness will increase taxpayer compliance by 0.558 units, holding other factors constant.

Overall, both variables have positive coefficients, suggesting that improvements in tax digitalization and administrative effectiveness jointly contribute to higher levels of taxpayer compliance in Indonesia.

D. Hypothesis Test

Partial Test (t -Test)

Table 9. Partial Test Results

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.041	.126		.324	.751
	The Digitalization of Tax Services	.833	.108	.777	7.708	.000
	Tax Administration Effectiveness	.558	.137	.412	4.087	.002

a. Dependent Variable: Taxpayer Compliance

Source: SPSS 25 Output

The partial test (t-test) was conducted to examine the individual effect of each independent variable on taxpayer compliance. The results of the t-test, which examine the individual effects of each independent variable on taxpayer compliance, are presented as follows:

1) The digitalization of tax services variable obtained a t-value of 7.708 with a significance level of 0.000, which is lower than 0.05. This result indicates that digitalization has a positive and significant effect on taxpayer compliance.
2) The effectiveness of tax administration variable obtained a t-value of 4.087 with a significance level of 0.002, which is also below 0.05. This suggests that administrative effectiveness has a positive and significant effect on taxpayer compliance.

These findings imply that improvements in both digitalization and administrative efficiency contribute meaningfully to the increase in taxpayer compliance, with digitalization showing a stronger influence.

Simultaneous Test (f-test)

Table 10. Simultaneous Test Results

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.184	2	.092	44.668	.000[b]
	Residual	.025	12	.002		
	Total	.208	14			

a. Dependent Variable: Taxpayer Compliance

b. Predictors: (Constant), Tax Administration Effectiveness, The Digitalization of Tax Services

Source: SPSS 25 Output

The simultaneous test (F-test) was conducted to examine the joint effect of the independent variables, tax service digitalization and tax administration effectiveness on taxpayer compliance. The results show an F-value of 44.668 with a significance level of 0.000, which is lower than 0.05.

This indicates that both independent variables, when considered together, have a positive and significant influence on taxpayer compliance. Hence, the regression model used in this study is statistically feasible and reliable for explaining the relationship among the variables.

Coefficient of Determination Test

Table 11. Coefficient of Determination Test Results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.939[a]	.882	.862	.0453272	.882	44.668	2	12	.000

a. Predictors: (Constant), Tax Administration Effectiveness, The Digitalization of Tax Services

Source: SPSS 25 Output

The coefficient of determination test (R^2) was performed to measure the model's ability to explain variations in the dependent variable. The results show an R value of 0.939 and an R^2 value of 0.882, indicating that approximately 88.2% of the variation in taxpayer compliance can be explained by tax service digitalization and tax administration effectiveness, while the remaining 11.8% is influenced by other factors not included in the model.

This result demonstrates that the model has a high explanatory power, confirming that digital transformation and administrative efficiency play a significant role in improving taxpayer compliance in Indonesia.

DISCUSSION

The analysis results show that both electronic system digitalization and the effectiveness of non–oil and gas tax administration have a positive and significant effect on taxpayer compliance, both partially and simultaneously. The electronic system digitalization variable has a dominant influence, indicating that the modernization of the tax system through the implementation of digital technology has had a tangible impact on improving taxpayer compliance.

These findings reinforce the previous correlation analysis, which revealed a strong relationship between tax digitalization and taxpayer compliance. The implementation of electronic systems such as e-Filing and e-SPT not only enhances administrative efficiency but also promotes transparency and accessibility for taxpayers. On the other hand, the effectiveness of non–oil and gas tax administration, reflected in the achievement of tax revenue targets, further strengthens public trust in the government's performance in managing taxation.

Thus, the regression results confirm that the combination of advancements in digitalization and improvements in tax administration effectiveness has made a substantial contribution to increasing taxpayer compliance in Indonesia during the 2009–2023 period.

CONCLUSIONS AND RECOMMENDATIONS

Based on the data analysis and discussion conducted on the influence of tax service digitalization and tax administration effectiveness on the level of taxpayer compliance in Indonesia during the 2009–2023 period, several conclusions can be drawn as follows:

1. The digitalization of tax services, which includes the implementation of systems such as e-Filing, e-SPT, and e-Form, has been proven to have a positive and significant effect on the level of taxpayer compliance. The increased use of digital-based taxation systems encourages taxpayers to be more compliant in submitting their Annual Tax Returns (SPT). Digital systems provide convenience, speed, and efficiency in administrative processes while minimizing errors and bureaucratic obstacles. Thus, the application of digital technology in tax services plays an essential role in improving taxpayer compliance in Indonesia.
2. The effectiveness of non–oil and gas tax administration also has a positive and significant effect on taxpayer compliance. The more effective the implementation of tax administration in achieving revenue targets, the higher the level of taxpayer compliance. The achievement of revenue targets reflects credible and professional tax administrative performance, thereby increasing public trust in tax authorities. This trust, in turn, leads to greater taxpayer awareness and willingness to fulfill their tax obligations in a more orderly and voluntary manner.
3. The simultaneous test results show that tax service digitalization and the effectiveness of non–oil and gas tax administration jointly have a positive and significant effect on taxpayer compliance in Indonesia. These two factors complement each other, with the digital system enhancing administrative efficiency, while administrative effectiveness strengthens taxpayers' trust in the taxation system. The coefficient of determination value of 0.882 indicates that 88.2% of the variation in taxpayer compliance can be explained by these two variables, while the remaining percentage is influenced by other factors outside the scope of this research model.

Overall, the findings of this study confirm that tax digitalization has a more dominant influence than the effectiveness of tax administration in improving taxpayer compliance. Digital transformation fosters convenience, transparency, and efficiency that encourage voluntary compliance, while effective administration ensures stability and trust in the national tax system. Therefore, it can be concluded that strengthening digitalization and enhancing the effectiveness of tax administration are two key elements that significantly contribute to increasing taxpayer compliance in Indonesia during the 2009–2023 period.

ADVANCED RESEARCH

This study is limited by its use of secondary data obtained from the annual reports of the Directorate General of Taxes (DGT), which may not fully capture behavioral or psychological aspects influencing taxpayer compliance. In addition, the analysis focuses only on two independent variables—tax service digitalization and the effectiveness of non–oil and gas tax administration—while other potential factors such as tax awareness, policy consistency, and economic conditions were not included in the model.

Future research is recommended to incorporate primary data through surveys or interviews to gain a more comprehensive understanding of taxpayer behavior. Expanding the model by including additional variables such as tax literacy, perception of fairness, and technological readiness could provide deeper insights into the determinants of taxpayer compliance in the digital era.

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