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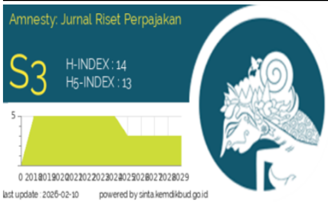

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The Effect of Digital Tax Services on MSME Taxpayer Compliance with Tax Literacy as Moderator

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ABSTRACT

The increasing adoption of digital tax services has raised important questions regarding their effectiveness in encouraging taxpayer compliance, particularly among Micro, Small, and Medium Enterprises (MSMEs) whose engagement with the digital fiscal system is influenced by technological factors and tax literacy. This study aims to analyze the effect of digital tax service utilization on MSME taxpayer compliance in Makassar City, with tax literacy as a moderating variable. A quantitative design was employed, with data collected from 89 MSME taxpayers registered at the local Tax Service Office through a structured Likert-scale questionnaire using a purposive sampling technique. Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4 was applied to assess both direct and interaction effects of moderation. The results reveal that the utilization of digital tax services has a significant positive effect on MSME taxpayer compliance (β = 0.438, T = 5.441, p = 0.000), and that tax literacy significantly moderates this relationship (β = 0.421, T = 3.789, p = 0.000), with the model explaining 48.6% of the variance in compliance. These findings extend the Technology Acceptance Model and the Theory of Planned Behavior by demonstrating that tax literacy strengthens the compliance-enhancing impact of digital tax platforms, serving as a critical cognitive enabler for MSME taxpayers. This study contributes theoretically by positioning tax literacy as a moderating construct within the behavioral compliance framework, and practically by recommending an integrated policy strategy that combines digital infrastructure development with tax literacy education programs to maximize compliance outcomes among MSME taxpayers.

1. Introduction

The digital transformation of the public sector has become a strategic priority for governments worldwide in enhancing the quality, efficiency, and transparency of public administration, including tax administration. Digital transformation extends beyond the adoption of information technology; it represents a comprehensive institutional reform aimed at improving governance effectiveness, accountability, and service delivery. In taxation, this transformation has been implemented through electronic services such as e-filing, e-billing, and e-registration, which simplify interactions between tax authorities and taxpayers while reducing administrative burdens. Previous studies consistently demonstrate that digital tax administration enhances operational efficiency, improves service quality, and lowers taxpayers' compliance costs, thereby creating a more responsive and transparent tax system (Heinemann & Stiller, 2025; Hesami et al., 2024; Kebede et al., 2025; Umbet et al., 2025). Consequently, digital transformation influences

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not only administrative processes but also taxpayer behavior in fulfilling tax obligations.

In Indonesia, the modernization of tax administration through digital technology constitutes a key component of the government's ongoing tax reform agenda (Mujiyati et al., 2024). The Directorate General of Taxes (DGT) has introduced various digital platforms to improve the accessibility, accuracy, efficiency, and timeliness of tax reporting and payment processes. These initiatives are supported by regulatory reforms designed to encourage broader adoption of digital tax services among taxpayers (Sijabat, 2020). Despite these developments, the effectiveness of digital tax services in enhancing taxpayer compliance remains inconclusive. While several studies report that digital platforms improve compliance by simplifying tax procedures and reducing transaction costs, others argue that technological innovation alone is insufficient to generate substantial behavioral change among taxpayers (Abu-Silake et al., 2024; Belahouaoui & Attak, 2024; Mosca et al., 2024). These inconsistent findings suggest that additional behavioral and cognitive factors may influence the relationship between digital tax services and taxpayer compliance.

Taxpayer compliance remains a fundamental determinant of tax system effectiveness because it directly affects government revenue sustainability and fiscal capacity. High levels of compliance reflect taxpayers' willingness to voluntarily fulfill their fiscal obligations and indicate the effectiveness of tax administration. However, compliance among Micro, Small, and Medium Enterprises (MSMEs) continues to present significant challenges. The heterogeneous characteristics of MSMEs, limited financial and technological resources, and relatively low levels of tax knowledge contribute to inconsistent compliance behavior (Roida et al., 2025; Widianti, 2025). Although digital tax services have been developed to simplify administrative procedures, many MSME taxpayers continue to encounter difficulties in utilizing these platforms effectively. This situation reveals a persistent gap between the availability of digital tax systems and taxpayers' capability to adopt and maximize their use.

From a theoretical perspective, taxpayer compliance can be explained through the **Theory of Planned Behavior (TPB)** developed by Ajzen (1991), which posits that individual behavior is determined by behavioral intentions shaped by attitudes, subjective norms, and perceived behavioral control. Within the context of digital taxation, taxpayers' perceptions regarding the usefulness and ease of use of digital services influence their attitudes toward compliance. Social expectations and regulatory requirements contribute to subjective norms, whereas taxpayers' ability to understand and operate digital platforms reflects perceived behavioral control. These behavioral determinants ultimately influence taxpayers' intentions and actual compliance behavior. Previous studies further emphasize that the effectiveness of digital public services depends not only on technological infrastructure but also on users' cognitive capabilities, including digital competence and literacy (Agostino et al., 2022; Bassey et al., 2022). Accordingly, a behavioral perspective provides a robust theoretical foundation for explaining the relationship between digital tax service utilization and taxpayer compliance.

A growing body of empirical research has investigated the relationship between digital tax services and taxpayer compliance, yet the findings remain inconsistent. Several studies report that digital tax services positively influence compliance by increasing administrative efficiency, reducing procedural complexity, and facilitating tax reporting (Idrus, 2024; Rokhman et al., 2023). In contrast, other studies reveal weak or statistically insignificant relationships, particularly among taxpayers possessing limited tax knowledge, inadequate digital skills, and restricted access to technology (Sholihah & Nugroho, 2025). These conflicting findings indicate that the effectiveness of digital tax

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services may depend on additional factors that condition or strengthen their influence on taxpayer behavior. Consequently, a more comprehensive analytical framework incorporating moderating variables is required to explain these inconsistencies.

Among the potential moderating variables, tax literacy has emerged as an important determinant of taxpayer behavior. Tax literacy encompasses not only taxpayers' knowledge of tax laws and regulations but also their ability to understand tax procedures, interpret tax information, and recognize the economic and social benefits of taxation (De Clercq, 2023). Individuals with higher levels of tax literacy are more capable of making informed decisions regarding tax compliance and are more likely to perceive digital tax services as useful and beneficial (Buchan et al., 2024). Therefore, tax literacy is expected to strengthen the relationship between the utilization of digital tax services and taxpayer compliance, particularly among MSMEs, where knowledge limitations and information asymmetry remain substantial barriers to voluntary compliance.

The existing literature demonstrates increasing scholarly interest in digital taxation and taxpayer compliance, as evidenced by recent systematic literature reviews emphasizing the importance of digital transformation in improving tax administration performance (Belahouaoui & Attak, 2024; Rizkina, 2025). Although previous studies consistently acknowledge the positive contribution of digital tax services to administrative efficiency, most focus primarily on the direct relationship between digital technology and taxpayer compliance. Limited attention has been devoted to examining moderating variables, particularly tax literacy, while relatively few studies have investigated this relationship within the context of MSMEs operating in specific local environments such as Makassar City, whose socio-economic characteristics differ from those of other regions.

This research gap highlights the need to examine how tax literacy interacts with the utilization of digital tax services in influencing taxpayer compliance among MSMEs. Accordingly, this study investigates the effect of digital tax service utilization on MSME taxpayer compliance in Makassar City by incorporating tax literacy as a moderating variable. Guided by the Theory of Planned Behavior (Ajzen, 1991), this study proposes that tax literacy strengthens the positive effect of digital tax services on taxpayer compliance. The novelty of this research lies in integrating tax literacy as a moderating construct within a behavioral framework and applying the model specifically to MSMEs in Makassar City. The findings are expected to contribute theoretically by extending the application of the Theory of Planned Behavior in digital taxation research and empirically by providing evidence regarding the role of tax literacy in digital tax compliance. Practically, the results offer valuable insights for the Directorate General of Taxes and policymakers in designing more effective digital tax strategies and literacy programs to enhance voluntary tax compliance among MSMEs in the digital era.

2. Literature Review

2.1 Conceptual and Theoretical Foundations

2.1.1 Theory of Planned Behavior

The Theory of Planned Behavior (Ajzen, 1991) explains that taxpayer compliance is driven by behavioral intentions formed by attitudes, subjective norms, and perceived behavioral control. In this study, the use of digital tax services reflects perceived behavioral control and attitudes, as measured through indicators such as usefulness, ease of use, accessibility, reliability, security, efficiency, accuracy, timeliness, integration, and satisfaction, which are based on the theory of technology acceptance (Davis, 1989). MSME taxpayer compliance represents actual behavior, as measured through registration, calculation, payment, reporting, recording, regulatory compliance, responsiveness,

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transparency, and consistency, in line with tax compliance theory (Kirchler, 2007) . Tax literacy acts as a moderating variable that strengthens the relationship between intention and behavior, as measured through knowledge of regulations, procedural understanding, awareness of rights and obligations, digital skills, financial literacy, policy interpretation, awareness of sanctions, and decision-making ability, based on the theory of financial literacy (Lusardi & Mitchell, 2014).

2.1.2 The Impact of Utilizing Digital Tax Services on MSME Taxpayer Compliance

The adoption of digital tax services has been widely recognized as a key driver of taxpayer compliance, particularly among small and medium-sized enterprises. Building on the Technology Acceptance Model (TAM), Davis (1989) stated that perceived usefulness and perceived ease of use of an information system directly influence users' behavioral intentions, including compliance-related behaviors. This theoretical premise is further strengthened by DeLone and McLean's (2003) Information Systems Success Model, which asserts that system quality, information quality, and service quality jointly determine user satisfaction and net benefits—results that are directly applicable to digital tax platforms such as e-Filing, e-Billing, and e-SPT.

Empirically, Diantini et al. (2018) found that the use of e-Filing significantly increased compliance levels among individual taxpayers in Indonesia, which was associated with reduced time costs and administrative burdens. Similarly, Sari (2024) showed that digital tax services had a positive and significant effect on MSME taxpayer compliance in Bali, noting that easy access to online reporting systems reduced procedural barriers that previously prevented small business owners from fulfilling their obligations. Internationally, Loo et al. (2012) stated that technology-mediated tax administration improves voluntary compliance by increasing transparency and reducing perceived tax complexity among taxpayers. Furthermore, Alm & Torgler (2011) argued that simplified digital interactions between tax authorities and taxpayers can foster greater institutional trust, a key antecedent of compliant behavior.

2.1.3 Tax Literacy as a Moderating Variable in the Relationship between the Utilization of Digital Tax Services and Tax Compliance of MSMEs

While digital tax services reduce structural and procedural barriers to compliance, their effectiveness depends on taxpayers' capacity to understand and meaningfully engage with these systems—a capacity captured by the concept of tax literacy. Drawing on the Financial Literacy Framework issued by the OECD in Kristanto et al. (2025), which defines financial literacy as the knowledge, skills, and attitudes necessary for sound financial decision-making, Bhushan & Medury (2014) extend this construct to the tax realm, defining tax literacy as an individual's awareness and understanding of tax laws, obligations, and available administrative procedures. From the perspective of the Theory of Planned Behavior (Ajzen, 1991), behavioral intentions, including the intention to comply, are shaped by subjective norms, attitudes, and perceived behavioral control; tax literacy directly enhances perceived behavioral control by equipping taxpayers with the cognitive resources necessary to effectively navigate digital systems .

Empirically, Saad (2014) found that taxpayers with higher tax knowledge demonstrated significantly greater levels of compliance, as they were better equipped to interpret regulatory requirements and use reporting mechanisms correctly. Mukhlis, Utomo, and Soesetio (2015) further confirmed that tax literacy moderates the relationship between tax administration modernization and compliance among MSME taxpayers in Indonesia, showing that the compliance-enhancing benefits of a modern tax system were significantly stronger among taxpayers with higher levels of tax literacy. This

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moderating effect was also confirmed by Nzioki and Peter (2014) in the Kenyan context, where tax knowledge reinforced the positive impact of a simplified digital reporting system on MSME compliance. These findings suggest that digital tax services alone may not be sufficient to drive compliance among taxpayers with low tax literacy, thus strengthening the understanding of the moderating role of this variable.

2.2 Review of Empirical Studies

The relationship between digital tax services and taxpayer compliance has received considerable attention in both national and international literature. Based on the Technology Acceptance Model, Davis (1989) argued that perceived usefulness and perceived ease of use significantly influence users' intentions to adopt information systems. This argument is reinforced by the Information Systems Success Model proposed by DeLone and McLean (2003), which highlights the importance of system quality, information quality, and service quality in generating user satisfaction and positive behavioral outcomes.

Empirical evidence generally supports the positive contribution of digital tax services to taxpayer compliance. Diantini et al. (2018) found that the implementation of e-Filing significantly improved compliance among individual taxpayers in Indonesia by reducing administrative burdens and time costs. Similarly, Sari (2024) demonstrated that digital tax services positively influenced MSME taxpayer compliance in Bali, particularly through easier access to online reporting systems that reduced procedural obstacles faced by small business owners.

International studies have produced consistent findings. Loo et al. (2012) stated that technology-based tax administration enhances voluntary compliance by increasing transparency and reducing perceived tax complexity. Likewise, Alm and Torgler (2011) argued that simplified digital interactions between tax authorities and taxpayers contribute to higher institutional trust, which subsequently encourages compliant behavior.

In addition to direct effects, several studies have examined factors that may strengthen the effectiveness of digital tax services. Tax literacy has emerged as an important determinant of compliance behavior. According to the OECD financial literacy framework discussed by Kristanto et al. (2025), financial literacy encompasses knowledge, skills, and attitudes required for effective financial decision-making. Extending this concept to taxation, Bhushan and Medury (2014) defined tax literacy as an individual's understanding of tax regulations, obligations, and administrative procedures.

Empirical findings suggest that tax literacy not only influences compliance directly but also enhances the effectiveness of tax administration systems. Saad (2014) reported that taxpayers possessing higher tax knowledge exhibited significantly greater compliance because they were better able to understand regulations and properly utilize reporting mechanisms. Furthermore, Mukhlis, Utomo, and Soesetio (2015) found that tax literacy strengthened the positive relationship between tax administration modernization and compliance among MSME taxpayers in Indonesia. Similar findings were reported by Nzioki and Peter (2014), who observed that tax knowledge reinforced the positive impact of simplified digital reporting systems on MSME taxpayer compliance in Kenya.

Overall, previous studies consistently indicate that digital tax services contribute positively to taxpayer compliance and that tax literacy may strengthen this relationship. However, differences in context, taxpayer characteristics, and levels of digital readiness suggest the need for further investigation, particularly among MSMEs operating in developing economies.

2.3 Identification of the Research Gap

Although previous studies have demonstrated the positive effect of digital tax services on taxpayer compliance, several gaps remain in the literature. First, many prior studies have primarily focused on the direct relationship between digital tax systems and compliance behavior (Diantini et al., 2018; Sari, 2024; Loo et al., 2012), while limited attention has been given to the conditions under which digital services become more effective in promoting compliance.

Second, studies examining tax literacy as a moderating variable remain relatively limited, particularly within the context of MSMEs. While Mukhlis, Utomo, and Soesetio (2015) and Nzioki and Peter (2014) confirmed the moderating role of tax knowledge, empirical evidence remains insufficient regarding how tax literacy influences the effectiveness of contemporary digital tax services in rapidly evolving digital tax environments.

Third, the increasing digitalization of tax administration has transformed taxpayer interactions with tax authorities, creating a need to reassess the relevance of behavioral theories such as the Theory of Planned Behavior (Ajzen, 1991) in explaining compliance behavior within digital contexts. Existing studies often examine technological adoption or tax compliance separately, with limited integration of behavioral theory, digital service utilization, and tax literacy within a single analytical framework.

Therefore, this study addresses these gaps by integrating the Theory of Planned Behavior, digital tax service utilization, and tax literacy into a unified research model. Specifically, the study investigates the direct effect of digital tax services on MSME taxpayer compliance and examines whether tax literacy strengthens this relationship.

2.4 Development of the Conceptual Framework

The conceptual framework of this study is developed based on the Theory of Planned Behavior (Ajzen, 1991), the Technology Acceptance Model (Davis, 1989), and the financial literacy framework proposed by Lusardi and Mitchell (2014). The framework assumes that the utilization of digital tax services facilitates tax administration processes, reduces compliance costs, and improves taxpayer convenience, thereby encouraging greater compliance among MSMEs.

Digital tax services are represented by indicators including usefulness, ease of use, accessibility, reliability, security, efficiency, accuracy, timeliness, integration, and satisfaction. MSME taxpayer compliance is reflected through registration, tax calculation, payment, reporting, record-keeping, regulatory compliance, responsiveness, transparency, and consistency. Tax literacy is conceptualized as taxpayers' knowledge and understanding of tax regulations, procedures, rights, obligations, digital systems, financial literacy, policy interpretation, sanction awareness, and decision-making capabilities.

Based on the theoretical and empirical evidence, digital tax services are expected to positively influence MSME taxpayer compliance. Furthermore, taxpayers with higher levels of tax literacy are expected to derive greater benefits from digital tax services, thereby strengthening the positive relationship between digital tax service utilization and taxpayer compliance.

2.5 Hypotheses or Research Propositions

Based on the theoretical foundations, empirical evidence, and identified research gaps, the following hypotheses are proposed:

H1: The Use of Digital Tax Services Has a Significant Impact on MSME Taxpayer Compliance.

H2: Tax Literacy Moderates the Effect of the Use of Digital Tax Services on MSME Taxpayer Compliance.

3. Research Methods

3.1 Research Design

This study employs a quantitative research approach using an explanatory research design to examine the effect of digital tax service utilization on MSME taxpayer compliance, with tax literacy serving as a

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moderating variable. The explanatory design is appropriate because it aims to test causal relationships among variables and verify hypotheses derived from established theories, including the Technology Acceptance Model (Davis, 1989), the IS Success Model (DeLone & McLean, 2003), the Theory of Planned Behavior (Ajzen, 1991), Tax Compliance Theory (Kirchler, 2007), and the Financial Literacy Framework (Bhushan & Medury, 2014). This approach enables the study to empirically assess both direct and moderating effects within a single analytical framework.

3.2 Research Context and Setting

The study was conducted in Makassar City, Indonesia, focusing on Micro, Small, and Medium Enterprises (MSMEs) registered as taxpayers at the local Tax Service Office (Kantor Pelayanan Pajak/KPP). The MSME sector was selected because it represents a significant contributor to economic development while simultaneously facing challenges in tax compliance and digital tax service adoption. Furthermore, the increasing digitalization of tax administration in Indonesia makes MSMEs an appropriate context for examining the effectiveness of digital tax services and the role of tax literacy in supporting compliance behavior.

2.4 Population and Sample Research Participants

The target population consists of MSME taxpayers registered at the Tax Service Office in Makassar City. The study employed purposive sampling to select respondents who met specific criteria relevant to the research objectives. The criteria included MSME taxpayers who had experience using digital tax services and were actively engaged in fulfilling their tax obligations. A total of 89 respondents participated in the study. The sample size is considered adequate for Partial Least Squares Structural Equation Modeling (PLS-SEM), which is suitable for medium-sized samples and complex models involving moderation effects.

3.4 Data Sources and Data Collection

This study utilizes primary data collected directly from respondents through a structured questionnaire survey. The questionnaire was designed using a Likert-scale format to measure respondents' perceptions regarding digital tax service utilization, taxpayer compliance, and tax literacy. Data collection was conducted by distributing questionnaires to eligible MSME taxpayers in Makassar City. The use of standardized survey instruments helps ensure consistency and minimizes measurement bias during the data collection process.

2.4 Measurement of Variables and Research Instruments

Three main variables were examined in this study: digital tax service utilization, MSME taxpayer compliance, and tax literacy. Digital tax service utilization was measured based on the Technology Acceptance Model (Davis, 1989) and the IS Success Model developed by DeLone and McLean (2003). The indicators include usefulness, ease of use, accessibility, reliability, security, efficiency, accuracy, timeliness, integration, and user satisfaction.

MSME taxpayer compliance was measured based on the Theory of Planned Behavior (Ajzen, 1991) and Tax Compliance Theory (Kirchler, 2007). The indicators include taxpayer registration, tax calculation, tax payment, tax reporting, record-keeping, compliance with regulations, responsiveness, transparency, and consistency. Tax literacy was measured using indicators adapted from the Financial Literacy Framework and the tax literacy concept proposed by Bhushan and Medury (2014). The indicators include knowledge of tax regulations, procedural understanding, awareness of rights and obligations, digital skills, financial literacy, policy interpretation, awareness of sanctions, and tax-related decision-making ability.

All indicators were measured using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5).

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3.6 Data Analysis Techniques

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4 software. PLS-SEM was selected because it is appropriate for predictive and explanatory research, accommodates relatively small to medium sample sizes, and can simultaneously evaluate measurement and structural models. In addition, PLS-SEM effectively tests moderation effects through the product indicator interaction term approach, making it suitable for examining the moderating role of tax literacy in the relationship between digital tax service utilization and taxpayer compliance.

3.7 Validity, Reliability, and Trustworthiness

The quality of the measurement model was evaluated through validity and reliability assessments. Convergent validity was assessed using the Average Variance Extracted (AVE), while discriminant validity was examined using the Heterotrait-Monotrait Ratio (HTMT). Reliability was evaluated using Composite Reliability (CR) and Cronbach's Alpha. The measurement model was considered acceptable when all validity and reliability criteria met the recommended threshold values established in the PLS-SEM literature.

3.8 Ethical Considerations

The study adhered to fundamental research ethics principles throughout the data collection process. Participation was voluntary, and respondents were informed about the purpose of the research before completing the questionnaire. The confidentiality and anonymity of respondents were maintained, and all collected information was used exclusively for academic research purposes. No personal identifying information was disclosed during data analysis or reporting.

3.9 Research Procedure

The research procedure consisted of several stages. First, the study identified relevant theories and empirical literature related to digital tax services, taxpayer compliance, and tax literacy. Second, the research framework and hypotheses were developed based on the literature review. Third, measurement instruments were designed and distributed to selected MSME taxpayers. Fourth, the collected data were screened and prepared for analysis. Fifth, the measurement model was evaluated through validity and reliability testing. Finally, the structural model and moderation effect were tested using PLS-SEM to evaluate the proposed hypotheses.

3.10 Methodological Limitations

Several limitations should be acknowledged. First, the study was conducted exclusively among MSME taxpayers in Makassar City, which may limit the generalizability of the findings to other regions or taxpayer groups. Second, the use of self-reported questionnaire data may introduce response bias. Third, the cross-sectional nature of the study restricts the ability to observe changes in taxpayer behavior over time. Future research may consider broader geographical coverage, larger sample sizes, and longitudinal research designs to provide more comprehensive insights into digital tax service adoption and taxpayer compliance behavior.

4. Results and Discussion

4.1 Research Results

4.1.1 Sample Description and Descriptive Statistics

The data analyzed in this study were collected through a structured questionnaire administered via Google Forms. A total of 89 MSME taxpayers in Makassar City participated in the survey and met the research criteria. Respondents were profiled according to demographic characteristics, including gender, age, and educational attainment, to provide a comprehensive overview of the sample. Age was categorized into several groups to capture potential generational differences, while educational attainment was classified into secondary, undergraduate, and postgraduate

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levels. These demographic characteristics facilitate a more comprehensive interpretation of the findings regarding the utilization of digital tax services, tax literacy, and taxpayer compliance.

a. Descriptive Statistics

Descriptive statistics provide an overview of the distribution and central tendency of the research variables. This study examined three constructs: Digital Tax Service Utilization (PB), MSME Taxpayer Compliance (KM), and Tax Literacy (EB). The analysis was performed using SmartPLS 4, and the results are presented in Table 1.

Table 1. Descriptive Statistics

Variables	N	Minimum	Maximum	Mean	Standard Deviation
Digital Tax Service Utilization (PB)	89	1.000	5.000	3.668	0.503
MSME Taxpayer Compliance (KM)	89	1.000	5.000	3.632	0.519
Tax Literacy (EB)	89	1.000	5.000	3.639	0.538

Source: Processed by the authors using SmartPLS 4.

As presented in Table 1, all constructs exhibit relatively high mean scores, ranging from 3.632 to 3.668 on a five-point Likert scale, indicating generally positive perceptions among respondents. Digital Tax Service Utilization (PB) recorded the highest mean (3.668, SD = 0.503), suggesting that MSME taxpayers in Makassar City have generally adopted and utilized the digital tax services provided by the Directorate General of Taxes.

Meanwhile, MSME Taxpayer Compliance (KM) obtained a mean score of 3.632 (SD = 0.519), indicating a relatively satisfactory level of voluntary tax compliance, although further improvement remains necessary. Tax Literacy (EB) produced a mean score of 3.639 (SD = 0.538), reflecting that respondents possess an adequate understanding of tax regulations, procedures, and obligations. Furthermore, the relatively low standard deviation values (0.503–0.538) indicate that respondents' perceptions are relatively homogeneous, suggesting limited variability across observations. Overall, these descriptive findings provide preliminary evidence that the constructs exhibit sufficient variation and consistency for subsequent structural model analysis.

4.1.2 Measurement Model Evaluation

Before testing the structural relationships, the measurement model was evaluated to ensure the reliability and validity of the research constructs. Following the recommendations of Hair et al. (2022), the assessment included internal consistency reliability, convergent validity, discriminant validity, and overall model fit. Reliability was evaluated using Cronbach's Alpha, rho_A, and Composite Reliability (CR), whereas convergent validity was assessed using the Average Variance Extracted (AVE). Discriminant validity was subsequently examined using the Fornell-Larcker Criterion and the Heterotrait-Monotrait Ratio (HTMT).

a. Convergent Validity and Reliability

Table 2. Convergent Validity and Reliability Results

Variables	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Digital Tax Service Utilization (PB)	0.919	0.925	0.931	0.576
MSME Taxpayer Compliance (KM)	0.890	0.893	0.911	0.534
Tax Literacy (EB)	0.909	0.951	0.923	0.600

Source: Processed by the authors using SmartPLS 4.

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Table 2 demonstrates that all constructs satisfy the recommended reliability and convergent validity criteria. Cronbach's Alpha values range from 0.890 to 0.919, while rho_A values range from 0.893 to 0.951, indicating excellent internal consistency. Similarly, Composite Reliability values exceed the recommended threshold of 0.70, ranging from 0.911 to 0.931. Furthermore, all AVE values are above 0.50, indicating that each construct explains more than 50% of the variance of its respective indicators. Collectively, these findings confirm that the measurement model possesses satisfactory reliability and convergent validity, making it appropriate for subsequent structural model analysis.

b. Discriminant Validity (Fornell-Larcker Criterion)

Table 3. Discriminant Validity (Fornell-Larcker Criterion)

Variables	Digital Tax Service Utilization (PB)	MSME Taxpayer Compliance (KM)	Tax Literacy (EB)
Digital Tax Service Utilization (PB)	0.759		
MSME Taxpayer Compliance (KM)	0.440	0.731	
Tax Literacy (EB)	-0.094	0.283	0.775

Source: Processed by the authors using SmartPLS 4.

Table 3 presents the Fornell-Larcker Criterion results, in which the diagonal elements represent the square roots of the AVE values. Discriminant validity is established when each diagonal value exceeds the corresponding inter-construct correlations. The square roots of the AVE are 0.759 for PB, 0.731 for KM, and 0.775 for EB, all of which are greater than the correlations between constructs. These findings demonstrate that each construct captures a unique concept and is empirically distinguishable from the others, thereby confirming satisfactory discriminant validity.

c. Discriminant Validity (HTMT)

Table 4. Heterotrait-Monotrait Ratio (HTMT)

Variables	Digital Tax Service Utilization (PB)	MSME Taxpayer Compliance (KM)	Tax Literacy (EB)
Digital Tax Service Utilization (PB)	—		
MSME Taxpayer Compliance (KM)	0.467	—	
Tax Literacy (EB)	0.159	0.272	—
Tax Literacy × Digital Tax Service Utilization	0.075	0.539	0.169

Source: Processed by the authors using SmartPLS 4.

The HTMT criterion provides a more rigorous assessment of discriminant validity. According to Hair et al. (2022), HTMT values below 0.90 indicate adequate discriminant validity. As shown in Table 4, all HTMT values are substantially below the recommended threshold. The highest HTMT value is 0.539, while the remaining values range between 0.075 and 0.467. These results provide strong evidence that all constructs are empirically distinct and measure different conceptual domains.

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d. Model Fit Assessment

Table 5. Model Fit Indices

Model Fit Index	Saturated Model	Estimated Model
SRMR	0.078	0.077
d_ULS	2.272	2.231
d_G	0.931	0.933
Chi-Square	401.683	400.074
NFI	0.741	0.742

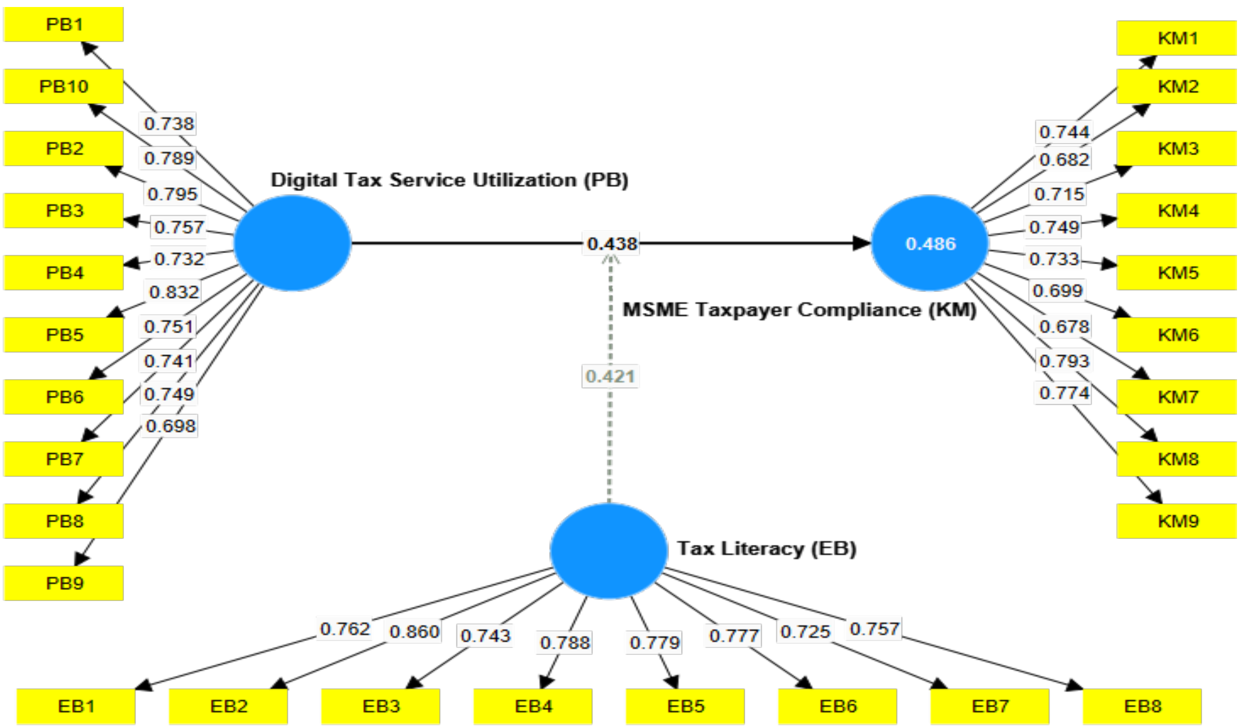
Source: Processed by the authors using SmartPLS 4.

The model fit statistics indicate that the proposed PLS-SEM model demonstrates an acceptable level of goodness-of-fit. The Standardized Root Mean Square Residual (SRMR) for the estimated model is 0.077, which is below the recommended threshold of 0.08, indicating a satisfactory fit between the empirical data and the proposed model. The d_ULS and d_G values are comparable between the saturated and estimated models, suggesting model stability and consistency. Although the Chi-Square statistic is reported for completeness, it is not considered the primary fit criterion in PLS-SEM. Additionally, the Normed Fit Index (NFI) of 0.742 indicates an acceptable level of model fit relative to the null model. Overall, these results confirm that the measurement and structural models are statistically adequate and suitable for hypothesis testing.

4.1.3 Main Analytical Results

The structural model was estimated using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4. Figure 1 presents the estimated outer and structural models, including the standardized indicator loadings, path coefficients, interaction effect, and coefficient of determination (R^2).

Figure 1. Measurement and Structural Model Results



Source: Processed by the authors using SmartPLS 4.

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Figure 1 demonstrates that all measurement indicators exhibit satisfactory standardized outer loadings, with values generally exceeding the recommended threshold of 0.70, indicating adequate indicator reliability. For the Digital Tax Service Utilization (PB) construct, outer loadings range from 0.698 to 0.832, with PB4 displaying the highest loading (0.832), suggesting that this indicator contributes most strongly to representing the construct. The MSME Taxpayer Compliance (KM) construct records indicator loadings ranging from 0.678 to 0.793, while the Tax Literacy (EB) construct exhibits loadings between 0.725 and 0.860, with EB2 emerging as the strongest indicator (0.860).

Regarding the structural model, the standardized path coefficient from Digital Tax Service Utilization (PB) to MSME Taxpayer Compliance (KM) is 0.438, indicating a positive relationship between the two constructs. Furthermore, the interaction term between Tax Literacy (EB) and Digital Tax Service Utilization (PB) produces a path coefficient of 0.421, suggesting that tax literacy strengthens the influence of digital tax service utilization on taxpayer compliance. The coefficient of determination (R^2 = 0.486) indicates that approximately 48.6% of the variance in MSME taxpayer compliance is jointly explained by digital tax service utilization and the moderating effect of tax literacy. According to Hair et al. (2022), this value represents a moderate explanatory power, indicating that the proposed model provides an adequate explanation of taxpayer compliance behavior.

4.1.4 Hypothesis Testing Results

The structural relationships were evaluated using the bootstrapping procedure in SmartPLS 4. Hypotheses were considered supported when the t-statistic exceeded 1.96 and the p-value was below 0.05, corresponding to a 95% confidence level.

Table 6. Results of Hypothesis Testing

Hypothesis	Structural Relationship	Original Sample (β)	Sample Mean	Standard Deviation	t-Statistic	p-Value	Decision
H1	Digital Tax Service Utilization (PB) → MSME Taxpayer Compliance (KM)	0.438	0.460	0.080	5.441	0.000	Supported
H2	Tax Literacy (EB) × Digital Tax Service Utilization (PB) → MSME Taxpayer Compliance (KM)	0.421	0.389	0.111	3.789	0.000	Supported

Source: Processed by the authors using SmartPLS 4.

The results presented in Table 6 indicate that both proposed hypotheses are empirically supported. First, Digital Tax Service Utilization (PB) has a positive and statistically significant effect on MSME Taxpayer Compliance (KM) (β = 0.438, t = 5.441, p < 0.001), supporting Hypothesis 1. This finding suggests that greater utilization of digital tax services contributes to higher levels of taxpayer compliance among MSMEs in Makassar City.

Second, the interaction between Tax Literacy (EB) and Digital Tax Service Utilization (PB) has a positive and statistically significant effect on taxpayer compliance (β = 0.421, t = 3.789, p < 0.001), supporting Hypothesis 2. This result confirms that tax literacy functions as a positive moderating variable, strengthening the influence of digital

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tax service utilization on MSME taxpayer compliance. In other words, taxpayers with higher levels of tax literacy are better able to maximize the benefits of digital tax services, leading to stronger compliance behavior.

4.2 Research Discussion

4.2.1 Interpretation of Key Findings

a. Proof of H1: The Effect of Utilization of Digital Tax Services on MSME Taxpayer Compliance

The results of the hypothesis testing confirm that the Utilization of Digital Tax Services (PB) has a significant positive effect on MSME (SME) Taxpayer Compliance, as indicated by a path coefficient of 0.438, a T-statistic of 5.441, and a P-value of 0.000, thus H1 is accepted. This finding is theoretically based on the Technology Acceptance Model (TAM) proposed by Davis (1989), which states that perceived usefulness and perceived ease of use of an information system drive user behavioral intentions, including behaviors related to compliance; in this context, the utilization of digital platforms such as e-Filing, e-Billing, and e-SPT reduces administrative burdens and procedural complexity, thereby encouraging MSME taxpayers to fulfill their obligations more consistently.

This is further supported by DeLone and McLean's (2003) Information Systems Success Model, which states that system quality, information quality, and service quality collectively generate net benefits for users—a framework directly applicable to digital tax services. Empirically, these results align with the findings of Diantini et al. (2018), who found that e-Filing adoption significantly improved individual taxpayer compliance in Indonesia by reducing time and administrative costs, and Sari (2024), who demonstrated that digital tax services positively impacted MSME compliance in Bali by reducing procedural barriers.

Internationally, Loo et al. (2012) established that technology-mediated tax administration improves voluntary compliance by increasing transparency and reducing perceived complexity, while Alm and Torgler (2011) argued that streamlined digital interactions between tax authorities and taxpayers foster greater institutional trust, a key antecedent of compliant behavior. Overall, the theoretical foundation and empirical evidence strongly support the conclusion that improving the accessibility and quality of digital tax services is an effective strategy for improving taxpayer compliance among MSMEs in Makassar City.

b. Proof of H2: The Moderating Role of Tax Literacy on the Influence of the Use of Digital Tax Services on MSME Taxpayer Compliance

The results of the study further confirmed that Tax Literacy (EB) significantly moderates the relationship between the Utilization of Digital Tax Services and MSME Taxpayer Compliance, with a path coefficient of 0.421, a T-statistic of 3.789, and a P-value of 0.000, thus H2 is accepted. This moderating effect is theoretically based on the Theory of Planned Behavior (Ajzen, 1991), which states that perceived behavioral control, shaped by an individual's knowledge and cognitive resources, is an important determinant of actual compliance behavior; tax literacy directly strengthens this control by equipping taxpayers with an understanding of the regulations, procedures, and digital systems necessary to translate service availability into compliance actions.

This is also consistent with the Financial Literacy Framework (Lusardi & Mitchell, 2014) and the tax literacy construct defined by Bhushan and Medury (2014), which emphasize that knowledge, skills, and awareness of tax obligations are prerequisites for effective engagement with modern tax administration. Empirically, Saad (2014) found that taxpayers with higher tax literacy demonstrated significantly greater levels of compliance due to their better ability to interpret regulatory requirements and use reporting mechanisms correctly, while Mukhlis et al. (2015) showed that tax literacy moderated the relationship between tax administration modernization and

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compliance among MSME taxpayers in Indonesia, with significantly stronger compliance benefits among more literate taxpayers.

A similar moderating effect was also confirmed by Nzioki and Peter (2014) in Kenya, where tax knowledge reinforced the positive impact of a simplified digital reporting system on MSME compliance. These findings collectively suggest that digital tax services alone are insufficient to drive compliance among taxpayers lacking basic tax literacy, and that policy interventions combining improved digital infrastructure with tax education programs would result in significantly greater improvements in MSME taxpayer compliance in Makassar City.

4.2.2 Comparison with Previous Studies

The positive relationship between digital tax service utilization and taxpayer compliance is consistent with the findings of Diantini et al. (2018), who reported that e-Filing adoption significantly improved taxpayer compliance in Indonesia by reducing time and administrative costs. Similarly, Sari (2024) found that digital tax services positively influenced MSME taxpayer compliance in Bali by minimizing procedural barriers. International evidence also supports these findings. Loo et al. (2012) demonstrated that technology-mediated tax administration enhances voluntary compliance by increasing transparency and reducing perceived complexity, while Alm and Torgler (2011) argued that simplified digital interactions between tax authorities and taxpayers strengthen institutional trust, which is a key determinant of compliance behavior.

Regarding the moderating role of tax literacy, the findings are in line with Saad (2014), who found that taxpayers with higher levels of tax literacy exhibited greater compliance due to their better understanding of tax regulations and reporting requirements. Likewise, Mukhlis et al. (2015) showed that tax literacy strengthened the relationship between tax administration modernization and taxpayer compliance among Indonesian MSMEs. Similar evidence was reported by Nzioki and Peter (2014) in Kenya, where tax knowledge reinforced the effectiveness of simplified digital reporting systems in improving MSME compliance. These similarities confirm that taxpayer knowledge remains a critical factor in maximizing the benefits of digital tax administration.

4.2.3 Theoretical Contributions

The findings provide important contributions to the existing theoretical literature. First, the results support the Technology Acceptance Model (TAM) proposed by Davis (1989), which emphasizes that perceived usefulness and perceived ease of use influence behavioral intentions and actual system utilization. The significant positive effect of digital tax services demonstrates that taxpayers are more likely to comply when digital systems are accessible, useful, and easy to operate.

Second, the findings support the Information Systems Success Model developed by DeLone and McLean (2003), which suggests that system quality, information quality, and service quality generate positive user outcomes. In the context of digital taxation, high-quality digital services contribute to improved taxpayer compliance.

Third, the study extends the Theory of Planned Behavior (Ajzen, 1991) by demonstrating that tax literacy functions as an important cognitive resource that strengthens perceived behavioral control and facilitates compliance behavior. The findings are also consistent with the Financial Literacy Framework proposed by Lusardi and Mitchell (2014) and the tax literacy construct developed by Bhushan and Medury (2014), highlighting the importance of taxpayer knowledge, awareness, and skills in utilizing digital tax systems effectively. Consequently, this study contributes to the literature by establishing tax literacy as a critical moderating factor that enhances the effectiveness of digital tax infrastructure in promoting taxpayer compliance among

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MSMEs.

4.2.4 Practical and Policy Implications

The findings have important practical implications for tax authorities and policymakers. The significant role of digital tax services suggests that continuous investment in digital taxation infrastructure is necessary to improve taxpayer compliance. Enhancing the usability, accessibility, reliability, and user experience of platforms such as e-Filing, e-Billing, and e-SPT can help reduce compliance costs and administrative complexity for MSMEs.

In addition, the significant moderating role of tax literacy indicates that digitalization efforts should be complemented by comprehensive tax education initiatives. Policymakers should design targeted tax literacy programs, workshops, online training modules, and awareness campaigns specifically for MSME taxpayers. Such integrated policies are likely to generate greater compliance improvements than relying solely on technological modernization. Therefore, combining digital tax transformation with taxpayer education represents an effective strategy for improving tax compliance among MSMEs in Makassar City.

4.2.5 Integration with the Research Gap

This study addresses an important research gap identified in the literature concerning the limited understanding of how tax literacy influences the effectiveness of digital tax services in promoting taxpayer compliance among MSMEs. Previous studies have generally examined either the direct effect of digital tax services on compliance or the independent role of tax literacy. However, limited evidence has explored the interaction between these two factors, particularly in the context of MSMEs in developing economies.

The findings demonstrate that tax literacy significantly strengthens the positive effect of digital tax services on taxpayer compliance, thereby providing empirical evidence for the complementary relationship between technological and educational factors in tax administration. By integrating these two dimensions, the study contributes new insights into the mechanisms through which digital tax transformation can achieve optimal compliance outcomes among MSMEs.

4.2.6 Acknowledgement of Study Limitations

Despite its contributions, several limitations should be acknowledged. First, the findings are based on MSME taxpayers located in Makassar City, which may limit the applicability of the results to other geographical contexts with different economic, technological, and institutional conditions. Second, the study focuses specifically on digital tax service utilization and tax literacy, whereas other factors such as tax morale, trust in government, perceived fairness, and technological readiness may also influence taxpayer compliance. Third, the findings reflect conditions within the current stage of digital tax implementation and may evolve as digital tax systems become more advanced and widely adopted.

5. Conclusion

5.1 Summary of Key Findings

This study examined the effect of digital tax service utilization on MSME taxpayer compliance in Makassar City and investigated the moderating role of tax literacy. The results reveal that the utilization of digital tax services has a significant positive effect on MSME taxpayer compliance ($\beta = 0.438$, $T = 5.441$, $p = 0.000$). This finding indicates that digital platforms such as e-Filing, e-Billing, and e-SPT help reduce procedural barriers and administrative complexity, thereby encouraging taxpayers to comply more consistently with their tax obligations.

The study also finds that tax literacy significantly strengthens the relationship between digital tax service utilization and taxpayer compliance ($\beta = 0.421$, $T = 3.789$, $p = 0.000$). Taxpayers with greater knowledge and understanding of tax regulations are better equipped to utilize digital tax services

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effectively, resulting in higher levels of compliance.

5.2 Theoretical Contributions

This study contributes to the literature by providing empirical support for the Technology Acceptance Model (Davis, 1989), the Information Systems Success Model (DeLone & McLean, 2003), and the Theory of Planned Behavior (Ajzen, 1991). The findings confirm that digital tax systems can enhance taxpayer compliance when they are perceived as useful and easy to use.

More importantly, the study extends existing theoretical frameworks by identifying tax literacy as a significant moderating variable that amplifies the compliance-enhancing effects of digital tax services. This contribution enriches the growing body of literature on digital taxation and taxpayer behavior, particularly within the MSME context where informational and cognitive constraints often influence compliance decisions.

5.3 Practical and Policy Implications

The findings suggest that tax authorities should continue improving the quality and accessibility of digital tax services to facilitate taxpayer compliance. Efforts to enhance system functionality, service reliability, and user convenience can further encourage MSMEs to fulfill their tax obligations efficiently.

In addition, policymakers should implement targeted tax literacy programs to ensure that taxpayers possess the knowledge and skills necessary to utilize digital tax services effectively. Combining digital tax infrastructure development with taxpayer education initiatives is likely to produce stronger and more sustainable improvements in taxpayer compliance.

5.4 Limitations of the Study

This study is limited to MSME taxpayers in Makassar City, which may restrict the generalizability of the findings to other regions with different socioeconomic and technological characteristics. Furthermore, the study focuses on digital tax service utilization and tax literacy, while other determinants of taxpayer compliance may not have been fully captured. Therefore, the findings should be interpreted within the specific context of the study.

5.5 Directions for Future Research

Future research may expand the scope of analysis by including MSMEs from different cities, provinces, or countries to improve the generalizability of the findings. Longitudinal research designs could also be employed to examine changes in taxpayer behavior over time as digital tax systems continue to evolve.

Additionally, future studies may incorporate other relevant variables, such as tax morale, trust in government, perceived fairness of the tax system, technological readiness, or digital literacy, to develop a more comprehensive understanding of taxpayer compliance behavior in the digital taxation era.

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