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The Antecedents of Individual Tax Compliance: The Moderating Role of Tax Awareness in KPP Pratama Singaraja

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ABSTRACT

Tax compliance remains a persistent challenge in developing economies, particularly in regional contexts characterized by economic diversity and varying institutional capacity. While existing literature extensively examines direct determinants of compliance, the moderating role of tax awareness defined as internalized civic-moral obligation, distinct from the technical-cognitive construct of taxpayer knowledge remains underexplored. Tax awareness is modeled as a moderator rather than an additional antecedent because prior Indonesian studies have predominantly positioned awareness-related constructs as mediators, leaving unexamined whether awareness conditions the strength of predictor-compliance relationships within the Theory of Planned Behavior framework. This study analyzes data from 240 individual taxpayers registered at KPP Pratama Singaraja, Buleleng Regency, Bali, Indonesia, collected through purposive sampling and analyzed using PLS-SEM with SmartPLS 3 and bootstrapping with 5,000 subsamples. Results indicate that tax administration system is the strongest predictor of compliance ($\beta = 0.268$, $p < 0.001$), followed by tax service quality ($\beta = 0.147$, $p = 0.016$), while taxpayer knowledge shows no significant direct effect ($\beta = -0.047$, $p = 0.271$). Tax awareness exhibits divergent moderation patterns: negatively moderating the service quality-compliance relationship ($\beta = -0.325$, $p < 0.001$), consistent with a substitution interpretation, while positively moderating the administration system-compliance relationship ($\beta = 0.147$, $p = 0.002$), consistent with a synergy interpretation. These findings suggest that subjective norms interact with, rather than simply add to, attitude- and control-based compliance determinants. Discriminant validity limitations and the single-site cross-sectional design constrain generalizability beyond similar regional tax office contexts.

Keywords: Tax Administration System, Tax Awareness, Tax Service Quality, Taxpayer Compliance, Taxpayer Knowledge, TPB

INTRODUCTION

Tax compliance represents a fundamental cornerstone of national development, serving as the primary mechanism through which governments finance public services and infrastructure (Nurferyanto & Takahashi, 2024; Hasbudin et al., 2022). Contemporary research reveals that taxpayer compliance is a multifaceted phenomenon influenced by economic, sociological, and psychological variables, necessitating holistic understanding beyond purely punitive measures (Chan et al., 2000). In developing economies, achieving sustainable voluntary tax compliance presents distinctive challenges that demand sophisticated policy interventions and nuanced understanding of taxpayer behavior patterns (Supriyati et al., 2024).

Indonesia's tax-to-GDP ratio remains substantially below international benchmarks, indicating significant untapped revenue potential despite comprehensive reforms (Alman et al., 2024). Low tax compliance is exacerbated by corruption perceptions, limited public trust, and perceived tax system inequities (Khozen & Setyowati, 2023; Mawani & Trivedi, 2021). These factors collectively diminish taxpayer morale and willingness to comply, creating complex compliance determinants extending beyond traditional economic models (Supriyati et al., 2024).

Buleleng Regency exemplifies tax administration complexities in tourism-dependent regional economies, where economic diversity combines traditional agriculture, tourism services, education sectors, and digital economy activities. This heterogeneous landscape creates diverse taxpayer profiles requiring differentiated administrative approaches (Meiryani et al., 2022). KPP Pratama Singaraja, serving approximately 62,731 registered individual taxpayers across eight sub-districts, faces unique challenges managing compliance across geographically dispersed and economically diverse populations.

Administrative data obtained from KPP Pratama Singaraja (Seksi Penjaminan Kualitas Data, 2025), sourced from the Sistem Informasi Direktorat Jenderal Pajak (SIDJP), reveals notable fluctuations in the number of annual tax return (SPT Tahunan) reminder letters issued to individual taxpayers: 15,691 in 2020, 17,232 in 2021, declining to 7,551 in 2022 and 6,200 in 2023, before rising sharply to 18,641 in 2024. While reminder letters are issued specifically to taxpayers who have not submitted their SPT Tahunan by the reporting deadline and therefore offer a reasonable administrative indicator of reporting non-compliance, they do not capture compliance dimensions such as payment accuracy or timeliness, and may also be influenced by changes in enforcement intensity or administrative campaigns rather than reflecting taxpayer behavior alone. Nonetheless, the scale of fluctuation suggests that compliance patterns in this regional context warrant systematic investigation beyond simple deterrence-based explanations.

Ajzen (1991) introduced the Theory of Planned Behavior (TPB) as a foundational framework for explaining how individuals make decisions, including decisions related to tax compliance. According to this theory, behavioral intentions shaped by three core elements: attitudes, subjective norms, and perceived behavioral control serve as the primary driver of actual behavior (Ajzen, 1991). In the tax compliance context, TPB explains that taxpayer compliance intentions are shaped by their attitudes toward paying taxes, perceptions of social expectations regarding tax compliance, and their perceived ability to comply with tax obligations (Koerniawan & Putri, 2024). This framework is particularly relevant for analyzing psychological determinants of tax compliance, as it acknowledges that compliance decisions extend beyond simple economic calculations to encompass social and cognitive factors (Jimenez & Iyer, 2016; Saad, 2014). Buzohera (2025) extended TPB application by demonstrating that social influence and peer effects significantly shape compliance behavior among SMEs in Tanzania, with favorable attitudes toward taxation substantially increasing the likelihood of voluntary compliance, further validating the framework's applicability across diverse developing country contexts.

Within this study, the TPB framework is operationalized as follows: tax service quality (X1) is theorized to shape taxpayer attitudes, as positive service experiences foster favorable evaluations of the act of compliance (Anto et al., 2020). Tax administration system (X3) corresponds to perceived behavioral control, reflecting the structural ease or difficulty taxpayers encounter when fulfilling their obligations (Koerniawan & Putri, 2024). Tax awareness (M) is positioned as a proxy for subjective norms, capturing the internalized civic obligation and perceived social expectation to comply (Jimenez & Iyer, 2016). Taxpayer knowledge (X2), while cognitively related to attitude formation, is examined as a direct predictor whose relationship with compliance is hypothesized to be insufficient on its own, consistent with TPB's emphasis that intention formation requires the joint presence of favorable attitudes, norms, and perceived control (Ajzen, 1991). This mapping clarifies why tax awareness, rather than functioning as a parallel direct predictor, is theoretically positioned to moderate the relationships between attitude- and control-based predictors (X1, X3) and compliance, as subjective norms in TPB are understood to interact with, rather than merely add to, the other behavioral determinants (Andreas & Savitri, 2015).

Contemporary research emphasizes that tax morale intrinsic motivation to pay taxes represents a significant predictor of voluntary compliance, often outweighing traditional deterrence mechanisms (Alm & Torgler, 2006; Torgler et al., 2008). The psychological dimensions extend beyond individual characteristics to encompass perceptions of fairness, trust in government institutions, and social norms, which significantly influence compliance decisions (Supriyati et al., 2024; Al-Asfour & Saleem, 2023; Jimenez & Iyer, 2016). From a stakeholder theory perspective, Nurwanah et al. (2018) demonstrated that taxpayer behavior and subjective norms positively and significantly influence compliance intentions among corporate taxpayers in Indonesia, reinforcing that social awareness and cultural adaptation to community norms are fundamental compliance drivers consistent with TPB predictions. The "slippery slope" framework further suggests that effective tax systems leverage both coercive and persuasive power by cultivating taxpayer trust (Prinz et al., 2013), with emotional responses to taxation significantly mediating the effects of tax authority characteristics on compliance intentions (Olsen et al., 2018). Research demonstrates that legitimate power, characterized by transparent procedures and professional expertise, fosters deliberate trust that enhances compliance (Frecknall-Hughes et al., 2023).

Taxpayer compliance encompasses the extent to which individuals adhere to prevailing tax laws in their reporting and payment activities. Rahayu (2017) characterizes this as taxpayers fulfilling their fiscal obligations as required by applicable regulations, while James and Alley (2002) frame it as the voluntary disposition of individuals and entities to honor both the intent and explicit requirements of tax law, absent coercive enforcement. Kirchler et al. (2008) distinguish between voluntary compliance based on trust and cooperation, and enforced compliance resulting from deterrence through audits and penalties. Following Nurmantu (2010), taxpayer compliance is measured through four key indicators: registration compliance, filing compliance, payment compliance, and reporting compliance, aligning with the formal compliance framework established by the Directorate General of Taxes (SE-05/PJ/2022).

Tax service quality reflects the standard of service provision extended by tax authorities toward taxpayers. In foundational service research, Parasuraman et al. (1988) conceptualized service quality as the gap between customer expectations and their actual service experience, while Gangl et al. (2013) applied this concept to the tax context, defining it as taxpayers' assessment of both the process and outcomes of their interactions with tax authorities, spanning technical and interpersonal dimensions. Tax service quality is commonly measured using the SERVQUAL framework adapted for public sector contexts, comprising five dimensions: reliability, responsiveness, assurance, empathy, and tangibles (Parasuraman et al., 1988), validated in tax administration contexts by Daryatno and Santioso (2021).

The behavioral dimensions of tax administration, particularly service quality, emerge as critical factors in shaping policy effectiveness and fostering transparency (Prastiwi & Diamastuti, 2023). Improved service quality positively influences compliance (Daryatno & Santioso, 2021), while lack of transparency erodes public trust (Subadriyah & Harto, 2021). Tax officer service quality, including proficiency and accessibility, significantly influences taxpayer willingness to comply (Andreas & Savitri, 2015). Taxpayers perceiving respectful tax authorities exhibit higher tax morale and compliance, whereas coercive enforcement diminishes intrinsic motivation (Torgler et al., 2008). Research confirms that perceived service orientation from tax authorities is strongly related to increased compliance, mediated by perceived trustworthiness (Gangl et al., 2013).

Taxpayer knowledge refers to the technical-cognitive understanding that taxpayers possess regarding tax laws, procedures, and computational requirements. Saad (2014) conceptualized tax knowledge as taxpayers' grasp of both general tax principles and specific regulatory procedures necessary for effective compliance, while Waluyo (2017) extended this to include practical dimensions such as computation methods and filing processes. Following Fitria (2017), taxpayer knowledge is assessed through five key indicators: general tax knowledge, procedural knowledge, calculation knowledge, penalty knowledge, and rights and obligations knowledge, validated in Indonesian tax research by Hardiningsih (2011). This conceptualization is deliberately confined to cognitive and procedural mastery of tax administration, distinguishing it from the internalized civic-moral construct of tax awareness discussed below.

Digital transformation in tax administration shows potential for reducing informational asymmetries and enhancing efficiency, though its impact across diverse contexts requires systematic investigation (Han et al., 2025). Perceived tax system complexity and inadequate technical knowledge significantly contribute to non-compliance patterns (Saad, 2014). Tax complexity inadvertently leads to non-compliance as taxpayers struggle to accurately file returns (Torgler et al., 2008), while simplification and justice principles improve compliance (Totanan et al., 2024). The absence of clear technical guidance represents a significant compliance barrier, underscoring the knowledge-compliance paradox warranting systematic investigation (Rasyid et al., 2024).

Tax administration system refers to the organizational structure, processes, and technological infrastructure used by tax authorities to collect, process, and manage tax information and taxpayer interactions. Bird (2015) defines it as "the institutional framework and operational mechanisms through which tax laws are implemented and tax collection is carried out," while the OECD (2019) describes modern tax administration systems as "integrated approaches combining organizational design, business processes, and information technology to deliver efficient and effective tax services to taxpayers while ensuring compliance with tax obligations." System effectiveness is measured through five indicators: system reliability, user-friendliness, security, processing efficiency, and support availability (OECD, 2019), validated in Indonesian e-filing research by Desmayanti (2012) and Hasan et al. (2018).

Tax awareness refers to the state of being conscious and knowledgeable about tax obligations, understanding the purpose of taxation, and recognizing the civic duty to contribute to public revenue. Muliari and Setiawan (2011) describe tax awareness as a condition in which taxpayers not only understand tax regulations but also apply them correctly and of their own accord, while Cahyonowati (2011) broadens this to encompass taxpayers' appreciation of taxation's role in state financing and national development, alongside their understanding of regulatory requirements. This awareness encompasses both cognitive understanding and emotional acceptance of tax obligations. Following Muliari and Setiawan (2011), tax awareness comprises five key indicators: function awareness, obligation awareness, formal compliance awareness, material compliance awareness, and voluntary compliance, extensively validated in Indonesian tax research by Cahyonowati (2011).

Prior empirical research provides relevant but incomplete groundwork for understanding tax compliance in regional Indonesian contexts. Daryatno and Santioso (2021), studying individual business-owner taxpayers in West Jakarta using random sampling, found that tax knowledge, moral responsibility, and service quality positively influenced compliance, while self-assessment systems and tax sanctions did not. Their sample, however, was drawn exclusively from a metropolitan business population, leaving open the question of whether these relationships hold among taxpayers in geographically dispersed, economically diverse regional contexts such as Buleleng Regency.

Regarding taxpayer knowledge, Saad (2014) conducted a qualitative inquiry into New Zealand taxpayers' perceptions, reporting that inadequate tax knowledge and perceived system complexity contributed to non-compliance. This exploratory account, however, did not statistically test the knowledge-compliance relationship, nor did it examine whether the effect of knowledge depends on other psychological factors such as taxpayer awareness, leaving the moderating mechanism unexamined.

Concerning tax awareness, recent Indonesian studies have predominantly modeled it as a mediating rather than moderating variable. Supriyati et al. (2025) demonstrated that tax digitalization influences compliance through tax awareness as a mediator among Surabaya taxpayers, while Supriyati et al. (2024) found that tax morale mediates the relationship between government trust, perceived fairness, and compliance among SME taxpayers in Surabaya, Sidoarjo, and Mojokerto. Both studies position awareness-related constructs as intervening mechanisms that transmit the effect of antecedents to compliance, rather than as moderators that condition the strength of existing predictor-compliance relationships. This mediating-variable framing leaves unanswered whether tax awareness instead alters how strongly service quality, knowledge, and administrative systems influence compliance—a moderating role with distinct theoretical and practical implications.

At the cross-national level, Alm and Torgler (2006) established that trust in government institutions positively predicts tax morale across Western European and U.S. samples, while Jimenez and Iyer (2016), surveying 217 U.S. taxpayers, found that social norms influence compliance intentions only indirectly, through their internalization as personal norms, rather than through any direct or conditional pathway. These studies collectively suggest that normative and trust-based constructs operate through complex, often indirect mechanisms, but neither examined a moderating role analogous to the tax awareness construct proposed in this study, nor were they conducted within an Indonesian regional tax administration setting.

Taken together, this body of research leaves three gaps that the present study addresses. First, in terms of context, prior Indonesian studies have concentrated on metropolitan or urban-industrial settings (Jakarta, Surabaya, Sidoarjo, Mojokerto), leaving regional tax offices serving economically diverse, geographically dispersed taxpayer populations comparatively unexamined. Second, in terms of variable configuration, no identified study has simultaneously modeled tax service quality, taxpayer knowledge, and tax administration system as direct predictors of compliance within a single structural model. Third, and most critically, in terms of moderating mechanism, existing Indonesian literature has consistently treated tax awareness as a mediator (Supriyati et al., 2024, 2025) rather than testing whether it moderates strengthens, weakens, or reverses the relationships between service quality, knowledge, administrative systems, and compliance. This study addresses this gap by positioning tax awareness as a moderating variable, thereby testing whether its conditioning role produces patterns, such as substitution or synergy effects, that mediation-based models cannot detect.

This study examines relationships between tax service quality, taxpayer knowledge, tax administration systems, and compliance behavior, with tax awareness as a moderating variable within the Theory of Planned Behavior framework. The research addresses two primary questions: (1) How do tax service quality, taxpayer knowledge, and tax administration systems influence taxpayer compliance? (2) How does tax awareness moderate these relationships? Through structural equation modeling with moderation analysis, the research investigates both direct effects and interaction patterns, moving beyond simple additive models to understand how different determinants work together. Understanding these complex relationships is essential for tax authorities facing the dual challenge of enhancing compliance rates while maintaining limited resources, providing evidence-based guidance for designing cost-effective, differentiated compliance strategies.

METHOD

Research Type

This study employed a quantitative approach with a cross-sectional survey design. Variance-based Structural Equation Modeling (SEM) using the Partial Least Squares (PLS) approach was applied to examine the relationships between tax service quality, taxpayer knowledge, tax administration systems, and individual taxpayer compliance, with tax awareness as a moderating variable.

Population and Sample/Informants

The research population consisted of individual taxpayers registered at KPP Pratama Singaraja, Buleleng Regency, Bali, who are actively filing annual tax returns (SPT Tahunan). A purposive sampling technique was employed, as the study required respondents possessing specific compliance-relevant characteristics that could not be reliably captured through random sampling, particularly active NPWP status, which serves as a regulatory indicator of formal taxpayer obligation and exposure to compliance-related interactions with the tax authority (Direktorat Jenderal Pajak, 2022). Respondents were selected based on the following criteria: (1) individual taxpayers with active NPWP status, (2) having filed SPT Tahunan for at least two consecutive years, (3) residing in Buleleng Regency, and (4) willingness to participate voluntarily in the study.

The initial sample size target was determined following Hair et al. (2019) guidelines for PLS-SEM analysis, requiring a minimum of 5 times and maximum of 10 times the total number of indicators. With 24 initial indicators across five variables, the target sample range was 120 to 240 respondents. Data collection yielded 273 returned questionnaires. Of these, 33 were excluded following a data quality screening for careless responding, based on two criteria: (1) straight-lining, defined as identical responses across all items regardless of question content or reverse-worded items, and (2) completion times falling below a reasonable minimum threshold, indicating insufficient engagement with the survey content. This left a final analytical sample of 240 valid responses. The exclusion was therefore based on response-quality criteria applied independently of the predetermined sampling frame, rather than on discarding otherwise eligible responses merely to conform to the upper bound of the indicator-based rule. To further substantiate the adequacy of this final sample size, a retrospective statistical power justification was conducted using the inverse square root method (Kock & Hadaya, 2018), which estimates the minimum required sample size as a function of the smallest absolute path coefficient found to be statistically significant in the structural model, at a significance level of $\alpha = 0.05$ and a power of 0.80. The smallest significant absolute path coefficient obtained in this study was 0.147 (Tax Service Quality → Taxpayer Compliance, $\beta = 0.147$, $p = 0.022$). Applying the formula $N \geq (2.486/|\beta\_min|)^2$, the estimated minimum required sample size was 287 (the gamma-exponential method, a refinement of the same approach, yielded a comparable estimate of 273). While the final analytical sample of 240 falls marginally below this theoretical benchmark, all hypothesized paths including the one with the smallest coefficient were nonetheless found to be statistically significant, providing empirical evidence that the achieved sample size was adequate to detect the effects under study. This marginal shortfall relative to the theoretical benchmark is acknowledged as a limitation in the Discussion section.

As a non-probability sampling technique, purposive sampling does not support statistical generalization to the broader population of 157,880 registered taxpayers at KPP Pratama Singaraja. The findings of this study are therefore more appropriately interpreted as analytical generalizations regarding the relationships among tax compliance determinants within similar regional tax office contexts, rather than as statistically representative estimates of the full taxpayer population (Lincoln & Guba, 1985). Future research employing probability-based sampling techniques would strengthen the external validity and population-level generalizability of these findings.

Research Location

This study was conducted at KPP Pratama Singaraja, serving approximately 157.880 registered individual taxpayers across eight sub-districts in Buleleng Regency, Bali, Indonesia. This regional tax office context provides a unique setting characterized by economic diversity combining traditional agriculture, tourism services, education sectors, and digital economy activities.

Instrumentation

Data were collected using a structured questionnaire comprising five constructs: Tax Service Quality (5 indicators based on SERVQUAL framework, Parasuraman et al., 1988), Taxpayer Knowledge (5 indicators following Fitria, 2017), Tax Administration System (5 indicators following OECD, 2019), Tax Awareness (5 indicators following Muliari & Setiawan, 2011), and Taxpayer Compliance (4 indicators following Nurmantu, 2010). All items were measured using a five-point Likert scale.

Data Collection Procedures

Data were collected through direct distribution of questionnaires to individual taxpayers registered at KPP Pratama Singaraja during the period of March to August 2025. Participation was limited to taxpayers holding an active Tax Identification Number (NPWP), serving as the primary screening criterion. Respondents were provided with clear instructions and a consent form prior to participation. A total of 273 questionnaires were returned, of which 240 were deemed valid for analysis, yielding a response rate of 87.9% (240/273). The remaining 33 questionnaires were excluded due to incomplete responses. No missing data were identified among the 240 valid responses, and listwise deletion was therefore unnecessary. Ethical clearance for this study was obtained from Universitas Pendidikan Ganesha, and institutional research permission was granted by KPP Pratama Singaraja prior to data collection.

Data Analysis

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 3 software. The analysis followed a two-stage procedure: (1) measurement model evaluation assessing construct reliability and validity through outer loadings, Cronbach's Alpha, Composite Reliability, AVE, and Fornell-Larcker criterion; and (2) structural model evaluation assessing path coefficients, R^2, effect sizes (f^2), predictive relevance (Q^2), and moderation effects through bootstrapping with 5,000 subsamples. During measurement model evaluation, one indicator of Tax Awareness was removed due to an outer loading value below the 0.70 threshold recommended by Hair et al. (2019), resulting in a final model comprising 23 indicators.

Collinearity was assessed through Variance Inflation Factor (VIF) values for all indicators. All VIF values ranged from 2.848 to 4.848, falling below the threshold of 5.0 recommended by Hair et al. (2019), indicating that multicollinearity does not pose a concern in this study. Interaction term indicators yielded VIF values of 1.000, confirming the absence of collinearity among moderation terms.

To mitigate common method bias inherent in self-reported cross-sectional data, procedural remedies were employed during data collection (Podsakoff et al., 2003). Respondents were assured of anonymity, informed that there were no right or wrong answers, and instructed to respond independently. These procedural safeguards reduce the likelihood of socially desirable responding and evaluation apprehension as sources of common method variance.

Moderation effects were specified using the product indicator approach available in SmartPLS 3, wherein interaction terms were constructed from the standardized latent variable scores of the predictor and moderator constructs. SmartPLS automatically standardizes constructs prior to generating interaction terms, ensuring that the moderation specification is free from multicollinearity artifacts introduced by non-centered variables (Hair et al., 2019; Henseler & Fassott, 2010).

RESULTS

Measurement Model Evaluation

Prior to hypothesis testing, the measurement model was evaluated to ensure construct reliability and validity. All constructs demonstrated strong internal consistency, with Cronbach's Alpha values ranging from 0.929 to 0.949, rho A values from 0.929 to 0.950, and Composite Reliability values from 0.949 to 0.961, all substantially exceeding the 0.70 threshold recommended by Hair et al. (2019). Convergent validity was confirmed as all Average Variance Extracted (AVE) values exceeded 0.815, well above the 0.50 minimum criterion. Table 1 presents the complete construct reliability and validity statistics.

Table 1. Construct Reliability and Validity

Construct	Items	Outer Loadings Range	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Tax Service Quality (X1)	5	0.898–0.931	0.949	0.950	0.961	0.832
Taxpayer Knowledge (X2)	5	0.880–0.929	0.947	0.948	0.959	0.824
Tax Administration System (X3)	5	0.868–0.924	0.943	0.944	0.957	0.815
Tax Awareness (M)	4	0.898–0.917	0.929	0.929	0.949	0.824
Taxpayer Compliance (Y)	4	0.906–0.920	0.936	0.936	0.954	0.839

Source: Primary Data

Note: AVE = Average Variance Extracted; CR = Composite Reliability; All values meet or exceed Hair et al. (2019) thresholds.

Indicator reliability was assessed through outer loadings. As presented in Table 2, all outer loadings ranged from 0.868 to 0.931, substantially exceeding the recommended threshold of 0.70 (Hair et al., 2019), confirming that all indicators adequately represent their respective constructs.

Table 2. Outer Loadings

Indicator	X1	X2	X3	M	Y
Tax Service Quality (X1)					
X1.1	0.898				
X1.2	0.931				
X1.3	0.912				
X1.4	0.907				
X1.5	0.911				
Taxpayer Knowledge (X2)					
X2.1		0.929			
X2.2		0.897			
X2.3		0.903			
X2.4		0.929			
X2.5		0.880			
Tax Administration System (X3)					
X3.1			0.912		
X3.2			0.892		
X3.3			0.868		
X3.4			0.924		
X3.5			0.917		
Tax Awareness (M)					

M1				0.898	
M2				0.899	
M3				0.917	
M4				0.916	
Taxpayer Compliance (Y)					
Y1					0.906
Y2					0.918
Y3					0.919
Y4					0.920

Source: Primary Data

Note: Values represent standardized outer loadings. All loadings exceed the 0.70 threshold (Hair et al., 2019).

Discriminant validity was assessed using the Fornell-Larcker criterion (Table 3). The square root of each construct's AVE (diagonal values) is generally comparable to the inter-construct correlations; however, several construct pairs exhibit high correlations, which is attributable to the conceptually overlapping nature of tax compliance determinants. This pattern is acknowledged as a limitation of the current instrumentation and warrants refinement in future studies.

Table 3. Fornell-Larcker Criterion

Construct	X1	X2	X3	M	Y
Tax Service Quality (X1)	0.912				
Taxpayer Knowledge (X2)	0.964	0.908			
Tax Admin. System (X3)	0.939	0.952	0.903		
Tax Awareness (M)	0.922	0.939	0.940	0.908	
Taxpayer Compliance (Y)	0.923	0.928	0.936	0.933	0.916

Source: Primary Data

Note: Diagonal values (bold) represent the square root of AVE. Off-diagonal values are inter-construct correlations.

Structural Model Evaluation

The structural model was evaluated through the coefficient of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2). As presented in Table 4, the model demonstrates substantial explanatory power, with an R^2 of 0.930 and adjusted R^2 of 0.928 for Taxpayer Compliance, indicating that the predictor variables collectively explain 93.0% of the variance in taxpayer compliance. This substantially exceeds the 0.75 threshold for substantial predictive accuracy established by Hair et al. (2019).

Table 4. R Square and R Square Adjusted

Construct	R Square	R Square Adjusted
Taxpayer Compliance (Y)	0.930	0.928

Source: Primary Data

Note: R^2 = 0.75 indicates substantial predictive accuracy (Hair et al., 2019).

Predictive relevance was further assessed using the blindfolding procedure with an omission distance of 7. As presented in Table 5, the Q^2 value for Taxpayer Compliance (Y) = 0.701, substantially exceeding the 0.35 threshold for large predictive relevance (Hair et al., 2019). This confirms that the structural model possesses strong out-of-sample predictive power, complementing the high in-sample explanatory capacity indicated by R^2.

Table 5. Construct Crossvalidated Redundancy (Q^2)

Construct	SSO	SSE	Q^2
Taxpayer Compliance (Y)	960.000	287.451	0.701

Source: Primary Data

Note: $Q^2 > 0.35$ indicates large predictive relevance (Hair et al., 2019). Q^2 is only reported for endogenous constructs.

Effect sizes (f^2) were calculated to assess the practical significance of each predictor's contribution to the model. Following Cohen's (1988) criteria, f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effects respectively. As shown in Table 6, the interaction term X1*M demonstrated the largest effect size ($f^2 = 0.123$), falling between the small and medium thresholds, consistent with the substantial moderation coefficient observed. Tax Administration System ($f^2 = 0.057$) and its interaction term X3*M ($f^2 = 0.043$) demonstrated small effects. Tax Awareness ($f^2 = 0.025$) and Tax Service Quality ($f^2 = 0.020$) also showed small effects at or near the minimum threshold. Taxpayer Knowledge ($f^2 = 0.001$) and its interaction with Tax Awareness ($f^2 = 0.005$) showed negligible effect sizes, consistent with the non-significant path coefficients reported.

Table 6. Effect Size (f^2)

Relationship	f^2	Effect Size Category
Tax Service Quality (X1) → Taxpayer Compliance (Y)	0.020	Small
Taxpayer Knowledge (X2) → Taxpayer Compliance (Y)	0.001	Negligible
Tax Administration System (X3) → Taxpayer Compliance (Y)	0.057	Small
Tax Awareness (M) → Taxpayer Compliance (Y)	0.025	Small
X1*M → Taxpayer Compliance (Y)	0.123	Small–Medium
X2*M → Taxpayer Compliance (Y)	0.005	Negligible
X3*M → Taxpayer Compliance (Y)	0.043	Small

Source: Primary Data

Note: f^2 effect size interpretation: ≥0.02 = small, ≥0.15 = medium, ≥0.35 = large (Cohen, 1988).

The analysis employed a bootstrapping procedure to assess the significance of path coefficients and moderation effects. The results of the hypothesis testing are presented in Table 7.

Table 7. Results of Hypothesis Testing

Relationship	Path Coefficient (β)	T-Statistics	P-Value	Decision
Tax Service Quality (X1) → Taxpayer Compliance (Y)	0.147	2.148	0.016	Supported
Taxpayer Knowledge (X2) → Taxpayer Compliance (Y)	-0.047	0.609	0.271	Not Supported
Tax Administration System (X3) → Taxpayer Compliance (Y)	0.268	4.257	0.000	Supported
Tax Awareness moderates X1 → Y (X1*M)	-0.325	4.404	0.000	Supported
Tax Awareness moderates X2 → Y (X2*M)	-0.069	0.805	0.211	Not Supported

Tax Awareness moderates X3 → Y (X3*M)	0.147	2.958	0.002	Supported

Source: Primary Data

Note: Significance level at $p < 0.05$

The analysis revealed that two of the three independent variables significantly influenced taxpayer compliance. Tax administration system (X3) demonstrated the strongest direct effect on taxpayer compliance ($\beta = 0.268$, $t = 4.257$, $p < 0.001$), indicating that improvements in administrative systems substantially enhance compliance behavior. Tax service quality (X1) also showed a significant positive effect on taxpayer compliance ($\beta = 0.147$, $t = 2.148$, $p = 0.016$), demonstrating that service delivery quality plays a meaningful role in fostering compliance behavior.

Contrary to expectations, taxpayer knowledge (X2) did not exhibit a significant direct effect on taxpayer compliance ($\beta = -0.047$, $t = 0.609$, $p = 0.271$). The negative coefficient, although statistically insignificant, suggests that knowledge alone may be insufficient to drive compliance behavior without other mediating or moderating factors.

The examination of moderation effects yielded noteworthy findings regarding the role of tax awareness in the relationship between independent variables and taxpayer compliance. Tax awareness significantly moderated the relationship between tax service quality and taxpayer compliance in a negative direction ($\beta = -0.325$, $t = 4.404$, $p < 0.001$). This substantial negative moderation effect indicates that as tax awareness increases, the impact of service quality on compliance diminishes, consistent with a substitution interpretation, wherein taxpayers with higher awareness may demonstrate compliance regardless of service quality levels, though formal conditional-effect analysis is needed to confirm this pattern.

In contrast, tax awareness positively moderated the relationship between tax administration system and taxpayer compliance ($\beta = 0.147$, $t = 2.958$, $p = 0.002$). This positive moderation effect reveals a synergistic relationship, indicating that the effectiveness of administrative systems in promoting compliance is amplified when coupled with higher levels of tax awareness among taxpayers. The moderating effect of tax awareness on the relationship between taxpayer knowledge and compliance was not statistically significant ($\beta = -0.069$, $t = 0.805$, $p = 0.211$), suggesting that the interaction between knowledge and awareness does not meaningfully influence compliance outcomes.

The empirical results demonstrate that taxpayer compliance is primarily driven by tax administration systems, followed by service quality. Taxpayer knowledge showed no significant direct effect on compliance. Collectively, these findings reveal divergent moderation patterns of tax awareness across the predictor-compliance relationships examined. These findings suggest that compliance strategies should prioritize administrative infrastructure while recognizing that awareness-building initiatives can reduce dependency on service quality improvements, particularly among taxpayers with lower awareness levels.

Discussion

This study examined taxpayer compliance determinants through the Theory of Planned Behavior (TPB) framework, with particular emphasis on the moderating role of tax awareness. The TPB, proposed by Ajzen (1991), posits that behavioral intention is primarily influenced by attitude toward the behavior, subjective norms, and perceived behavioral control (Koerniawan & Putri, 2024; Anto et al., 2020). In tax compliance contexts, TPB explains that compliance intentions are shaped by attitudes toward paying taxes, perceptions of social expectations, and perceived ability to comply (Koerniawan & Putri, 2024), with these constructs collectively explaining significant variance in compliance intentions and actual behavior (Saad, 2014). This study extends the TPB framework by examining direct effects of tax service quality, taxpayer knowledge, and tax administration system on compliance, along with the moderating role of tax awareness. The following discussion interprets each hypothesis within the TPB framework, elucidating how these factors interact to influence taxpayer compliance behavior.

The Effect of Tax Service Quality on Taxpayer Compliance

Empirical evidence supported the first hypothesis, confirming a positive association between tax service quality and taxpayer compliance ($\beta = 0.147$, $p = 0.016$). As a standardized path coefficient in PLS-SEM, this magnitude reflects a relatively modest but statistically significant positive association, indicating that tax service quality contributes meaningfully, albeit not dominantly, to taxpayer compliance relative to the other predictors examined in this study. This relationship aligns with the TPB construct of attitude formation, suggesting that service quality contributes to taxpayers' attitudes toward the tax authority and the act of tax compliance.

Within the TPB framework, attitudes represent an individual's positive or negative evaluation of performing a behavior (Anto et al., 2020). When tax authorities provide high-quality services characterized by responsiveness, efficiency, and professionalism, taxpayers develop more favorable attitudes toward their interactions with the tax system (Koerniawan & Putri, 2024). Positive service encounters reduce the psychological costs associated with compliance and foster perceptions of the tax authority as a legitimate and trustworthy institution (Kirchler et al., 2006). Thaha et al. (2024) demonstrated through text mining analysis of taxpayer reviews at Jakarta tax offices that service efficiency, administrative procedures, and staff interaction are primary determinants of taxpayer satisfaction, with positive service experiences directly fostering trust and voluntary compliance behavior. Such positive attitudes, rooted in perceptions of convenience and support from tax officers, can subsequently enhance perceived behavioral control, making compliance seem more achievable and less burdensome (Koerniawan & Putri, 2024; Anto et al., 2020).

This finding is consistent with prior research demonstrating that a greater perceived service orientation from tax authorities is strongly related to increased tax compliance, mediated by perceived trustworthiness (Gangl et al., 2013). The quality of interaction between taxpayers and tax officials, characterized by procedural fairness and clear communication, significantly influences compliance intentions (Kirchler et al., 2006). Research by Gangl et al. (2013) emphasizes that when taxpayers perceive tax authorities as helpful and service-oriented, their overall satisfaction and willingness to comply tend to increase. Saptono et al. (2023) further demonstrated that perceived service quality of e-filing systems positively influences tax compliance intention among certified tax professionals, with user satisfaction serving as a significant mediator, reinforcing that both technical quality and experiential dimensions of service shape compliance behavior. This positive relationship implies that improvements in service quality can strengthen the belief among taxpayers that compliance is within their control and is a socially endorsed action, leading to a higher likelihood of compliance (Andreas & Savitri, 2015).

The slippery slope framework provides additional theoretical support for this relationship, positing that trust in authorities fosters voluntary compliance (Kirchler et al., 2008). When tax services are perceived as high quality, taxpayers develop trust in the tax administration, which cultivates intrinsic motivation and sustained voluntary adherence to tax regulations (Batrancea et al., 2019). This trust-building aspect is particularly important as it moves compliance behavior beyond simple deterrence models to encompass emotional and relational aspects (Olsen et al., 2018). Research indicates that respectful treatment from tax authorities, which acknowledges taxpayers as clients rather than delinquents, correlates with higher tax morale and greater willingness to pay (Alm & Torgler, 2006; Torgler et al., 2008).

However, the relatively modest effect size observed in this study suggests that service quality, while statistically significant, is not the primary driver of compliance behavior. This indicates that positive attitudes formed through service experiences represent only one component of the compliance decision-making process. As TPB suggests, attitudes must be accompanied by favorable subjective norms and adequate perceived behavioral control to produce behavioral intentions and subsequent compliance (Andreas & Savitri, 2015). Nevertheless, the finding underscores that investments in enhancing the accountability and responsiveness of public services can significantly bolster taxpayer compliance by fostering positive attitudes toward the tax system (Anto et al., 2020).

The Effect of Taxpayer Knowledge on Taxpayer Compliance

Contrary to expectations, the second hypothesis was not supported, as taxpayer knowledge did not demonstrate a significant relationship with taxpayer compliance ($\beta = -0.047$, $p = 0.271$). This counterintuitive finding challenges the conventional assumption that enhanced knowledge automatically translates into compliant behavior and requires careful interpretation within the TPB framework.

Knowledge can be conceptualized as a cognitive resource that potentially contributes to attitude formation and perceived behavioral control (Saad, 2014). In theory, taxpayers who understand tax laws, regulations, and procedures should possess more positive attitudes toward compliance and greater confidence in their ability to comply. However, the absence of a significant relationship in this study suggests that knowledge represents a necessary but insufficient condition for compliance. Consistent with this finding, Pattiasina et al. (2021) demonstrated that tax knowledge has no significant direct effect on compliance, but operates indirectly through taxpayer awareness as an intervening variable, reinforcing the necessity of awareness cultivation as a mediating mechanism. Research indicates that the link between knowledge and behavior is often weaker than assumed, as knowledge alone does not determine attitudes or subjective norms (Guerra & Harrington, 2018).

The TPB framework provides several explanations for this paradoxical finding. First, knowledge alone does not determine attitudes; taxpayers may understand tax regulations yet hold negative attitudes toward the tax system based on perceptions of fairness, reciprocity, or trust in government (Jimenez & Iyer, 2016). Second, knowledge without accompanying perceived behavioral control may remain inert. Taxpayers may know what they should do but lack confidence in their ability to navigate complex compliance procedures or lack the resources to fulfill their obligations (Koerniawan & Putri, 2024). Third, subjective norms play a crucial role in compliance decisions. Even knowledgeable taxpayers may fail to comply if they perceive that non-compliance is socially acceptable or if they lack internalized moral obligations regarding tax payment (Sudiartana & Mendra, 2018).

The slightly negative coefficient, though not statistically significant, hints at a more complex phenomenon. It is possible that increased knowledge exposes taxpayers to the complexity and perceived inequities within the tax system, potentially generating negative attitudes that counteract intended positive effects. Research by Saad (2014) indicates that tax complexity, even when understood, can negatively influence compliance intentions. This knowledge paradox is not unique to Indonesian contexts; Kushwah et al. (2021) similarly found that tax knowledge showed no statistically significant relationship with corporate taxpayer compliance in India, while electronic filing and penalties demonstrated significant effects, suggesting that structural and technological factors outweigh cognitive ones. Similarly, Mukhtaruddin et al. (2023) found that tax awareness and knowledge had no significant influence on individual taxpayer compliance in Palembang, Indonesia, while tax audits demonstrated positive effects, further supporting the argument that structural enforcement mechanisms may override cognitive factors in certain regional contexts. Alternatively, knowledge may increase awareness of legal loopholes or compliance costs, inadvertently reducing compliance motivation.

This finding underscores the importance of moving beyond mere information dissemination toward comprehensive interventions that simultaneously address attitudes, subjective norms, and perceived behavioral control. Educational programs focused solely on technical knowledge transfer may produce limited returns (Andreas & Savitri, 2015). Instead, tax authorities should consider shifting emphasis from knowledge dissemination to awareness cultivation moving beyond "what" and "how" to address "why" taxpayers should comply (Koerniawan & Putri, 2024). This approach acknowledges that knowledge must be accompanied by changes in attitudes and perceived social norms to effectively influence compliance behavior.

The Effect of Tax Administration System on Taxpayer Compliance

The third hypothesis received strong empirical support, with tax administration system demonstrating the most substantial effect on taxpayer compliance among all direct predictors ($\beta = 0.268$, $p < 0.001$). This finding aligns closely with the TPB construct of perceived behavioral control, which reflects an individual's perception of the ease or difficulty of performing a behavior (Koerniawan & Putri, 2024).

In the tax compliance context, administrative systems directly influence perceived behavioral control by determining the structural and procedural environment within which compliance occurs (Anto et al., 2020). An efficient, well-designed administrative system reduces the complexity and perceived difficulty of fulfilling tax obligations. When systems incorporate user-friendly digital platforms, simplified procedures, clear guidance, and transparent processes, taxpayers perceive compliance as more achievable and less burdensome (Koerniawan & Putri, 2024). This enhanced perception of control over the compliance process subsequently translates into stronger behavioral intentions and actual compliance behavior.

The substantial effect size observed in this study underscores the primacy of structural facilitation in compliance behavior. Research consistently demonstrates that improvements in administrative efficiency reduce compliance costs and enhance taxpayers' confidence in their ability to fulfill obligations accurately and on time (Kirchler et al., 2006). Modern tax administration systems that incorporate digital transformation initiatives, procedural simplification, and transparent interfaces substantially reduce perceived barriers to compliance (Hammond et al., 2023). This finding is corroborated by Supriyati et al. (2025), who demonstrated that tax awareness mediates the relationship between tax digitalization and compliance in Indonesia, with digitalization positively impacting compliance when channeled through heightened taxpayer awareness. This structural facilitation is particularly important because TPB recognizes that perceived behavioral control can directly influence behavior independently of intentions, especially when perceptions of control accurately reflect actual control (Andreas & Savitri, 2015).

The finding suggests that when tax authorities make compliance easier through administrative improvements, taxpayers are more capable of translating compliance intentions into actual behavior, regardless of their attitudes or normative beliefs (Sukesi & Yunaidah, 2020). Administrative barriers represent significant obstacles that can prevent compliance even among well-intentioned taxpayers. Conversely, administrative improvements can facilitate compliance by removing obstacles and reducing the effort required to fulfill tax obligations. Research indicates that improvements in service accessibility, especially in IT infrastructure and payment facilities, are crucial for facilitating taxpayer compliance (Koerniawan & Putri, 2024).

This finding aligns with fiscal exchange theory, which posits that taxpayers are more likely to comply when they observe efficient use of tax revenues and effective administrative systems (Gebrihet et al., 2023). An efficient administrative system signals governmental competence and legitimacy, fostering trust and voluntary compliance. The theoretical significance of this finding lies in highlighting that behavioral intentions, no matter how strong, require facilitating conditions to manifest as actual behavior. Therefore, investments in administrative modernization should constitute the highest priority for tax authorities seeking to enhance compliance rates.

Tax Awareness Moderates the Relationship Between Service Quality and Compliance

The fourth hypothesis received strong empirical support, though in an unexpected direction ($\beta = -0.325$, $p < 0.001$). The substantial negative moderation coefficient indicates that tax awareness weakens rather than strengthens the service quality-compliance relationship. While this study did not conduct a formal simple-slope or conditional-effect decomposition, the negative interaction coefficient is consistent with a substitution interpretation, wherein the influence of service quality on compliance is comparatively weaker among taxpayers with higher levels of tax awareness. This pattern is proposed as a theoretically grounded interpretation of the observed interaction effect rather than a directly demonstrated mechanism, and future research employing simple-slope analysis or interaction plots is encouraged to empirically substantiate this conditional pattern.

This finding can be interpreted through the TPB construct of subjective norms, which encompasses both perceived social expectations and internalized moral obligations (Koerniawan & Putri, 2024). Tax awareness represents an internalized understanding of civic duty and moral obligation to contribute to public finances. When taxpayers possess strong internalized norms regarding tax compliance—manifested as high tax awareness—their compliance behavior becomes less dependent on external service quality (Jimenez & Iyer, 2016). In essence, these taxpayers comply because they believe it is their civic responsibility, not because the tax authority provides excellent service.

This potential substitution pattern reveals important heterogeneity in compliance decision-making processes. For taxpayers with low tax awareness, whose subjective norms regarding compliance are weak, attitudes formed through service experiences become critical determinants of compliance. These taxpayers engage in transactional evaluations, where their willingness to comply depends heavily on the quality of service they receive (Gangl et al., 2015). Positive service experiences can compensate for weak subjective norms by fostering favorable attitudes that motivate compliance. Research by Kirchler et al. (2006) supports this notion, indicating that taxpayers with lower intrinsic motivation rely more heavily on external factors like service quality to drive compliance behavior.

Conversely, taxpayers with high tax awareness exhibit compliance motivated by internalized values rather than service satisfaction (Alm & Torgler, 2006). For these individuals, strong subjective norms override the influence of attitudes formed through service experiences. They demonstrate a principle-based compliance orientation where moral obligations supersede transactional considerations (Torgler et al., 2008). Even when service quality is suboptimal, their strong internalized norms maintain compliance behavior. Recent evidence from Indonesia supports this synergistic dynamic; Mangoting et al. (2025) demonstrated that trust in authorities positively moderates the influence of both knowledge and awareness on MSME taxpayer compliance, suggesting that contextual moderators fundamentally reshape compliance determinants. This pattern aligns with research indicating that tax morale a construct closely related to tax awareness significantly predicts voluntary compliance independently of external service factors (Supriyati et al., 2024).

This moderation pattern has important theoretical implications. While TPB traditionally treats the three determinants as additive, this finding suggests potential substitutability among them. Strong subjective norms can compensate for less favorable attitudes, maintaining behavioral intentions even when one determinant is weak (Prastika & Trisnaningsih, 2023). This highlights the complexity of psychological mechanisms underlying compliance and the need to consider interaction effects among TPB constructs. From a practical perspective, this finding suggests that tax authorities should adopt differentiated strategies based on taxpayer awareness levels. For taxpayers with low awareness, service quality improvements can significantly impact compliance, making investment in service excellence particularly cost-effective for this segment (Gangl et al., 2013).

Tax Awareness Moderates the Relationship Between Knowledge and Compliance

The fifth hypothesis, which predicted that tax awareness would moderate the relationship between taxpayer knowledge and compliance, was not supported ($\beta = -0.069$, $p = 0.211$). The absence of significant moderation reinforces the earlier finding that knowledge alone is insufficient for compliance, even when combined with high tax awareness.

This non-significant result suggests that knowledge and awareness, while conceptually related, operate through distinct psychological mechanisms that do not interact synergistically to influence compliance behavior (Saad, 2014). Knowledge represents cognitive understanding of tax regulations and procedures, while awareness represents internalized understanding of civic duty and moral obligation. The lack of interaction between these constructs indicates that possessing both knowledge and awareness does not produce multiplicative effects on compliance.

Within the TPB framework, this finding suggests that knowledge fails to translate into compliance not because of insufficient awareness but because it does not adequately address the three core determinants of behavioral intention (Sudiartana & Mendra, 2018). Knowledge may enhance understanding without improving attitudes, strengthening subjective norms, or increasing perceived behavioral control. Simply knowing tax regulations does not make taxpayers feel more positively about paying taxes, does not increase their sense of moral obligation beyond existing awareness, and does not necessarily make compliance seem easier or more achievable (Langham et al., 2012).

The non-significant moderation effect further emphasizes that interventions focused solely on knowledge dissemination are unlikely to succeed even when targeted at taxpayers with high awareness (Andreas & Savitri, 2015). Both knowledge and awareness must be accompanied by favorable attitudes and adequate perceived behavioral control to produce compliance behavior. This underscores the necessity of comprehensive interventions that simultaneously address multiple TPB constructs rather than focusing narrowly on cognitive factors. Educational programs should move beyond technical training to incorporate attitude change strategies and mechanisms to enhance perceived behavioral control (Koerniawan & Putri, 2024).

This finding also suggests that the relationship between cognitive factors (knowledge) and compliance is more complex than simple linear or interactive models suggest. The absence of moderation indicates that awareness does not amplify or diminish the (already non-significant) effect of knowledge on compliance. This pattern reinforces the need for tax authorities to reconsider traditional education-based compliance strategies and develop more holistic approaches that address the full range of psychological determinants identified by TPB (Chan et al., 2000).

Tax Awareness Moderates the Relationship Between Administrative System and Compliance

The sixth hypothesis received empirical support, demonstrating that tax awareness positively moderates the relationship between tax administration system and taxpayer compliance ($\beta = 0.147$, $p = 0.002$). Unlike the substitution effect observed with service quality, this positive moderation reveals a synergistic relationship wherein the effectiveness of administrative systems in promoting compliance is amplified when taxpayers possess strong tax awareness.

This synergy effect can be interpreted as complementarity between perceived behavioral control and subjective norms within the TPB framework (Koerniawan & Putri, 2024). Administrative systems enhance perceived behavioral control by making compliance structurally easier and procedurally simpler. Tax awareness contributes strong subjective norms that motivate taxpayers to fulfill their civic obligations (Jimenez & Iyer, 2016). Supporting this moderating role, Michael et al. (2025) found that tax awareness strengthens the positive relationship between attitudes toward e-tax systems and compliance among Indonesian MSMEs, demonstrating that awareness amplifies the compliance-enhancing effects of behavioral and technological factors. When both factors are present simultaneously, their combined effect exceeds the sum of individual effects, creating a multiplicative rather than additive relationship.

The theoretical significance of this synergy lies in demonstrating that different TPB constructs can interact positively to enhance behavioral outcomes (Prastika & Trisnaningsih, 2023). While the substitution effect with service quality showed that strong subjective norms can compensate for weaker attitudes, the synergy effect with administrative systems shows that strong subjective norms can amplify the effectiveness of enhanced perceived behavioral control. This suggests that the relationship between TPB constructs is more complex than simple additive models suggest, involving both substitution and complementarity depending on which constructs are examined (Anto et al., 2020).

From a psychological mechanism perspective, the synergy effect suggests that tax awareness enhances taxpayers' ability to recognize and utilize administrative improvements effectively. Taxpayers with high awareness possess stronger motivation to comply and are therefore more attentive to and appreciative of structural facilitation provided by improved administrative systems (Kirchler et al., 2006). They actively seek to utilize available tools and procedures, translating structural capabilities into actual compliance behavior more effectively than taxpayers with low awareness who may lack motivation to engage with even well-designed systems (Koerniawan & Putri, 2024).

CONCLUSION

Within the context of KPP Pratama Singaraja, this study provides preliminary evidence that TPB constructs vary in their relative importance for taxpayer compliance, with the tax administration system emerging as the strongest direct predictor. The findings tentatively suggest that subjective norms may function as contextual moderators exhibiting divergent patterns substitution with service quality and synergy with administrative systems—though generalizability beyond the study context requires further confirmation. The non-significant effect of taxpayer knowledge contributes to ongoing discussions regarding the attitude-behavior gap in tax compliance research.

These findings offer context-specific insights for tax authorities in similar regional settings, particularly KPP Pratama-level offices with comparable taxpayer profiles. Administrative modernization and values-based awareness cultivation may warrant prioritization, though these recommendations should be adapted to local institutional capacities and taxpayer characteristics before broader application. The divergent moderation patterns further suggest that differentiated strategies targeting low-awareness taxpayer segments may merit consideration in regional compliance programs.

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional research design precludes causal inferences, as compliance behavior and its determinants may evolve over time. Longitudinal studies examining compliance trajectory would strengthen causal claims. Second, the geographic scope is limited to KPP Pratama Singaraja, Buleleng Regency, constraining generalizability to other regional tax offices with different taxpayer profiles, economic structures, or administrative capacities.

Third, self-reported measures introduce potential social desirability bias, as respondents may overreport compliance intentions. Future research should incorporate objective behavioral measures such as actual filing rates or audit outcomes to complement self-report instruments. Fourth, discriminant validity assessment using the Fornell-Larcker criterion revealed high inter-construct correlations among several construct pairs, with some off-diagonal values exceeding the square root of AVE, reflecting the inherently overlapping nature of tax compliance determinants. Future research should develop more psychometrically distinct indicators to better differentiate these theoretically related constructs.

Fifth, this study focused on individual taxpayers and did not examine organizational or institutional-level influences on compliance. Multilevel designs incorporating tax office characteristics alongside individual-level variables would provide more comprehensive understanding. Sixth, the moderating mechanisms through which tax awareness develops remain unexplored; future research should investigate antecedents of awareness formation and how awareness-building interventions can be optimally designed and targeted. Seventh, although the final analytical sample (N = 240) met the indicator-based range recommended by Hair et al. (2019), it fell marginally below the retrospective minimum sample size benchmark (N = 287) suggested by the inverse square root method (Kock & Hadaya, 2018) for the weakest structural path. While all hypothesized paths, including this one, reached statistical significance, future studies are encouraged to target larger samples to further strengthen the robustness of parameter estimates, particularly for interaction effects. Finally, comparative studies across diverse regional and national contexts are needed to assess the generalizability of the divergent moderation patterns identified in this study.

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