Driving Sustainable Corporate Tax Compliance in Thailand: The Role of Technology, Responsibility, and Filing Intention in a Hybrid Analytical Framework

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Abstract

This study examines the determinants of corporate tax compliance in Thailand, partic-ularly in the context of increasing digitalization. While prior studies have separately addressed technology acceptance and behavioral intention, few have integrated these domains to explain voluntary tax compliance. This research employs a hybrid model that combines the Technology Acceptance Model (TAM), the Theory of Planned Be-havior (TPB), and taxpayer responsibility theory. Using data from 500 corporate ac-countants, we employed Partial Least Squares Structural Equation Modeling (PLS-SEM), Necessary Condition Analysis (NCA), and Importance–Performance Map Analysis (IPMA) to analyze the data. The results demonstrate that perceived ease of use, subjec-tive norms, and perceived behavioral control significantly influence tax intention, which in turn affects compliance behavior. Furthermore, attitudes toward technology and perceived usefulness indirectly support compliance, while taxpayer responsibility ex-hibits a strong direct effect. These findings contribute to the theoretical understanding of compliance behavior and offer practical insights for enhancing technology-enabled tax systems in emerging markets.

Keywords: *Sustainable Tax Compliance, Corporate Behavior, Technology Adoption, NCA, IPMA, Thailand.*

Introduction

The increasing digitalization of tax administration continues to reshape fiscal governance, particularly in emerging economies aiming to improve efficiency, trans-parency, and revenue collection (Slemrod, 2019; Belahouaoui et al., 2024). In Thailand, this shift aligns with ongoing fiscal reforms, where online filing systems modernize tax procedures and support voluntary compliance (Nguyen et al., 2023; UN ESCAP, 2025). These digital platforms improve convenience, access, and efficiency while reducing administrative burdens, making tax services more accessible to the public (Bassey et al., 2022; Okunogbe et al., 2023; Coccia, 2022).

Despite these efforts, many taxpayers still hesitate to use digital tax platforms. Success depends on more than just technology. Taxpayers must also demonstrate readiness and willingness to adopt these systems. While the government has intro-duced several initiatives, many small and medium-sized enterprises (SMEs) remain disengaged. This pattern reflects ongoing behavioral and institutional obstacles that hinder Thailand's digital tax objectives (Nguyen et al., 2023).

SMEs represent over 85 percent of Thailand's taxpayer base and play a vital role in national revenue (Mas'ud et al., 2024; Safitri, 2025). However, many of these businesses either operate

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informally or fail to meet their tax responsibilities. Several factors con-tribute to this situation, including limited knowledge, low motivation to comply, and a weak understanding of how taxes support public services (Nguyen et al., 2024; Ariyanto et al., 2024). Some business owners view compliance as a burden, which discourages them from using digital filing systems. This disconnect between policy and actual be-havior highlights the need for strategies that address both technical and behavioral challenges (UN ESCAP, 2025).

Many countries have improved digital tax infrastructure, but core issues still re-main. Taxpayer behavior involves more than access to technology. Psychological and social dynamics also influence how people interact with tax systems (Mas'ud et al., 2024; Ahmad, 2024). Several studies have questioned the long-term impact of penalties and audits as the main approach to enforcement. Social norms, peer influence, and profes-sional expectations often shape decisions around compliance and technology adoption (Supriyati et al., 2024).

Researchers have explored factors such as perceived usefulness, ease of use, and user attitudes (Al-Okaily, 2024; Davis et al., 2024). However, few studies examine the conditions required for tax compliance. The combination of social pressure and digital readiness still lacks sufficient investigation. Many scholars rely on basic methods, which may fail to uncover complex relationships. Techniques such as Partial Least Squares Structural Equation Modeling (PLS-SEM), Necessary Condition Analysis (NCA), and Importance–Performance Map Analysis (IPMA) can address these gaps (Kumar et al., 2025; Richter et al., 2023; Teeluckdharry et al., 2024).

This study applies these methods to analyze tax compliance behavior in Thailand. The approach combines PLS-SEM, NCA, and IPMA to explore relationships among variables, define minimum thresholds, and rank key factors (Hauff et al.,2024; Dul et al., 2023). PLS-SEM examines how technological, behavioral, and social factors interact (Hakam et al., 2024; Ariyanto et al., 2024). NCA identifies essential requirements for successful outcomes. IPMA supports decision-making by linking performance and importance (Sarsted et al., 2024; Hauff et al., 2024).

The findings offer clear insights into how taxpayers respond to digital reforms. The study underscores the importance of enhancing tax knowledge, fostering a stronger sense of civic responsibility, and encouraging behavioral shifts through well-designed systems. These outcomes are expected to support Thai policymakers in refining strate-gies that promote voluntary compliance and contribute to a more stable and equitable tax environment in Thailand.

Materials and Methods

Theories and Key Concepts

Understanding tax compliance behavior requires a multidimensional perspective that accounts for both rational and normative drivers. This study integrates four prom-inent theoretical frameworks—the Theory of Planned Behavior (TPB), Technology Ac-ceptance Model (TAM), Utility Maximization Theory, and the Responsible Taxpayer Framework—to construct a comprehensive model that explains corporate tax compli-ance in Thailand's digital filing environment.

The Theory of Planned Behavior (TPB) (Ajzen, 2020; Asmah et al., 2025; Raut et al., 2024) emphasizes how attitudes, subjective norms (SJN), and perceived behavioral con-trol (PBC) shape behavioral intentions. In the tax context, these components reflect how corporate decision-

makers internalize expectations from peers, institutions, and them-selves when choosing to adopt or resist digital tax platforms. TPB informs hypotheses such as the influence of ATU, SJN, and PBC on tax intention (TIN), as well as their me-diating roles in compliance outcomes.

The Technology Acceptance Model (TAM) (Al-Okaily, 2024; Raut et al., 2024) ex-tends this behavioral lens by focusing on technology-specific factors—perceived ease of use (PEU) and perceived usefulness (PCU)—that influence users' attitudes toward dig-ital platforms (Davis et al., 2024). These perceptions directly shape ATU and indirectly affect TIN and tax compliance (TCP), forming the foundation for hypotheses H1–H4 and mediation paths in H15–H16. TAM is particularly relevant in Thailand, where digitali-zation is uneven across firm sizes and regions, making perceived usability and utility critical to adoption decisions.

While TPB and TAM provide psychological and perceptual insights, the Utility Maximization Theory (Mas'ud et al., 2024; Kumar et al., 2025; Raut et al., 2024) introduces a rational-economic dimension. This theory suggests taxpayers weigh the benefits of compliance (e.g., incentives or peace of mind) against the perceived cost of non-compliance (e.g., penalties, audits). However, as many researchers note, utili-ty-based models tend to overlook normative and ethical considerations that shape long-term compliance (Supriyati et al., 2024). Thus, hypotheses H10 and H17–H18 ex-plore utility maximization as an intermediate outcome influenced by ATU and feeding into TCP.

To address these ethical gaps, the Responsible Taxpayer Framework (Nguyen et al., 2023; Supriyati et al., 2024) emphasizes civic duty, psychological trust in public institu-tions, and moral obligation as key predictors of voluntary compliance. This framework is particularly relevant in Thailand, where trust in the state and perceptions of fairness vary significantly across taxpayer groups (Mas'ud et al., 2024; Anjarwi et al., 2024; Visedsun et al., 2024). The construct of Responsibility (REP) serves as the moral anchor of the model, directly influencing tax compliance (TCP) (H12) and mediating the effects of Attitude Toward Using (ATU) (H9) and Perceived Usefulness (PCU) (H19–H20).

Although these four theories have been previously applied in isolation, few studies have synthesized them within a unified framework that integrates behavioral, techno-logical, economic, and ethical dimensions. Even fewer have paired such theoretical in-tegration with an analytical design capable of testing both causal pathways and struc-tural prerequisites. This study addresses that gap by employing Partial Least Squares Structural Equation Modeling (PLS-SEM), Importance–Performance Map Analysis (IPMA), and Necessary Condition Analysis (NCA) to explore both sufficiency and ne-cessity conditions for compliance (Dul, 2016; Hauff et al., 2024; Sarstedt et al., 2024).

This theoretical integration and analytical approach set the foundation for the conceptual framework introduced in the following section.

The Concept Framework

This study proposes a conceptual framework by integrating the Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), Utility Maximization Theory, and the Responsible Taxpayer Framework. Unlike previous models that consider techno-logical or psychological factors in isolation, this framework combines them and intro-duces taxpayer responsibility (REP) as a core moral dimension. Alongside behavioral and technological predictors, REP deepens the understanding of voluntary tax compliance in Thailand's digital tax system (Supriyati et al., 2024; Raut et al., 2024; Mas'ud et al., 2024).

The model comprises nine constructs: perceived ease of use (PEU), perceived use-fulness (PCU), attitude toward using (ATU), subjective norm (SJN), perceived behavioral control (PBC), utility maximization (UMZ), responsibility (REP), tax intention (TIN), and tax compliance (TCP). REP, UMZ, and TIN directly influence TCP, positioning compli-ance as not only a technical outcome but also a moral and behavioral response (see Appendix A for construct-hypothesis mapping). The framework (as illustrated in Figure 1) provides a theoretical basis for hypothesis development and offers a holistic per-spective on digital tax behavior in the Thai context.
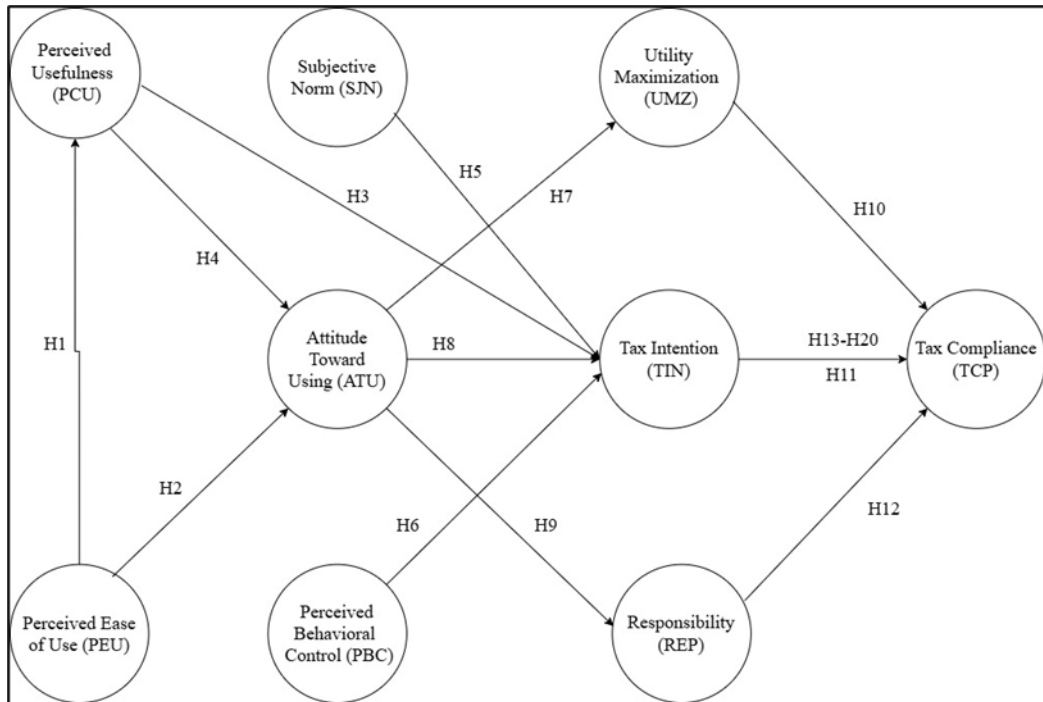

Figure 1. The Conceptual Framework

Source(s): Author

Hypothesis Development

Building upon this integrated framework, a series of hypotheses is proposed to explore how technological perceptions, behavioral dispositions, and normative influ-ences shape tax compliance decisions. It is hypothesized that perceived ease of use positively influences both perceived usefulness and attitude toward using the digital tax system, while perceived usefulness, in turn, affects both attitude and intention to use. Subjective norm and perceived behavioral control are expected to positively influence tax intention. Additionally, attitude is posited to drive utility maximization, responsi-bility, and intention.

Tax compliance is hypothesized to be directly influenced by utility maximization, tax intention, and responsibility. Several mediating pathways are also considered, whereby attitude and intention act as channels linking initial perceptions of the system to actual compliance behavior. The full set of hypotheses (H1–H20) reflects the model's multidimensional structure and supports a comprehensive test of both direct and in-direct effects. (Details are provided in

Appendix A.)

Research Design, Sample, and Data Collection

This study examines factors influencing corporate tax compliance in Thailand's digital system, focusing on reference group conformity, perceived usefulness and ease of use, satisfaction, and taxpayer responsibility. A hybrid method combining PLS-SEM, NCA, and IPMA was applied to explore both causal relationships and necessary condi-tions.

The population included 889,455 juristic persons registered on Thailand's national e-tax platform as of December 2023. Stratified random sampling ensured representation across business types and regions. Data were collected from 500 executives responsible for tax or accounting between October and December 2023, with the final sample re-flecting broad representativeness across firm types and regions, as shown in Table 1.

Juristic Person Type	Bangkok and Vicinity	Central	North	South	East	West	Northeast	Sampled	Actual Data Collected
Public Company	1	–	–	–	–	–	–	1	13
Limited Company	147	83	22	34	42	9	20	357	367
Limited Partnership	17	20	18	12	9	4	22	102	120
Total	**165**	**103**	**40**	**46**	**51**	**13**	**42**	**460**	**500**

Table 1. Sample Characteristics by Juristic Person Type and Region

Note: Sampling was stratified by juristic person type and region to reflect the national composition of registered business entities in Thailand.

Source(s): Author

Descriptive Statistics of Observed Variables

Descriptive statistics were computed using SmartPLS 4.0 to assess the distribu-tional properties of the data prior to structural equation modeling (Sarstedt et al., 2024). A total of 23 observed variables served as indicators for nine latent constructs. The analysis included means, standard deviations, skewness, and kurtosis to evaluate nor-mality and variability. The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity confirmed the adequacy of the data for factor analysis. No issues of multicol-linearity were observed, as all inter-item correlations remained below the critical threshold of 0.80. A complete summary of descriptive statistics for all indicators is pro-vided in Table 2.

Latent Construct	Indicators	Mean	Min	Max	SD	Kurtosis	Skewness
Subjective Norm (SJN)	Social Influence (SOC)	4.6	3	5	0.49	-0.446	-0.854
	Moral Obligation (MOR)	4.51	2	5	0.59	0.748	-1.077
Perceived Usefulness (PCU)	Convenience (CON)	4.65	3	5	0.48	1.511	-1.454
	Time Saving (SAV)	4.46	2.33	5	0.56	0.936	-1.048
Perceived Ease of Use (PEU)	Ease of Learning (ETL)	4.17	1.67	5	0.72	-0.201	-0.578
	Non-Complexity (NCO)	4.43	2	5	0.61	1.085	-1.161
Attitude Toward Using (ATU)	Feeling (FEL)	4.69	2	5	0.51	5.383	-2.141
	Idea (IDE)	4.47	1.67	5	0.63	2.454	-1.448
Perceived Behavioral Control (PBC)	Knowledge of Tax Payment (KTP)	4.34	2.33	5	0.59	-0.285	-0.597
	Understanding of Tax Laws (NTL)	4.31	1	5	0.68	2.102	-1.099
	Government Supervision (GSU)	4.16	2	5	0.7	-0.336	-0.52
Utility Maximization (UMZ)	Reporting Actual Income (RAI)	4.53	2	5	0.59	1.22	-1.171
	Reporting Lower Income (RIL)	3.31	1	5	1.24	-0.699	-0.318
Responsibility (REP)	Appropriate Incentive (API)	3.63	1	5	1.08	-0.292	-0.43
	Understanding of Tax Burden (UNT)	3.93	1.67	5	0.74	-0.358	-0.345
	Facilitation (FAC)	4.33	2	5	0.61	0.145	-0.7
Tax Intention (TIN)	Practice Trend (PRT)	4.69	1	5	0.58	11.892	-2.799
	Decision (DEC)	4.7	1	5	0.58	10.284	-2.7
	Needs (NED)	4.61	3	5	0.53	0.547	-1.194
	Login (LOG)	4.52	1	5	0.6	2.624	-1.317

	Form Submission (FOR)	4.42	1	5	0.63	1.956	-1.128
Tax Compliance (TCP)	Correct Tax Payment (PTC)	4.34	2	5	0.63	0.746	-0.819
	Timely Tax Payment (PTD)	4.34	1	5	1.01	3.886	-2.041

Table 2. Descriptive Statistics of Observed Variables

Source(s): Author

Analytical Strategy: PLS-SEM, NCA, and IPMA

To examine both causal relationships and structural constraints in tax compliance behavior, this study adopted an integrated strategy combining Partial Least Squares Structural Equation Modeling (PLS-SEM), Necessary Condition Analysis (NCA), and Importance–Performance Map Analysis (IPMA). PLS-SEM was applied to assess the strength and significance of both direct and indirect effects, along with model fit in-dices such as R^2 and Q^2.

NCA, using the CE-FDH method in SmartPLS, identified necessary—but not suf-ficient—conditions for achieving high compliance, based on effect size thresholds. IPMA further enhanced the analysis by mapping each construct's importance and performance into four strategic zones, supporting targeted policy interventions.

The nine-step hybrid analytical process adopted in this study is illustrated through a flowchart, integrating PLS-SEM for causal pathway estimation, NCA for identifying structural bottlenecks, and IPMA for prioritizing performance-based in-terventions, as shown in Figure 2.

Step 1:
Define research objectives and theoretical framework.

Step 2:
Prepare and check the dataset

Step 3:
Conduct PLS-SEM

Step 4:
Evaluate the measurement model

Step 5:
Run Necessary Condition Analysis (NCA).

Step 6:
Run Importance–Performance Map Analysis (IPMA).

Step 7:
Interpret and integrate PLS-SEM, NCA, and IPMA.

Step 8:
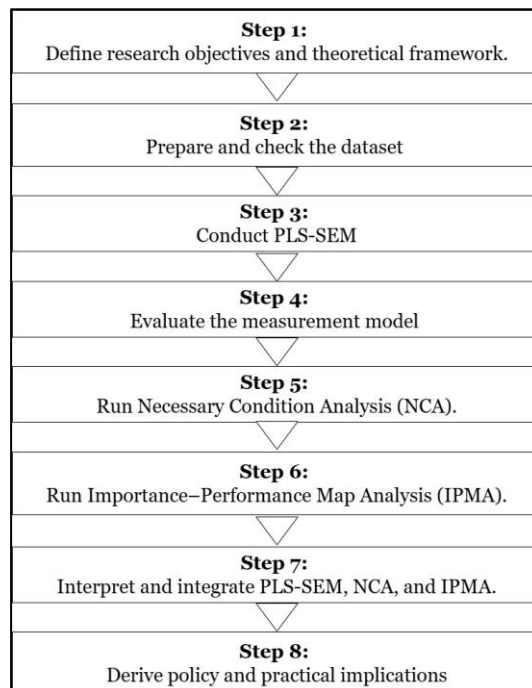Derive policy and practical implications

Figure 2. Hybrid Analysis Flowchart: PLS-SEM, NCA, and IPMA Integration

Results

Measurement Model Results

The measurement model was evaluated using SmartPLS 4.0, employing both reli-ability and validity diagnostics prior to structural model estimation. Standard thresh-olds were applied for validation, whereby indicator loadings exceeding 0.70, AVE values above 0.50, composite reliability (CR) values greater than 0.70, and variance inflation factor (VIF) values below 5.0 were considered indicative of acceptable measurement properties (Dul et al., 2023; Hauff et al., 2024; Sarstedt et al., 2024).

Following these criteria, all constructs met the required standards for convergent validity and internal consistency. Although some indicators demonstrated moderate loadings, they were theoretically justified and retained for content validity. No multi-collinearity issues were observed, as all VIF values were within acceptable limits. A full summary of loadings, reliability coefficients, and multicollinearity diagnostics is pro-vided in Table 3.

Construct (Latent)	Indicator (Observed Variable)	Outer Weight	Tolerance	VIF	AVE	CR	Cronbach's Alpha
Subjective Norm (SJN)	Social Influence (SOC)	0.756	0.491	2.036	0.64	0.89	0.707
	Moral Obligation (MOR)	0.358	0.479	2.086			
Perceived Usefulness (PCU)	Convenience (CON)	0.316	0.458	2.181	0.64	0.89	0.804
	Time Saving (SAV)	0.762	0.334	2.996			
Perceived Ease of Use (PEU)	Ease of Learning (ETL)	0.304	0.437	2.29	0.62	0.88	0.807
	Non-Complexity (NCO)	0.769	0.291	3.438			
Attitude Toward Using (ATU)	Feeling (FEL)	0.471	0.238	4.202	0.65	0.89	0.877
	Idea (IDE)	0.584	0.219	4.576			
Perceived Behavioral Control (PBC)	Knowledge of Tax Payment (KTP)	0.406	0.28	3.576	0.63	0.88	0.855

	Understanding of Tax Laws (NTL)	0.386	0.29	3.447			
	Government Supervision (GSU)	0.346	0.503	1.988			
Utility Maximization (UMZ)	Reporting Actual Income (RAI)	0.821	0.554	1.805	0.64	0.89	0.784
	Reporting Lower Income (RIL)	0.519	0.774	1.293			
Responsibility (REP)	Appropriate Incentive (API)	0.313	0.747	1.339	0.61	0.87	0.701
	Understanding of Tax Burden (UNT)	0.382	0.465	2.152			
	Facilitation (FAC)	0.642	0.518	1.932			
Tax Intention (TIN)	Practice Trend (PRT)	0.303	0.459	2.178	0.67	0.91	0.914
	Decision (DEC)	0.478	0.311	3.22			
	Needs (NED)	0.353	0.329	3.044			

Table 3. Measurement Model Summary: Validity and Reliability Indicators

Source(s): Author

Predictive Power and Model Explanation

The explanatory strength of the model was evaluated using the coefficient of de-termination (R^2) and cross-validated redundancy (Q^2). R^2 values indicate how much variance in each endogenous construct is explained by its predictors. As shown in Table 4, all R^2 values exceeded the minimum acceptable threshold of 0.25, demonstrating moderate to high explanatory power across the model. Particularly strong predictive values were observed for Attitude Toward Using (ATU = 0.729), Tax Compliance (TCP = 0.704), and Tax Intention (TIN = 0.664).

Predictive relevance, assessed through Q^2, further supports the model's robustness. All Q^2 values were above zero—ranging from 0.215 to 0.644—indicating satisfactory predictive accuracy. The highest Q^2 values were reported for ATU, TIN, and PEU, val-idating the model's predictive relevance for key behavioral constructs. The results R^2 and Q^2, along with their interpretive benchmarks for assessing predictive relevance, are presented in Table 4.

Latent Variable	R²	Predictive Power of Endogenous Latent Variable	Q²	Predictive Accuracy of the Model Path
Attitude Toward Using (ATU)	0.729	Moderate	0.644	High
Perceived Ease of Use (PEU)	0.504	Moderate	0.499	High
Utility Maximization (UMZ)	0.251	Moderate	0.215	Moderate
Tax Intention (TIN)	0.664	Moderate	0.551	High
Responsible (REP)	0.4	Moderate	0.402	High
Tax Compliance (TCP)	0.704	Moderate	0.45	High

Table 4. Results of Coefficient of Determination (R²) and Cross-Validated Redundancy (Q²)

Source(s): Author

Path Analysis and Hypothesis Outcomes

The structural model confirmed all 20 hypotheses (H1–H20), demonstrating strong direct and indirect effects across multiple pathways, and supporting the robustness of the proposed model. Effect sizes, significance levels, and outcomes are provided in Ta-ble 5, enabling interpretation without reference to the main text.

Hypothesis	Path	Direct Effect	Indirect Effect	Total Effect	t-value	p-value	Result
H1	PEU → PCU	0.71	-	0.710***	24.995	0	Supported
H2	PEU → ATU	0.52	-	0.520***	36.614	0	Supported
H3	PCU → TIN	0.118	-	0.118*	7.102	0.015	Supported
H4	PCU → ATU	0.402	-	0.402***	6.934	0	Supported
H5	SJN → TIN	0.185	-	0.185***	4.221	0	Supported
H6	PBC → TIN	0.171	-	0.171***	4.216	0	Supported
H7	ATU → UMZ	0.501	-	0.501***	12.709	0	Supported
H8	ATU → TIN	0.466	-	0.466***	9.082	0	Supported
H9	ATU → REP	0.632	-	0.632***	22.104	0	Supported
H10	UMZ → TCP	0.203	-	0.203***	6.176	0	Supported

H11	TIN → TCP	0.444	-	0.444***	12.859	0	Supported
H12	REP → TCP	0.341	-	0.341***	10.74	0	Supported
H13	SJN → TIN→ TCP	-	0.082	0.267***	3.815	0	Supported
H14	PBC → TIN→ TCP	-	0.076	0.247***	3.876	0	Supported
H15	PCU → ATU → TIN → TCP	-	0.083	0.485***	4.775	0	Supported
H16	PEU → ATU → TIN → TCP	-	0.108	0.628***	6.365	0	Supported
H17	PCU → ATU → UMZ → TCP	-	0.041	0.443***	4.854	0	Supported
H18	PEU → ATU → UMZ → TCP	-	0.053	0.573***	4.809	0	Supported
H19	PCU → ATU → REP → TCP	-	0.087	0.489***	5.439	0	Supported
H20	PEU → ATU → REP → TCP	-	0.112	0.632***	7.571	0	Supported

Table 5. Hypothesis Testing Results

Note. * $p \leq 0.05$; *** $p \leq 0.001$

Source(s): Author

In the hypothesis testing results, Perceived Ease of Use (PEU) significantly influ-enced both Perceived Usefulness (PCU) and Attitude Toward Using (ATU). ATU emerged as a central mediator, positively affecting Utility Maximization (UMZ), Inten-tion to Use (TIN), and Responsibility (REP). In turn, TIN, UMZ, and REP directly pre-dicted Tax Compliance Behavior (TCP), representing cognitive, economic, and normative drivers, respectively.

Social Influence (SJN) and Perceived Behavioral Control (PBC) also contributed to TIN. A series of indirect effects confirmed the mediating roles of ATU, TIN, REP, and UMZ in

translating perceptions of technology (PEU, PCU) into actual compliance be-havior. Notably, PEU demonstrated the highest cumulative total effect on TCP through multiple mediating paths, underscoring its foundational role in promoting digital tax system usability.

Necessary Condition Analysis (NCA)

To identify essential—but not sufficient—conditions for achieving tax compliance (TCP), a Necessary Condition Analysis (NCA) was conducted using the ceiling envelopment–free disposal hull (CE-FDH) method, available in the NCA add-on of SmartPLS 4.0 (Sarstedt et al., 2024). This method highlights structural bottlenecks by determining the minimum threshold levels that predictor constructs must meet to enable the desired outcome. Effect sizes (d) were interpreted using benchmarks suggested by Richter et al. (2023) d ≥ 0.1 (medium), d ≥ 0.3 (strong), and d ≥ 0.5 (very strong). Construct classification followed Dul's (2016) guidelines for necessity logic.

The analysis identified Attitude Toward Using (ATU) as strongly necessary, while Responsibility (REP) and Tax Intention (TIN) were marginally necessary. Although ATU and TIN showed relatively high performance, REP remained low—highlighting a strategic area for improvement. Full results appear in Table 6.

Construct	Effect Size (d)	Necessity Classification	Total Effect (p < 0.05)	95% CI of Total Effect	Performance Avg (0–100)	Min–Max Performance
ATU	0.284	Strongly	Yes (0.728)	[0.625; 0.832]	72.9	0–100
REP	0.212	Marginally	Yes (0.341)	[0.267; 0.421]	40.0	0–100
TIN	0.168	Marginally	Yes (0.444)	[0.352; 0.536]	66.4	0–100

Table 6. Necessary Condition Analysis (NCA) Results

Source(s): Author

Importance-Performance Map Analysis (IPMA)

In parallel, an Importance–Performance Map Analysis (IPMA) was applied to identify constructs with the greatest leverage for improving tax compliance. Constructs were positioned based on their total effects (importance) and normalized performance, and categorized into four strategic zones: Strategic Priority, Leverage, Facilitator, and Low Priority (Figure 3). Perceived Ease of Use (PEU) and Perceived Usefulness (PCU) ex-hibited both high importance and performance, confirming their roles as key techno-logical enablers. In contrast, Attitude Toward Using (ATU) and Responsibility (REP) emerged as Strategic Priorities, exerting significant influence despite their comparatively lower performance.

Although Tax Intention (TIN) showed slightly lower importance, its strong per-formance and classification as a marginally necessary condition reinforce its relevance. Taken together, the NCA and IPMA results underscore the critical role of psychological factors—such as user attitudes and perceived responsibility—in complementing tech-nological determinants. These insights suggest that strengthening these softer con-structs may be essential for overcoming

behavioral barriers to compliance. Summaries of construct-level necessity and performance are provided in Tables 6 and 7.
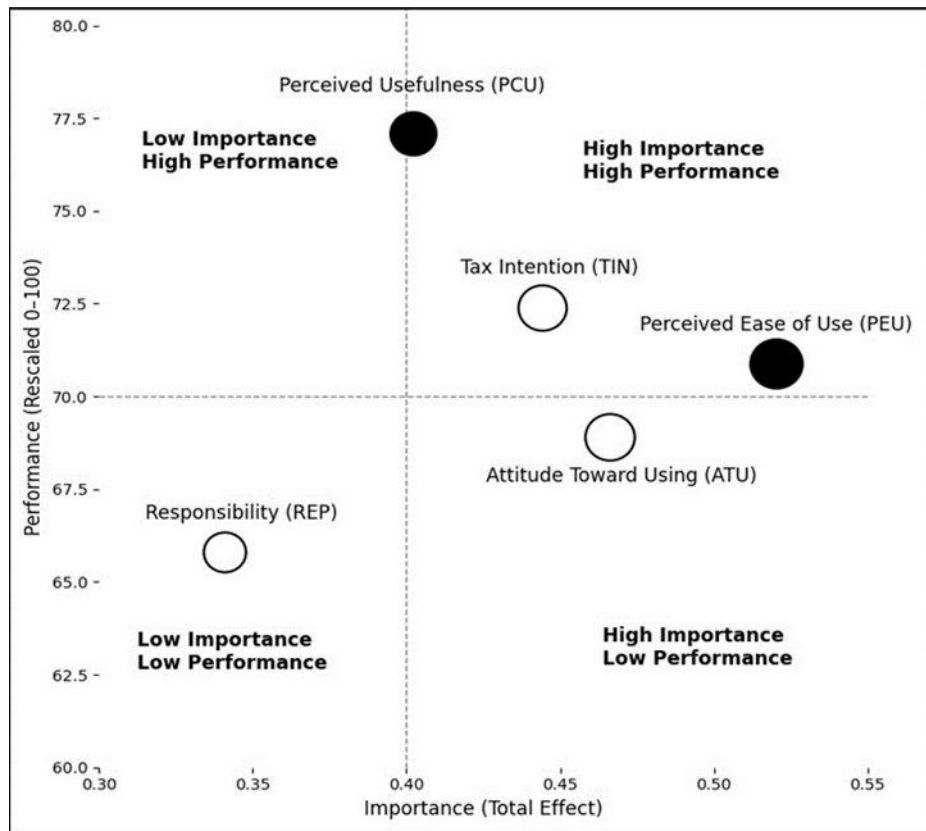

Figure 3. Importance–Performance Map for Tax Compliance Constructs

Note: Black-filled circles = high-impact constructs; white = moderate relevance. Quadrant placement guides policy prioritization.

Source(s): Author

Construct	Importance	Performance	IPMA Classification	Necessity Status
Responsibility (REP)	0.341	65.8	Strategic Priority	Marginal
Tax Intention (TIN)	0.444	72.4	Strategic Priority	Marginal
Attitude (ATU)	0.466	68.9	Facilitator	Strong
Usefulness (PCU)	0.402	77.1	Leverage	No
Ease of Use (PEU)	0.520	70.9	Leverage	No
Utility Maximization (UMZ)	-	-	Mediator	No
Subjective Norm (SJN)	-	-	Upstream	No
Perceived Behavioral Control (PBC)	-	-	Upstream	No

Tax Compliance (TCP)	-	-	Outcome	-

Table 7. IPMA Summary and Necessary Condition Status

Note: IPMA classification is based on quadrant placement in Figure 3. Necessity status is derived from NCA results.

Source(s): Author

Discussion

This research contributes to the understanding of corporate tax compliance in Thailand's digital context by addressing a key theoretical gap. It proposes and empiri-cally validates a causal model that explains voluntary compliance with corporate income tax among Thai entities. The findings offer practical insights for designing digital tax systems that are both socially and institutionally sustainable.

Empirical results show that perceived ease of use (PEU) and perceived usefulness (PCU) enhance user attitudes (ATU), which in turn foster voluntary tax compliance. Trust in e-government further strengthens this effect, highlighting the role of reliable, user-centric digital systems in sustaining taxpayer engagement. These insights align with Younus et al. (2025), who emphasize behavioral profiling and trust-driven digital platforms as key tools in reducing tax evasion.

While previous studies on environmental and regulatory tax compliance have emphasized fairness, social norms, and regulatory clarity (Hakam et al., 2024), the cur-rent work expands the conceptual framework by incorporating the Technology Ac-ceptance Model (TAM). The results demonstrate that PEU and PCU are key antecedents of ATU, particularly in digital platforms, thereby extending the theoretical foundation of behavioral tax research.

In terms of methodology, the application of Necessary Condition Analysis (NCA) offers a significant advancement by identifying ATU, tax responsibility (REP), and tax filing intention (TIN) as indispensable preconditions for sustained compliance (Dul et al., 2023). These findings are consistent with Kumar et al. (2025), who emphasize the non-compensatory role of behavioral conditions in digital service adoption. The inte-gration of PLS-SEM, NCA, and IPMA enhances analytical rigor and facilitates the translation of complex results into actionable guidance for both policy and system de-sign (Hauff et al., 2024).

Findings also carry important implications for key stakeholders. Policymakers should promote REP and TIN through civic education and ethically guided behavioral nudges, in line with Teeluckdharry et al. (2024). Special attention should be directed toward overcoming compliance barriers faced by micro, small, and medium-sized en-terprises (MSMEs), which often require context-specific interventions and innovative policy measures—a priority underscored by Safitri (2025). Platform designers are ad-vised to enhance usability and incorporate responsive feedback mechanisms to support ATU (Kumar et al., 2025). Corporate taxpayers should embed REP within ESG-aligned governance frameworks, reinforcing tax compliance as an element of broader ethical business practices (Sarstedt et al., 2024).

Beyond its empirical contributions, this research offers a reinterpretation of the role of tax responsibility (REP), extending it from a normative construct to one of statistical and behavioral significance—particularly within Thailand's evolving digital governance landscape. When compared to other Southeast Asian countries such as Malaysia, In-donesia, and Vietnam, the

findings suggest regional commonalities: both nations em-phasize trust in the quality of digital systems, user experience, civic responsibility, and ethical obligation (Nguyen et al., 2023; Ariyanto et al., 2024; Yun et al., 2025). Thailand's approach aligns with these ASEAN policy directions but places distinctive weight on deeply embedded moral norms and traditional behavioral expectations in sustaining voluntary tax compliance.

These insights underscore the importance of developing digital tax systems that are not only technologically robust but also culturally and ethically resonant. Sustainable tax compliance requires systems that reflect the socio-institutional contexts of indi-vidual countries while supporting broader ASEAN policy goals. By designing culturally sensitive platforms rooted in local values, governments can enhance public trust, foster civic engagement, and sustain long-term behavioral change across diverse populations.

Conclusions

This study offers a comprehensive yet focused contribution to the literature on sustainable corporate tax compliance in digital contexts. By employing a mixed-method framework—PLS-SEM, Necessary Condition Analysis (NCA), and Importance–Performance Map Analysis (IPMA)—the research integrates sufficiency and necessity perspectives to provide a more nuanced understanding of taxpayer behavior.

Theoretically, the study advances the role of ethical responsibility (REP) as both a statistically significant predictor and a necessary condition for compliance, differenti-ating it from traditional behavioral factors such as subjective norms and perceived con-trol. Empirically, it identifies REP, attitude toward technology use (ATU), and tax in-tention (TIN) as key drivers of long-term compliance within Thailand's digital tax sys-tem, where civic values and ethical norms are still developing.

Strategically, the findings inform policy and design. Civic education, trust-building, and intuitive platform features should be prioritized to foster REP, strengthen ATU, and support voluntary compliance. For businesses, embedding REP in ESG-oriented gov-ernance and internal practices can institutionalize ethical compliance behavior.

While grounded in the Thai context, the model provides a conceptual foundation that can be tested in other jurisdictions. Future research should explore additional var-iables—such as trust, fairness, and audit transparency—and examine how digital sys-tems might encourage ethical reflection, contributing to the development of socially and behaviorally informed tax systems.

References

Ahmad, E.; Chongvilaivan, A. Digital Transformation of Multilevel Tax Policies and Administration for Resilience
and Sustainable Growth. Asian Dev. Bank 2024. [CrossRef]

Ajzen, I. (2020). The theory of planned behavior: Frequently asked questions. Human behavior and emerging technologies, 2(4), 314-324. [CrossRef]

Al-Okaily, M. Advancements and forecasts of digital taxation information systems usage and its impact on tax compliance: Does trust and awareness make difference? J. Financ. Rep. Account. 2024. [CrossRef]

Anjarwi, A. W., Baridwan, Z., & Iqbal, S. (2024). Determinants of Tax Evasion in the Perspective of Enforcement, Psychology, Trust, and Services. Deviant Behavior, 45(12), 1787-1819. [CrossRef]

Ariyanto, D., Dewi, A. A., Paramadani, R. B., & Paramadina, A. A. (2024). Determinants of tax compliance and their impact on a sustainable information society: An investigation of MSMEs. Cogent Business & Management, 11(1), Article 2414856. [CrossRef]

Asmah, A.; Ampong, K.O.; Bibi, D.; Ofori, W. Exploring the drivers of digital technology adoption for enhancing domestic tax mobilization in Ghana. Int. J. Inf. Manag. 2025, 75, 102668. [CrossRef]

Bassey, E.; Mulligan, E.; Ojo, A. A Conceptual Framework for Digital Tax Administration: A Systematic Review. Gov. Inf. Q. 2022, 39(4), 101754. [CrossRef]

Belahouaoui, R.; Attak, E.H. Digital Taxation, Artificial Intelligence and Tax Administration 3.0: Improving Tax Compliance Be-havior – A Systematic Literature Review Using Textometry (2016–2023). Account. Res. J. 2024, 37(2), 172–191. [CrossRef]

Chiang, L., Tai, K. T., & Lee, I. P. (2024). Compliance with COVID-19 preventive policies and governmental transparency: an experimental analysis. Public Management Review, 1-21. [CrossRef]

Coccia, M. (2022). Theories of development. In Global encyclopedia of public administration, public policy, and governance. 12719-12725.
Cham: Springer International Publishing. [CrossRef]

Davis, F. D., Granić, A., & Marangunić, N. (2024). The technology acceptance model: 30 years of TAM. Switzerland: Springer Interna-tional Publishing AG. [CrossRef]

Dul, J.; Hauff, S.; Bouncken, R.B. Necessary condition analysis (NCA): Review of research topics and guidelines for good practice. Rev. Manag. Sci. 2023, 17, 683–714. [CrossRef]

Hakam, S.L.; Rahayu, A.; Wibowo, L.A.; Hakam, L.I.; Nugroho, M.A.; Fuadi, S.S. Compliance behavior in environmental tax policy. J. Risk Financ. Manag. 2024, 17, 542. [CrossRef]

Hauff, S.; Richter, N.F.; Sarstedt, M.; Ringle, C.M. Importance and performance in PLS-SEM and NCA: Introducing the combined importance-performance map analysis (cIPMA). J. Retail. Consum. Serv. 2024, 78, 103723. [CrossRef]

Kumar, J.; Rani, G.; Rani, M.; Rani, V. What factors influence the individual's behavior in engaging in income tax evasion? An
investigation using SEM and fsQCA. Asian Rev. Account. 2025. [CrossRef]

Mas'ud, A.; Manaf, N.A.A.; Saad, N.; Pantamee, A.A. Extending UTAUT through moderating effects of trust—Insights from electronic tax filing adoption among micro-entrepreneurs in merchandising sector. Int. J. Bus. Inf. Syst. 2024, 46, 238–257. [CrossRef]

Nguyen, T.Q.; Pham, T.A.N.; Hoang, A.P.; Do, T.H.N.; Fuller, D. Factors Affecting the Acceptance of Online Tax Filing and Payment System by Micro Small Medium Enterprises in Vietnam. J. Asian Public Policy 2023, 18(1), 184–205. [CrossRef]

Nguyen, T.T.U.; Van Nguyen, P.; Huynh, H.T.N.; Truong, G.Q.; Do, L. Unlocking e-government adoption: Exploring the role of perceived usefulness, ease of use, trust, and social media engagement in Vietnam. J. Open Innov. Technol. Mark. Complex. 2024, 10, 100291. [CrossRef]

Okunogbe, O.; Santoro, F. Increasing tax collection in African countries: The role of information technology. J. Afr. Econ. 2023, 32(S1), i57–i83. [CrossRef]

Raut, R.K. and Kumar, S. (2024), "An integrated approach of TAM and TPB with financial literacy and perceived risk for influence on online trading intention", Digital Policy, Regulation and Governance, Vol. 26 No. 2, pp. 135-152. [CrossRef]

Richter, N.F.; Hauff, S.; Ringle, C.M.; Sarstedt, M.; Kolev, A.E.; Schubring, S. How to apply necessary condition analysis in PLS-SEM. In Partial Least Squares Path Modeling; Springer: Cham, Switzerland, 2023; pp. 267–297. [CrossRef]

Safitri, K. Tax Policy Innovations for Enhancing MSMEs Compliance and Economic Resilience. Int. J. Bus. Appl. Econ. 2025, 4, 769–784. [CrossRef]

Sarstedt, M.; Richter, N.F.; Hauff, S.; Ringle, C.M. Combined importance–performance map analysis (cIPMA) in partial least squares structural equation modeling (PLS–SEM): A SmartPLS 4 tutorial. J. Mark. Anal. 2024, 1–15. [CrossRef]

Slemrod, J. Tax Compliance and Enforcement. J. Econ. Lit. 2019, 57(4), 904–954. [CrossRef]

Supriyati, I.H.; Nahumury, J. The influence of trust in the government, perceived fairness, and tax morale on taxpayer compliance: Implications for budget formation. Public Munic. Financ. 2024, 13, 129–139. [CrossRef]

Teeluckdharry, N.B.; Teeroovengadum, V.; Seebaluck, A.K. A roadmap for the application of PLS-SEM and IPMA for effective service quality improvements. TQM J. 2024, 36, 1300–1345. [CrossRef]

UN ESCAP. The Digitalization of Tax Administrations in Asia and the Pacific: A Manual for Practitioners. United Nations ESCAP, 2025. [CrossRef]

Visedsun, N., Piriyakul, M., Sriprasert, A., Rummapor, W., & Srithaworn, W. (2024). Effects of tax incentive measures, a facilitated tax system, and tax fairness and equity perception on corporate tax compliance behavior: Evidence from small and medi-um-sized enterprises in Thailand. International Journal of Business, 29(2). [CrossRef]

Younus, M.; Manaf, H.A.; Nurmandi, A.; Mutiarin, D.; Sohsan, I.; Rehman, A.; Minhas, R. The role of e-government in mitigating tax evasion through behavioral profiling of non-compliant taxpayers. In Modeling and Profiling Taxpayer Behavior and Com-pliance; IGI Global: Hershey, PA, USA, 2025; pp. 271–304. [CrossRef]

Yun, W. S., Pinjaman, S. B., Nipo, D. T., & Gulabdin, S. B. (2025). Digital Transformation in Reshaping Industries. In Perspectives on Digital Transformation in Contemporary Business (pp. 143-172). IGI Global Scientific Publishing. [CrossRef]

Hypothesis	Research Statement	Theory	Constructs
H1	Perceived ease of use positively affects perceived usefulness	TAM	PEU, PCU
H2	Perceived ease of use positively affects attitude toward using	TAM	PEU, ATU
H3	Perceived usefulness positively affects tax intention	TAM	PCU, TIN
H4	Perceived usefulness positively affects attitude toward using	TAM	PCU, ATU
H5	Subjective norm positively affects tax intention	TPB	SJN, TIN
H6	Perceived behavioral control positively affects tax intention	TPB	PBC, TIN
H7	Attitude toward using positively affects utility maximization	TPB + Utility Maximization	ATU, UMZ
H8	Attitude toward using positively affects tax intention	TPB	ATU, TIN
H9	Attitude toward using positively affects responsibility	TPB	ATU, REP
H10	Utility maximization positively affects tax compliance	Utility Maximization	UMZ, TCP
H11	Tax intention positively affects tax compliance	TPB	TIN, TCP
H12	Responsibility positively affects tax compliance	Responsible Taxpayer	REP, TCP
H13	Subjective norm affects tax compliance through tax intention	TPB	SJN, TIN, TCP
H14	Perceived behavioral control affects tax compliance through tax intention	TPB	PBC, TIN, TCP
H15	Perceived usefulness affects tax compliance through attitude and tax intention	TAM + TPB	PCU, ATU, TIN, TCP
H16	Perceived ease of use affects tax compliance through attitude and tax intention	TAM + TPB	PEU, ATU, TIN, TCP
H17	Perceived usefulness affects tax compliance through attitude and utility maximization	TAM + Utility Maximization	PCU, ATU, UMZ, TCP
H18	Perceived ease of use affects tax compliance through attitude and utility maximization	TAM + Utility Maximization	PEU, ATU, UMZ, TCP
H19	Perceived usefulness affects tax compliance through attitude and responsibility	TAM + Responsible Taxpayer	PCU, ATU, REP, TCP
H20	Perceived ease of use affects tax compliance through attitude and responsibility	TAM + Responsible Taxpayer	PEU, ATU, REP, TCP

Table Appendix A: Summary Table of Theories, Constructs, and Hypotheses (H1–H20)

Source(s): Author