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Drone Enabled Tax Monitoring, Trust in Authorities, and Voluntary Tax Compliance Intentions

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ABSTRACT



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Purpose – This study presents a research model focussing on the influence of drone-enabled tax monitoring on voluntary tax compliance by integrating the enforcement power, institutional trust, and governance perceptions.

Design/methodology/approach – Base on a survey-based PLS-SEM technique, the study conceptualizes how drone monitoring, transparency, regulation and privacy tenets together predict trust and compliance intentions while advancing behavioral governance arguments.

Findings – The results show that the use of drone technology to monitor has a significant effect on voluntary tax compliance, and this relationship is mediated by trust in tax authorities. Factors related to governance, particularly procedural transparency and regulatory clarity, impact trust and thus indirectly compliance intentions in one direction, while privacy concerns reduce trust and cooperative intentions. Perceived risk of detection increases compliance through a direct effect but not trust, reflecting constraints on deterrence in technologized enforcement environments.

Originality/value – It continues to be one of the early works that introduce drone-based surveillance into tax compliance theory empirically. It builds upon the Slippery Slope Framework; showing how new surveillance technologies, in conjunction with perceived trust, legitimacy and privacy operating conditions will condition compliance behavior.

Research Implications – These findings contribute to behavioral tax research by demonstrating that technological enforcement must be institutionally embedded to maintain compliance. They stress trust as a central mediating mechanism through which digital innovation is connected to cooperative taxpayer actions, providing the groundwork for purposeful digital tax governance.

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1. Introduction

The public sector is being transformed by the fast-developing digital surveillance era, including its tax administration. Revenue authorities around the world are increasingly turning to data-based tools. These are used as a means of improving tax compliance. They also help to lower information asymmetry. In addition, they increase enforcement capacity (Cingolani & Salazar-Morales, 2024; Lapuente & Suzuki, 2020; Mascagni & Santoro, 2023; Oecd, 2024; Scheuer & Slemrod, 2021). One such technology is drone-based surveillance, which is a new way of monitoring economic activities and taxable events that would otherwise be difficult to detect through traditional audit methods. While previous research has demonstrated the cost-effectiveness of technology-enhanced tax administration, the impact of

such control activities on taxpayers' behavioural intentions regarding trust and voluntary compliance remains largely unknown (Alm et al., 1993, 2023; Frecknall-Hughes et al., 2023; K. Gangl et al., 2019).

The relationship between taxpayers and state authorities is undergoing a new phase with the introduction of drone tax surveillance. Unlike traditional audits, drones offer high-profile and frequent visibility, increasing the perceived probability of detection, which may strengthen deterrence elements, as advocated by economic-of-crime models (Andersen, 1977; Francis, 2004; Michael, 2021; Pyle, 1991). Recent studies suggest that when people think they might be caught, they are more likely to follow the rules (Bott et al., 2026; Mascagni et al., 2021; Pomeranz & Serrato, 2025; Slemrod, 2024). However, this is not always the case. Sometimes, people



resist change when they feel it is being imposed on them too strongly or in a way that is too personal ((Mascagni et al., 2021; Mascagni & Santoro, 2023)). The importance of considering how technologically increased monitoring interacts with individuals' perceptions and attitudes, rather than just using enforcement to compel compliance, is highlighted by this duality.

The Slippery Slope Framework offers a theoretical approach to analysing this interplay. The model suggests that voluntary tax compliance is achieved when there is a balance of power between the authorities and the taxpayer, and when the taxpayer trusts the authorities (Kirchler et al., 2008). In contrast, recent extensions to the model have focused on how modern enforcement instruments may exert power and foster trust through dual consequences (i.e. a combination of power shaping and trust shaping) depending on their implementation (Alm et al., 2020; Alm & Torgler, 2011; Frecknall-Hughes et al., 2023; S. Gangl, 2024; Olson et al., 2025). The framework under discussion shows how drone surveillance can be both effective and risky to those being surveilled. At the same time, transparency of procedure, clarity of regulation and privacy are important for trust and legitimacy of the institution.

Procedural theories of justice and legitimacy suggest that taxpayers will only accept enforcement technologies if the procedures are fair, transparent and rule-based (Tyler, 2006). Recent research indicates that transparent communication, clear regulatory frameworks and opportunities for contestation can all contribute to building trust in tax authorities and encouraging adherence to cooperative compliance, even in situations involving intensified monitoring (Murphy et al., 2023; Kogler et al., 2024; Olsen & Hjorth, 2023; Lapuente & Suzuki, 2024). Trust can be eroded and the compliance incentives from technological enforcement counterbalanced by stockpiling data or lack of clarity in regulations.

At the same time, growing concerns about data protection and privacy are being fuelled by the increasing use of surveillance technology. The information privacy concern and privacy calculus literatures argue that individuals decide about new technologies by considering the perceived benefits in relation to the associated risks of potential privacy loss (Barth & de Jong, 2017; D. Malhotra, 2004; N. K. Malhotra et al., 2004; Schomakers et al., 2022). Recent empirical work postulates that increased vigilance regarding privacy issues can undermine trust in public actors and

acceptance of digital surveillance, especially when safeguard mechanisms are not transparent (Dinev et al., 2008; Jin & Wu, 2026; Małagocka, 2024), and van den Broek & van Veenstra (21 C-r) add that GUILayout die OECD (2025) also adds to this. Thus, in the case of tax, privacy concerns may counterbalance the favourable impact of monitoring by drones on compliance intentions.

These issues are becoming more and more important, but there is hardly any research that looks at how drone-based tax enforcement, trust in tax authorities and voluntary compliance related to taxes are connected. Most of these studies focus on either enforcement outcomes or e-government adoption without explicitly modelling trust as a key behavioural mechanism (Alm et al., 2023; Dwenger & Treber, 2022; Mascagni, 2018; Mascagni et al., 2021; Mascagni & Santoro, 2023; Scheuer & Slemrod, 2021; Slemrod & Yitzhaki, 2002; Tanko, 2023). Addressing this gap, this study considers how different facets of drone-based tax monitoring affect voluntary tax compliance intentions directly, as well as through trust in tax authorities. This study contributes to the literature on digital taxation governance by incorporating arguments relating to deterrence, procedural justice, technology acceptance and privacy into the Slippery Slope Framework, providing implications for the effective and legitimate implementation of enforcement mechanisms in a digital taxation context.

2. Critical Review

2.1 Theoretical background

The theoretical framework of this study is based on the Slippery Slope Framework (SSF) model, which describes tax compliance as a function of the interplay between power of taxation authorities and trust in authorities (Kirchler et al. Recent writing however stresses that digital enforcement technologies tilt this balance by increasing monitoring capacity and modifying the perceptions of legitimacy at the same time (Gangl et al., 2024; Alm & Torgler, 2023). Drone-based surveillance increases the enforcement power by raising visibility and certainty of detection, consistent with deterrence theory (Slemrod, 2024). Nonetheless, SSF derived studies suggest that sustainable compliance is determined by whether such power is exercised openly and fairly with regard to trust rather than to resistance (Hofmann et al., 2023; Olsen et al., 2024). Thus, this research combines deterrence, procedural justice technology acceptance and privacy explain how drone-

based monitoring of taxes affects the voluntary compliance behavior.

2.2 *The impact of drone monitoring factors on voluntary tax compliance*

From the standpoint of deterrence, good surveillance over drones and greater perceived detection risk are anticipated to enhance tax compliance because they increase voluntary compliance by increasing the expected cost of evading taxes (Becker, 1968; Allingham & Sandmo, 1972). Recent experimental studies provide evidence that technology-augmented observation increases compliance intentions if audits are perceived accurate and inevitable (Dwenger et al., 2023; Bott et al., 2023). Procedural transparency and regulatory clarity go beyond coercion to also act as complements by way of reducing uncertainty and increasing perceived fairness in the form of voluntary cooperation (Tyler, 2006; Murphy et al., 2023). On the other hand, privacy concern is a constraining force. Findings in the field of digital governance suggest that intrusive surveillance may decrease willingness to comply when there is a relative discrepancy between perceived privacy risks and public benefits (Martin et al., 2024; van den Broek & van Veenstra, 2025). Thus, H1-H5 suggest that factors associated to enforcement (H1-H4) have a positive effect on users' compliance intention and privacy concern has a negative impact on it.

2.3 *Drone-Monitoring effects on trust in tax authorities*

Taxpayers' confidence in tax authorities is a product not only of outcomes, but also of the manner in which enforcement is conducted. Within the SSL model, control efficiency builds trust to the extent that it indicates competence and rule-consistency (Kirchler et al., 2008; Gangl et al., 2024). Efficient control in the use of drones may consequently improve confidence through proof of administrative effectiveness and precision. Yet, too much focus on detection risk can destroy trust if enforcement is seen as act of punishment rather than one of offering services (Alm et al., 2023). Procedural transparency and regulatory clarity both seem to be drivers of institutional trust, as they indicate an equal, transparent and respectful treatment (Tyler, 2006; Kogler et al., 2024). Public trust, on the other hand, is undermined because of lack of privacy with regards to stolen data that can directly impact taxpayers (Bélanger & Carter, 2023; OECD, 2023). Thus H6-H10 posited nuanced effects of drone monitoring attributes on trust.

2.4 *Level of confidence in the tax authorities and voluntary tax compliance*

Taxpayers' trust in the tax authorities is a key determinant of voluntary tax compliance. There is plentiful evidences that taxpayers are more likely to cooperate, also in the absence of a threatening application, if they believe authorities to be just, capable and kind (Kirchler et al., 2008; Torgler, 2023). Recent evidence corroborates the role of trust in boosting moral motivation, cooperation and driving the long-term sustainability of compliance (Alm & Torgler, 2023; Hofmann et al., 2023). In digital enforcement arenas the space for trust becomes even more central, since advanced technological practices could otherwise be perceived as surveillance instead of governance (Lapuente & Suzuki, 2024). Therefore, H11 implies that trust in tax authorities is positively associated with voluntary tax compliance intention.

2.5 *Drone surveillance, trust and willingness to comply with tax laws*

Drawing from the Slippery Slope Framework, we posit trust as a primary mediator by which monitoring characteristics of drones impact compliance intentions. Existing research suggests that enforcement technologies affect behavior not merely by way of a direct effect, but also via the modification of how tax payers perceive legitimacy of authority (Gangl et al., 2024; Olsen et al., 2024). Trust, perceived transparency and clarity of procedure and regulation can establish trust that leads to voluntary compliance. On the other hand, privacy can hinder this transition by inducing distrust and pushback (Martin et al., 2024). H12-H16 thus suggest that trust in tax officials acts as a mediator of drone-based monitoring and cooperative tax behavior.

2.6 *Research model framework*

The research model incorporates with trust-based compliance theory the attributes of drone-enabled tax monitoring. It also places DME, PDR, PTPTC, RC and PC as antecedents that influence trust towards a tax authority and the intention to comply with taxes voluntarily. Trust plays a crucial mediating role between enforcement capability and institutional authority. The framework also answers recent demands for behavioral models which include the governance implications of digital surveillance in tax collection (Slemrod, 2024; Mascagni et al., 2023). It provides a systemic way to study compliance in technology based tax systems

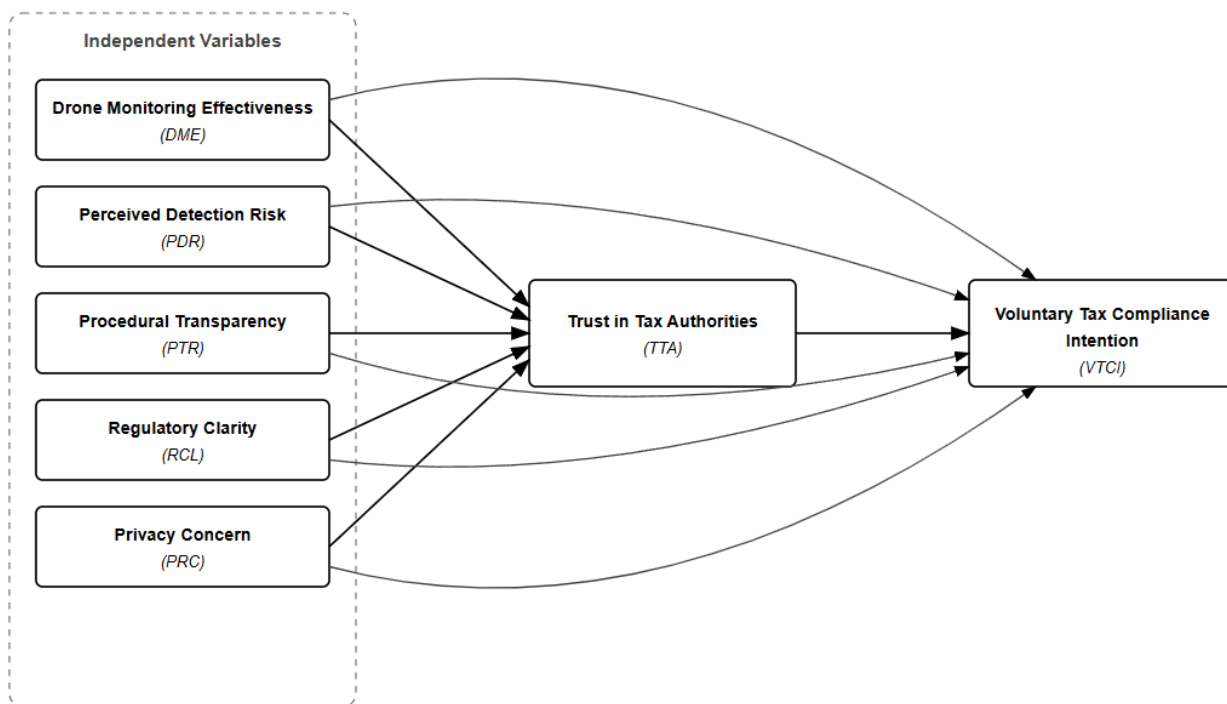


Figure 1. Research model framework

3. Methods innovation

3.1 Research design

This study uses a quantitative cross-sectional research design. The data will be collected using a pre-tested, structured questionnaire on Google Forms. Regarding the investigation of taxpayers' attitudes and behavioural intentions towards emerging digital monitoring technologies, it was also fine in that regard (Creswell & Creswell, 2018). A cross-sectional survey design is commonly used in tax compliance and digital governance research to efficiently gather attitudinal and perceptual data from large, geographically diverse populations (Alm et al., 2023; Mascagni et al., 2023). The study focuses on perception-based constructs because, as the Slippery Slope Framework says, the way enforcement power and trust interact can affect how people comply voluntarily (Kirchler et al., 2008; Gangl et al., 2024). The use of Likert-scale items is essential for obtaining consistent measurements of latent variables and structural equation models.

3.2 Research object and sample

The subject of the research is Wajib Pajak (individual taxpayer) in Indonesia with experience meeting their tax obligation and can assess perceptions of technology-based tax monitoring. The population is

taxpayers in all of Indonesia, and the total sample size is 372 individuals which are selected through purposive online sampling. The respondents had a valid tax payer identification number (NPWP), been maintaining or paying the taxes in past 12 months, and knowledge on tax administration procedures. Online sampling provides national scope and is becoming a norm for public administration- and taxation-related studies in digitally mediated settings (Bethlehem, 2010; Evans & Mathur, 2018). Research into trust and tax compliance has also emphasized the need to sample active taxpayers rather than members of the general public (Kirchler et al., 2008; Torgler, 2007). A full description of the population and sample characteristics is provided in Appendix A (Population and Sample Profile).

3.3 Variable instruments

All variables of this study were assessed using reflective items from existing tax compliance, procedural justice, technology acceptance, and privacy concerns literature. The factors consist of both enforcement-related perceptions (Drone Monitoring Effectiveness and Perceived Detection Risk) and governance-related perceptions (Procedural Transparency, Regulatory Clarity, Privacy Concern). As a central concept of the model, Trust in Tax Authorities is represented as a mediating construct reflecting its

importance within the Slippery Slope Framework (Kirchler et al., 2008). Voluntary Tax Compliance Intention is a measure of tax morality, meaning taxpayers will voluntarily comply with formal rules and regulations, beyond enforcement pressure (Alm & Torgler, 2011). All the scales were responded to on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Appendix B (Measurement Instrument) contains the complete list of constructs, indicators and theoretical bases.

3.4 Data analysis

The data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM), the appropriate technique for prediction-oriented models with multiple latent constructs and complicated mediation patterns (Hair et al., 2022). This technique is widely used in the literature of tax compliance and public governance, because it is resistant to non-normal data and suitable for moderate sample sizes (Sarstedt et al., 2020; Henseler et al., 2016). The analysis was twofold: testing the measurement model, which consisted of indicator reliability, internal consistency and construct validity; and examining the structural model, path coefficients, explained variance with significance levels bootstrapped. All the analyses were carried out by SmartPLS 4, in line with best-practice guidelines.

4. Results and Discussion

4.1 Measurement model results

As shown in Table 1, all indicators load highly on their hypothesized construct (from 0.784 to 0.926), thus surpassing the 0.70 threshold recommended by

guidelines. The strongest factor loadings are observed on PRC (e.g. PRC1 = 0.926; PRC2 = 0.911), which suggests that privacy concern has excellent indicator reliability. TTA and VTCl also demonstrate high loadings (TTA4 = 0.919; VTCl1 = 0.907), indicating reliable measurements of trust and compliance intention, respectively. With regard to perceptions of governance, PTR (0.816–0.849) and RCL (0.784–0.836) remain adequate. To sum up, there is no indication in Table 1 that any of the items should be dropped because of high loadings.

As seen in Table 2, consistency between items is strong for all constructs (Cronbach's α = 0.873–0.944), implying faithful measurement across scales. Composite reliability is also high (ρ_c = 0.907–0.957) and indicates scale stability. Convergent validity is established as all constructs surpass the AVE threshold of 0.50, with values ranging from 0.662 (RCL) to 0.817 (PRC). In particular, TTA (AVE = 0.807) and VTCl (AVE = 0.801) showed very good convergent validity. Therefore, Table 2 supports a measurement model that meets general acceptance criteria for reliability and convergent validity.

As shown in Table 3, the discriminatory validity is evident as all HTMTs are below the strict cut-off value (e.g., 0.85). The greatest HTMT ratios are observed for the theoretically related constructs PTR–TTA (0.446), PDR–DME (0.443) and TTA–VTCl (0.436). However, these values are all within acceptable limits. In contrast, PRC has very low HTMT values, suggesting strong distinctiveness (in the worst case, PRC–VTCl = 0.032; when is with the construct of ³VTCl). Constructs are empirically distinct, as suggested by Table 3, and the measurement model is satisfactory with respect to discriminant validity.

Table 1. Indicator loadings

Construct	Indicator	Loading
DME	DME1	0.851
	DME2	0.846
	DME3	0.874
	DME4	0.838
	DME5	0.902
PDR	PDR1	0.889
	PDR2	0.827
	PDR3	0.807
	PDR4	0.843
	PDR5	0.843
PRC	PRC1	0.926
	PRC2	0.911
	PRC3	0.904
	PRC4	0.904
	PRC5	0.873



Construct	Indicator	Loading
PTR	PTR1	0.849
	PTR2	0.819
	PTR3	0.846
	PTR4	0.816
	PTR5	0.825
RCL	RCL1	0.829
	RCL2	0.784
	RCL3	0.801
	RCL4	0.836
	RCL5	0.817
TTA	TTA1	0.898
	TTA2	0.885
	TTA3	0.914
	TTA4	0.919
	TTA5	0.875
VTCI	VTCI1	0.907
	VTCI2	0.906
	VTCI3	0.865
	VTCI4	0.89
	VTCI5	0.906

Table 2. Internal Consistency and Convergent Validity

Construct	Cronbach's α	rho_a	rho_c	AVE
DME	0.914	0.929	0.936	0.744
PDR	0.9	0.968	0.924	0.709
PRC	0.944	0.982	0.957	0.817
PTR	0.888	0.892	0.918	0.691
RCL	0.873	0.879	0.907	0.662
TTA	0.94	0.943	0.954	0.807
VTCI	0.938	0.941	0.953	0.801

Table 3. HTMT Criterion

	DME	PDR	PRC	PTR	RCL	TTA	VTCI
DME	—						
PDR	0.443	—					
PRC	0.083	0.037	—				
PTR	0.067	0.059	0.063	—			
RCL	0.086	0.138	0.04	0.109	—		
TTA	0.22	0.077	0.15	0.446	0.317	—	
VTCI	0.211	0.169	0.032	0.165	0.075	0.436	—

4.2 Structural model results

As shown in Table 4, multicollinearity is not a problem because the inner VIFs are all very low, ranging from 1.008 to 1.431. Regarding the predictors of TTA, we found acceptable low collinearity (VIF = 1.008–1.204), and the VTCI predictors also remained within this range (VIF = 1.041–1.431), as did the TTA > VTCI mediator path (VIF = 1.431). These values were much lower than typical thresholds. For example, they were less than 3.3 or 5.0. Table 4 provides further evidence that the estimated path coefficients are stable. They are not influenced by multicollinearity.

As shown in Table 5, the model accounts for 30.1% of the TTA variance ($R^2 = 0.301$; Adjusted $R^2 = 0.292$). This indicates that drone-monitoring and governance variables have a significant impact on trust formation. The model accounts for 19.9% of the variance in VTCI ($R^2 = 0.199$; adjusted $R^2 = 0.186$), which suggests moderate predictive power for compliance intention in a behavioural tax context. The small difference between R^2 and adjusted R^2 for both



constructs indicates that the explanatory power is not inflated due to model complexity. Overall, as shown in Table 5, the structural model provides an acceptable prediction of the two endogenous constructs.

As shown in Table 6, the following factors significantly predicted TTA: PTR > TTA ($\beta = 0.405, p < 0.001$), RCL > TTA ($\beta = 0.247, p < 0.001$), and DME > TTA ($\beta = 0.218, p < 0.001$). However, PRC > TTA was found to be significantly negative ($\beta = -0.152, p < 0.001$). Furthermore, the relationship between TTA and VTCI is very positive ($\beta = 0.422, p < 0.001$), which confirms that trust is a key factor in the intention to comply voluntarily. Of the direct paths to VTCI, only PDR > VTCI is significant ($\beta = 0.113, p = 0.030$). Other direct paths to VTCI are not significant. This is indicated by $p > 0.10$. This shows that there is limited direct influence. This is limited to trust and detection risk. This is shown in Table 6.

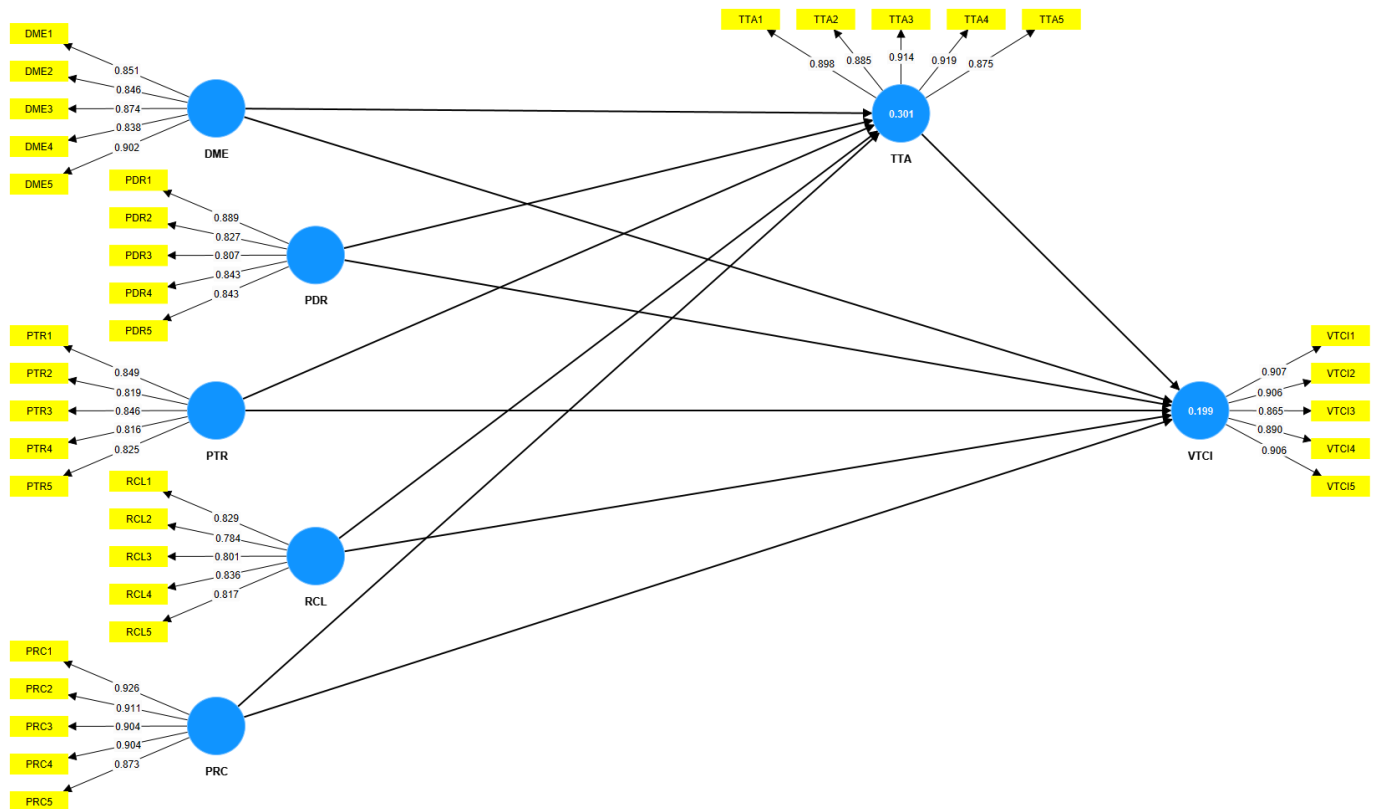


Figure 2. Measurement model outer model

Table 4. Collinearity assessment (VIF Values)

Structural relationship	VIF
DME > TTA	1.202
PDR > TTA	1.204
PRC > TTA	1.008
PTR > TTA	1.016
RCL > TTA	1.024
DME > VTCI	1.27
PDR > VTCI	1.208
PRC > VTCI	1.041
PTR > VTCI	1.251
RCL > VTCI	1.111
TTA > VTCI	1.431

Table 5. Coefficient of determination (R² Values)

Endogenous construct	R ²	Adjusted R ²
TTA	0.301	0.292



VTCI

0.199

0.186

Table 6. Direct effects path coefficients

Path	β (O)	STDEV	t	p	95% CI
DME > TTA	0.218	0.049	4.459	0.000	(0.120, 0.313)
DME > VTCI	0.076	0.052	1.454	0.146	(-0.026, 0.180)
PDR > TTA	-0.056	0.049	1.142	0.253	(-0.151, 0.042)
PDR > VTCI	0.113	0.052	2.172	0.03	(0.013, 0.218)
PRC > TTA	-0.152	0.041	3.705	0.000	(-0.234, -0.075)
PRC > VTCI	0.045	0.048	0.929	0.353	(-0.047, 0.139)
PTR > TTA	0.405	0.042	9.747	0.000	(0.323, 0.485)
PTR > VTCI	-0.015	0.052	0.298	0.766	(-0.118, 0.087)
RCL > TTA	0.247	0.044	5.579	0.000	(0.162, 0.335)
RCL > VTCI	-0.073	0.052	1.409	0.159	(-0.173, 0.033)
TTA > VTCI	0.422	0.054	7.821	0.000	(0.315, 0.526)

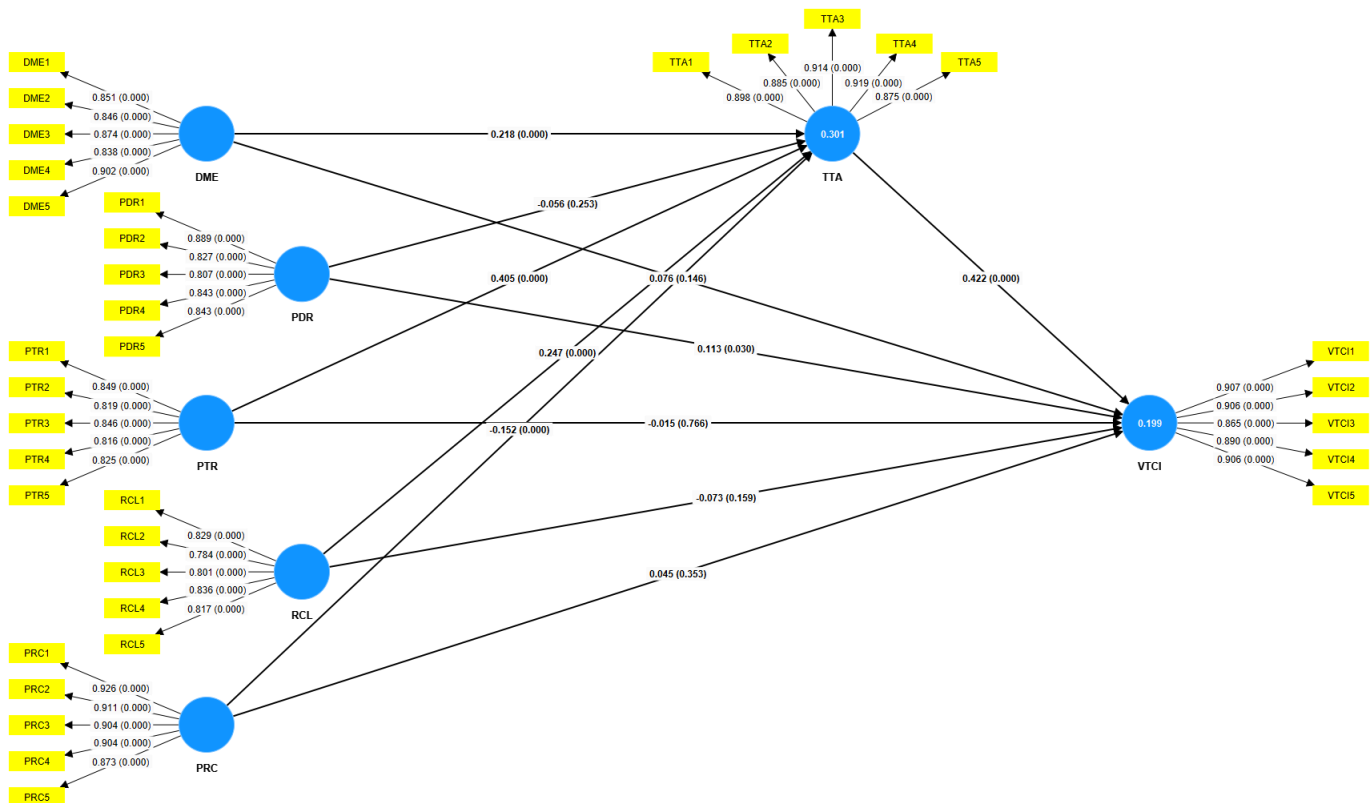


Figure 3. Structural Model (Inner Model)

4.3 Mediation and model quality results

As shown in Table 7, Trust in Tax Authorities (TTA) mediate statistically significant drone-based monitoring behaviors. The mediating effects on DME > VTCI ($\beta = 0.092, p < 0.001$), PTR > VTCI ($\beta = 0.171, p < 0.001$), and RCL > VTCI ($\beta = 0.104, p < 0.001$) are positive and significant, meaning that the constructs of effectiveness, transparency and regulatory clarity lead to increasing voluntary compliance via higher trust in agency primarily indeed. However, the indirect effect of PRC > VTCI is negative and significant ($\beta = -0.064, p = 0.001$),

indicating that privacy concerns decrease the compliance intentions through reducing trust. The mediating effect of the indirect path PDR > VTCI is not significant ($p = 0.270$). Table 7 shows that trust plays the key mediating role in transferring governance quality into enforcement intentions.

As shown in Table 8, effect size estimates indicate that predictor effects show meaningful variation in substantive impact. PTR > TTA is a strong and positive relation with procedural transparency as the most



powerful predictor for trust formation ($f^2 = 0.231$). RCL > TTA ($f^2 = 0.085$) and DME > TTA ($f^2 = 0.057$) suggest small-to-moderate effects, whereas PRC > TTA ($f^2 = 0.033$) shows a smaller but not negligible negative influence. For the purpose of compliance, TTA > VTCI ($f^2 = 0.155$) exhibits a moderate effect, providing evidence for trust as a primary explanatory factor. All other direct effects on Coherence show effect sizes that are relatively small ($f^2 \leq 0.013$). Hence, Table 8 indicates that trust-related paths are predominating the model's explanatory power.

As indicated in Table 9, the model has sufficient predictive relevance for endogenous constructs. The Q^2

value is 0.238 for TTA as medium predictive relevance, whereas $Q^2 = 0.153$ for VTCI represents acceptable out-of-sample predictive capability in behavioral tax research. In contrast, externals (DME, PDR, PRC, PTR and RCL) demonstrate $Q^2 = 0.000$ which is logically expected since this constructs are not predicted by any other variables in the model. Also, cross-validated communality values are strong for all constructs ($Q^2 = 0.488-0.712$), demonstrating robust measure quality. On the whole, Table 9 indicates that the derived model possesses substantial predictive capability, which is especially true for trust and voluntary compliance intention

Table 7. Indirect effects via trust in tax authorities

Path (via TTA)	(β)	STDEV	T-value	P-value
DME > TTA > VTCI	0.092	0.024	3.912	0.000
PDR > TTA > VTCI	-0.024	0.022	1.104	0.270
PRC > TTA > VTCI	-0.064	0.02	3.245	0.001
PTR > TTA > VTCI	0.171	0.029	5.961	0.000
RCL > TTA > VTCI	0.104	0.023	4.544	0.000

Table 8. Effect size (f^2)

Structural Path	f^2 Value	Effect Magnitude
DME > TTA	0.057	Small
PDR > TTA	0.004	Negligible
PRC > TTA	0.033	Small
PTR > TTA	0.231	Large
RCL > TTA	0.085	Small-Moderate
DME > VTCI	0.006	Negligible
PDR > VTCI	0.013	Small
PRC > VTCI	0.002	Negligible
PTR > VTCI	0.000	Negligible
RCL > VTCI	0.006	Negligible
TTA > VTCI	0.155	Moderate

Table 9. Predictive relevance (Q^2) values

Construct	SSO	SSE	Q^2
DME	1860	1860	0.000
PDR	1860	1860	0.000
PRC	1860	1860	0.000
PTR	1860	1860	0.000
RCL	1860	1860	0.000
TTA	1860	1417.22	0.238
VTCI	1860	1575.9	0.153

4.4 Discussion

This paper provides a novel contribution to the tax compliance literature by exploring how drone-assisted monitoring of taxes affects voluntary compliance via trust in tax authorities, largely following the Slippery

Slope Framework (Kirchler et al., 2008). The results corroborate that (technology-facilitated) enforcement is an insufficient condition for to obtain cooperative compliance, but it matters only when combined with governance features that strengthen legitimacy. Recent research underlines that digital surveillance



instruments alter the taxman's impact on both citizen perceptions of coercive power and institutional intentions, whereby trust constitutes a critical behavioral pathway (Gangl et al., 2019; Hofmann et al. 2023; OECD, 2023) Alm (2024). Consequently, this paper broadens the application of the Slippery Slope Framework to new surveillance tools and instruments and suggests that power based instruments need to be internally embedded in life practices so as to remain effective.

Procedural transparency and regulatory clarity also play a powerful role in trust formation, which is consistent with procedural justice and legitimacy theory (Tyler, 2006). Open communication of the ways in which drones are used, why they are used, and how data is governed communicates fairness and respect and encourages voluntary participation. Recent empirical evidence indicates that transparency reduces resistance against algorithmic and AI-based tools in public administration settings, especially in the area of taxation and compliance (Van den Boogaard & Gribnau, 2023; Langer et al., 2024; OECD, 2024). This study has contributed by demonstrating that, even within high-tech monitoring context, citizens are yet not evaluating the technology but the fairness of its institutional employment which suggests transparency is a pivotal dimension for digital tax governance.

The negative effects of privacy are highlighted by the importance of privacy calculus and IUIPC models (Smith et al., 1996; Malhotra et al., 2004). The public's perception of drone surveillance as an intrusion that lacks oversight will likely lead to a decline in both public confidence in the initiative and the motivation to adhere to tax regulations. Research shows that privacy concerns are a barrier for smart surveillance in public finance and smarter-city governance (see Martin et al., 2023; Acquisti et al., 2024; Cullen & Reitman, 2025). This corresponds to the findings of the aforementioned research. The present study offers a more nuanced perspective on privacy concerns by showing that they are less likely to be resisted and more likely to result from a loss of faith in the organisation. This finding suggests that privacy governance should be considered more than just an afterthought ethical addition; it should also be understood as a behavioural factor that influences compliance.

Compliance intention is directly impacted by perceived detection risk, though trust is not meaningfully boosted by this factor. The idea matches up with the ideas of deterrence and economic-of-crime theory (Becker, 1968; Allingham & Sandmo, 1972), and it also matches up with the criticism that securitisation tends to result in brittle compliance outcomes (Alm & Torgler,

2011; Mascagni et al., 2023). The tax literature is showing an increasing recognition that a self-enforcing arrangement does not necessarily have to be based on punitive deterrence (Gangl et al., 2024; Daubanes and Lefouili, 2018). The analysis shows that technology-based enforcement has two sides. It can make people follow the rules more easily, but it can also make people question whether the rules are fair. This can happen if the rules are not balanced by other parts of society.

The main theoretical contribution of this study is the identification of the mediating role of trust in tax authorities. This study puts together technology acceptance, procedural justice and tax compliance theory into one overarching behavioural model by showing that most governance effects are caused by trust. While existing research often analyses digital tax tools in isolation (e.g. e-filing and AI auditing), this study considers drone surveillance in the context of the broader trust-power balance (Hofmann et al., 2023; OECD, 2023). Here, we reveal a new fact: advanced surveillance technology can be compatible with voluntary compliance, provided that institutions are transparent, predictable and privacy-respecting.

The use of drones for tax monitoring should be subject to institutional design criteria over technical capabilities, as far as policy is concerned. In order to transform surveillance from a coercive signal into a trust-building measure, a modular oversight system must clearly spell out the rules, open its procedures to scrutiny and present credible guarantees of data protection. The developing and emerging economies stand to benefit from this observation, given that digital enforcement has grown more quickly than governance in these countries (IMF, 2024; OECD, 2024). To sum it up, our research gives us a good idea of how to manage digital taxes in a way that makes sense. It shows that trust is the most important thing for getting people to follow the rules in the long term.

5. Conclusion

This paper finds that drone-assisted tax monitoring affects voluntary tax compliance mainly through the trust of citizens in the public generation from whom they get access to enforcement power. In line with slippery slope mechanism, governance-related aspects, especially procedural transparency and regulatory clarity are revealed to be the key trust-enhancing factors that influence cooperative compliance. Though perceived detection risk directly raises compliance intention, the mechanism leverages relatively weak trust reinforcement, highlighting the attenuated role of

deterrence as a way of shaping attitudes toward rules. On the other hand, privacy concerns decrease trust and thereby indirectly compliance figures showing the human factor of data protection and ethical surveillance. The results suggest that in order for innovation in tax administration to be effective and legitimate, it should not only be accompanied by institutional safeguards. Drone monitoring could be a tool of compliance, if it is integrated into transparent procedures, clear legal frameworks and credible privacy governance. The primary contribution of this paper is that it applies tax compliance theory to new surveillance technologies, and finds trust as the focal mediating process between digital enforcement and voluntary compliance. These lessons provides practical information for policy makers who wish to modernize their tax enforcement whilst ensuring taxpayer morality and long-term compliance viability.

Theoretical implications

Add contribution to either tax compliance theory by applying the SSF and expand it toward drone-enabled surveillance technologies. It shows that sophisticated monitoring does not simply work via its enforcement capacity, but interacts powerfully with trust mechanisms in institutions. Synthesizing perspectives of procedural justice, technology acceptance, and privacy calculus theories, the results provide a richer account of compliance behavior in e-governance. The findings not only extend: they refine former models by demonstrating that trust is driving most governance-driven effects, repositioning trust as the main channel for technological innovation to affect tax compliance in a voluntary context.

Practical implications

For tax authorities, the results imply that the success or failure of drone surveillance is less about technical capability and more about how such technology is deployed and framed. Transparency on why, when, and how drones are being used and to what end is crucial for instilling confidence in the American taxpayer. There should therefore also be taxpayer education, the publication of monitoring rules, and strong data handling protocols alongside technological roll-out. Such strategies can help curb resistance and promote that technological enforcement is accelerated by voluntary compliance not counteracted.

Policy implications

On a policy level, the study points at the importance of regulatory models that pursue the optimization between enforcement efficiency and (a) legitimacy, (b) privacy protection. Clear legal definitions for the operation, data storage and access rights of drones should be established by policymakers to prevent such misuse as well as public distrust. The employment of privacy-by-design principles in tax monitoring strategies contributes to increasing both the acceptance by the public and the durability of compliance. The implications are that sound digital tax governance would entail the alignment of innovation policy with institutions seeking to promote trust.

Limitations

Several limitations should be acknowledged. First, the study is based on cross-sectional survey data, so that causality cannot be tried and [TAB:perceptions] are elicited at one single point in time. Second, compliance is assessed based on intention rather than the actual behavior which might be different in reality. Third, the analysis only addresses general taxpayer attitudes without the ability to distinguish among various tax categories and business sectors; thus there is a potential lack of specificity.

Future research directions

Future research could use longitudinal or experimental designs to study the development of trust and compliance as drone monitoring is institutionalized. It would be also enriching to see studies that compare various technological means of enforcement, or between different cross-country regulatory regimes. Connecting with objective compliance data and exploring moderating factors (e.g., digital literacy, cultural norms or sectoral risk profiles) could also advance the understanding of sustainable digital tax enforcement.

CRedit authorship contribution statement

Conceptualization, methodology, Investigation, Data curation, Formal analysis, Software, Visualization Roles: Writing – original draft Writing – review & editing
Jordev Gazza Ibrahim: Software. Daryono: Conceptualization, Methodology, Supervision, Validation, Theoretical framing, Writing – review & editing; Project administration.

Declaration of Competing Interest



The authors state that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Ethical approval

Ethical approval The study adhered to the standards established for social science research. Informed consent, including consenting to participate voluntarily in the study, anonymity and confidentiality were all strictly followed. Mill that the study was non-clinical, questionnaire-based research with adults and that among respondents an informally constituted feeling of risk could not have arisen.

Informed consent

All participants gave their informed consent to be included in the survey. The participants were explained about the study purpose, data utility and confidentiality and withdrawal at any time.

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Data availability

The datasets used and/or analyzed for the current study are available from the corresponding author on reasonable request. Data cannot be made available by the authors because of privacy and ethical between-taxpayer relationships or confidentiality.

Highlights

Discusses the use of drones to perform tax surveillance using a behavioural governance approach.

Shows that the fear of detection and punishment is not a necessary ingredient for compliance but that trust in tax administrations plays a central role as it bridges surveillance with compliance.

Demonstrates that transparency and regulatory clarity trump pure deterrence effects."

Highlights issues of privacy as a key source of risk for digital tax enforcement legitimacy.

Applying tax compliance theory to new surveillance technologies.

Appendix Table Data

Appendix A. Population and Sample Profile

Category	Description
Population	Indonesian taxpayers (Wajib Pajak)
Sampling method	Purposive online survey
Sample size	372 respondents
Inclusion criteria	NPWP holder; recent tax filing/payment; understanding of tax obligations
Regional coverage	Java, Sumatra, Kalimantan, Sulawesi, Bali-Nusa Tenggara, Maluku-Papua
Research period	Cross-sectional survey

Appendix B. Measurement Instrument

Variable	Code	Indicator
Drone Monitoring Effectiveness	DME1-DME5	Effectiveness, coverage, timeliness, deterrence, audit support
Perceived Detection Risk	PDR1-PDR5	Detection likelihood, certainty, enforcement visibility
Procedural Transparency	PTR1-PTR5	Openness, clarity, appealability, explanation
Regulatory Clarity	RCL1-RCL5	Legal basis, scope, data governance, accountability
Privacy Concern	PRC1-PRC5	Data collection, control, awareness, privacy trade-off
Trust in Tax Authorities	TTA1-TTA5	Benevolence, integrity, competence, fairness
Voluntary Tax Compliance Intention	VTCI1-VTCI5	Timely payment, honest reporting, moral motivation



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