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Examining causal linkages in the Balanced Scorecard framework: evidence from the Indonesian tax administration

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Abstract

The concept of causality is central to the Balanced Scorecard (BSC) framework. However, empirical evidence supporting these hypothesised relationships is scarce, particularly in the context of tax administration. Drawing on the Indonesian tax administration strategy map, this study conducts a path analysis using comprehensive key performance indicator data from 319 small tax offices across the country. Two key findings emerge. First, while a majority of the linkages are positive, outreach and enforcement activities are the most significant drivers of tax compliance, highlighting the importance of close monitoring in tax administration. Second, the relationship between tax compliance and revenue collection is complex and inconclusive, indicating a need for refining strategic alignment within the BSC framework. These results offer important insights for policy-makers aiming to improve the design and implementation of performance-based management. They underscore the importance of adopting context-specific approaches that align institutional capacity and behavioural dynamics to strengthen compliance and support sustainable revenue mobilisation.

Keywords: Balanced Scorecards (BSC), strategy map, tax compliance, revenue collection

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1. INTRODUCTION

Ongoing challenges in tax compliance and revenue collection continue to undermine the effectiveness of public financing systems, particularly in developing economies. These functions are indispensable for financing essential government services, such as healthcare, education, and infrastructure, which are fundamental to economic development and societal welfare (Ameyaw & Dzaka, 2016; Okeke et al., 2018). Improving tax compliance is a critical prerequisite to achieving revenue sufficiency and long-term fiscal sustainability.

In both emerging and developed contexts, tax administrations face persistent obstacles related to compliance and revenue mobilisation. In developing countries, these challenges are often intensified by weak administrative capacities, limited enforcement mechanisms, and systemic inefficiencies. Akitoby and co-authors (2018) documented that those reforms, such as improved taxpayer registration, risk-based audits, and enhanced reporting systems, have significantly contributed to successful revenue mobilisation efforts. However, in the absence of such institutional innovations, fiscal performance remains suboptimal (Akitoby et al., 2018). Meanwhile, advanced economies, although institutionally stronger, contend with the tax base erosion risks emerging from digitalisation and the complexities of cross-border transactions (Akitoby et al., 2020). These cross-cutting concerns underscore the need for continuous reforms and robust performance management frameworks across jurisdictions.

Performance management is instrumental in improving tax administration. It facilitates streamlined operations, elevates compliance levels, and ensures stable revenue flows to support government objectives (Dabla-Norris et al., 2017). An effective performance framework not only strengthens fiscal governance but also promotes transparency, taxpayer trust, and efficient allocation of public resources (Efuntade, 2020; Kipilimba, 2018). Recognising these benefits, many emerging economies have prioritised domestic revenue mobilisation through performance-oriented administrative reforms (von Haldenwang & von Schiller, 2016).

In Indonesia, challenges to tax compliance are formidable. These include a large informal economy, entrenched corruption, and a consistently low tax-to-Gross Domestic Product (GDP) ratio (Olken & Singhal, 2011; Matsumoto, 2018; Bardey & Mejía, 2019; Tran-Nam, 2023; Hoy et al., 2024). Between 2009 and 2019, Indonesia's revenue performance was markedly below regional benchmarks, with collections as a percentage of GDP being less than two-thirds of the average for Emerging East Asia and less than half of the Emerging Market economy average (Hoy et al., 2024). In 2021, Indonesia's tax-to-GDP ratio stood at 9.1% – among the lowest globally – significantly trailing countries such as Cambodia (18.0%), the Philippines (15.2%), and Vietnam (14.7%). The Covid-19 pandemic further exacerbated this situation, temporarily reducing the ratio to 8.3% in 2020 (Qian & Poniatowski, 2025).

Despite adopting tax policy structures similar to those of regional peers, such as Malaysia and the Philippines, Indonesia persistently underperforms in revenue generation (Asian Development Bank, 2022). The primary culprit is poor compliance, as evidenced by the finding that approximately one-quarter of registered firms in Indonesia admit tax evasion – accounting for an estimated 2% of GDP in forgone revenue (Hoy et al., 2024).

To manage its performance, the Directorate General of Taxation (DGT) introduced the Balanced Scorecard (BSC) in 2010 as a strategic management tool to align internal operations with broader compliance and revenue objectives (Erawan et al., 2022). Structured around four perspectives – stakeholder, customer, internal process, and learning and growth – the BSC has enabled the DGT to integrate financial and non-financial indicators into its performance assessment process to enhance tax administration efficiency and tax compliance (output), which ultimately leads to tax revenue collection (outcome). Prior research suggests that public organisations adopting the BSC experience improvements in accountability, efficiency, and alignment between strategy and execution (Greatbanks & Tapp, 2007; Greiling, 2010; Hoque & Adams, 2011; Philbin, 2011; Fajriah & Meiyanti, 2022).

Studies show that BSC-based reforms can reinforce tax authorities' strategic focus, optimise resource allocation, and enhance compliance through improved service delivery and operational transparency (Akitoby et al., 2018; Bayale et al., 2022). By combining financial outcomes with behavioural, operational, and developmental dimensions, the BSC provides a comprehensive framework for performance evaluation (Chan, 2004; Naro & Travaillé, 2011). These multidimensional indicators not only capture compliance levels but also allow tax administrators to adjust policies based on stakeholder feedback and systemic inefficiencies, thereby reinforcing adaptive governance.

Nevertheless, effective implementation of BSC in public sector institutions remains complex and often fraught with difficulties. Rigorous planning, consistent communication and high levels of organisational commitment are required (Chang, 2007; Budayan et al., 2020). Empirical studies have revealed high failure rates and frequent inconsistencies in application, which are attributed to both theoretical ambiguities and contextual constraints (Awadallah & Allam, 2015). Although its strategic potential is well recognised, few empirical investigations have tested the BSC's practical effectiveness in improving compliance or revenue outcomes within tax administrations, particularly in developing countries (Chang et al., 2020).

The concept of causality is central to the BSC framework (Kober & Northcott, 2021). As originally proposed by Kaplan and Norton (1996), each performance indicator is assumed to be part of a causal chain linking activities, capabilities, and outcomes. Strategy maps were later developed to visually illustrate these hypothesised causal linkages (Kaplan & Norton, 2004). This notion has since been scrutinised in academic research, with some scholars questioning whether causality within BSC frameworks can be empirically verified or is primarily aspirational (Nørreklit, 2000; Nørreklit & Mitchell, 2007; Chenhall, 2009; Hoque, 2014). However, other studies have affirmed that aligning financial and non-financial performance measures enhances the effectiveness of strategic planning (Perera & Kariyawasam, 2024). When implemented with a clear causal logic, BSC can contribute to performance optimisation, organisational learning, and strategic agility.

In the Indonesian context, empirical evidence of the effectiveness of the BSC in tax administration is limited. To the best of the author's knowledge, no existing studies have empirically examined the causal linkages between the four BSC perspectives – learning and growth, internal processes, customer outcomes, and financial performance – within the operational framework of tax administration, leaving a significant gap in both academic literature and policy-oriented research. Despite more than a decade of DGT's commitment to BSC implementation, very little is known about whether its performance

indicators demonstrate causal coherence or are linked in a way that improves compliance and revenue outcomes.

This is a significant omission given that tax compliance and revenue collection are influenced not only by enforcement strategies but also by behavioural, institutional, and sociocultural factors (Luttmer & Singhal, 2014; Larsen & Brøgger, 2021). This is because tax compliance and revenue collection are influenced by internal and external factors (Organisation for Economic Co-operation and Development (OECD), 2004). Internal factors that affect the risks associated with tax system administration include an organisation's culture, structure, technological infrastructure, operational processes and the competencies of both personnel and the institution (OECD, 2014). For instance, certain tax reforms have improved individual taxpayer compliance while simultaneously straining organisational resources and reducing overall collection efficiency (Eka, 2019). Similarly, Indonesia's 2016 tax amnesty program produced mixed results, revealing simultaneous improvements in compliance and persistent systemic weaknesses (Inasius et al., 2020). These complexities highlight the challenges faced by tax administrations in crafting coherent reform strategies that yield durable outcomes (von Haldenwang & von Schiller, 2016).

Further, Indonesian tax offices face significant performance management challenges in both operational and strategic dimensions. Studies have identified difficulties in consistently achieving key performance indicators (*Indikator Kinerja Utama – IKU*) within the Balanced Scorecard approach, undermining organisational performance (Yusrifalda et al., 2024). Efficiency analyses using stochastic frontier methods have revealed interprovincial disparities and technical inefficiencies, indicating uneven resource utilisation and process optimisation across tax offices (Laksono & Widyawati, 2018).

Indonesia's geographic and socioeconomic landscape is notably heterogeneous, necessitating a clear distinction between the Java and non-Java categories. As the nation's economic and infrastructural hub, Java benefits from concentrated development efforts, government support, and enhanced market dynamics, contributing to higher welfare indices and distinct consumer preferences (Mardalena et al., 2023; Briawan et al., 2024). Non-Java regions often lag in these dimensions, experiencing slower economic progress and varied environmental quality linked to different demographic and social characteristics (Arman et al., 2017; Pujiati et al., 2023). Failing to separately analyse Java and non-Java areas may mask underlying disparities and lead to misinterpreted policy implications for the latter. The unique dynamics in each category highlight the need for tailored research methodologies that account for region-specific variations, facilitating effective and context-sensitive interventions (Jamil et al., 2022).

Understanding the operating context is vital for tax administration, enhancing strategies by ensuring that performance measures reflect internal dynamics and external influences (OECD, 2014). This ensures that indicators are part of a broader framework reflecting real-life challenges and opportunities. Contextual awareness mitigates the risk of overfocusing on limited output indicators. Without understanding the environment, outcome measures can mislead stakeholders; targets may seem arbitrary because of external variables (OECD, 2014).

Therefore, this study contributes to the literature by examining the causal linkages embedded within the DGT BSC strategy map, not only at the national level but also at

two main regional levels: Java and non-Java. Understanding these internal causal relationships is essential for enhancing compliance, which is a key determinant of fiscal resilience and administrative legitimacy (Batrancea et al., 2019; Lee, 2020). This is because the revenue-raising capacity of tax authorities can be evaluated effectively by examining both the process and output dimensions (von Soest, 2007).

From a tax administration perspective, these findings have significant implications. From a practical perspective, the absence of verified cause-and-effect linkages within a BSC framework leads to poor managerial choices, misdirected employee actions, counterproductive organisational behaviour, and ultimately underperformance (Nørreklit, 2000, 2003; Kaplan & Norton, 2008; Huelsbeck et al., 2011).

Therefore, through an empirical analysis of these internal relationship dynamics, this study seeks to provide policy-makers with actionable insights to enhance tax compliance strategies, thereby advancing Indonesia's broader revenue mobilisation objectives. By empirically testing the presence and significance of causal relationships among BSC elements, this study provides robust insights for policy-makers seeking to improve compliance strategies and optimise Indonesia's domestic revenue mobilisation framework.

The remainder of this article is organised as follows: Section 2 describes the empirical context, detailing the structure and function of the DGT's BSC; section 3 outlines the methodological approach employed to identify causal linkages; section 4 presents and discusses the empirical findings; and section 5 concludes with policy recommendations and implications for future research.

2. EMPIRICAL SETTING

2.1 Performance management

Effective performance management is a foundational pillar in the modernisation of tax administrations, especially in the pursuit of improved tax compliance, operational efficiency and sustainable revenue generation (Mansor, 2018). When strategically applied, performance management supports the development of tax systems that not only enhance collection outcomes but also streamline operations and align with broader developmental objectives (Dabla-Norris et al., 2017). In this context, performance management extends beyond mere revenue metrics to encompass the optimisation of processes, strategic resource allocation, and the deployment of tailored interventions aimed at mitigating non-compliance.

By adopting data-driven practices, tax authorities can systematically identify operational inefficiencies, establish performance benchmarks and implement measurable objectives that support evidence-based decision-making (von Soest, 2007). Despite its theoretical appeal and widespread advocacy, the empirical literature assessing the direct impact of performance management frameworks on tax compliance and revenue outcomes in developing economies is sparse (Chang et al., 2020). This lacuna signals the need for further empirical investigation into the causal mechanisms through which performance management translates into tangible improvements in tax administration. In this sense, strategic frameworks, such as benchmarking, offer structured methodologies for evaluating and enhancing tax operational efficiency (Dibie & Dibie, 2020). Aligning tax collection processes with strategic objectives enables tax administrations to effectively address fiscal demands, respond to changes in taxpayer

behaviour and promote a culture of compliance that optimises revenue collection (Mansor & Tayib, 2012).

Furthermore, the implementation of performance management practices must be aligned with evolving domestic and international fiscal dynamics. Bird and Zolt (2008) emphasised the necessity of structured planning and process re-engineering to ensure that tax systems are responsive to macroeconomic volatility. This responsiveness is critical in an era of intensifying tax competition, where adaptive strategies are essential to safeguard fiscal sovereignty and economic stability (Vrijburg & de Mooij, 2016). By illuminating the linkages between inputs, processes, and outcomes, evidence-based strategies advance the twin goals of efficiency and equity in tax administration (Wenzel & Taylor, 2003).

Thus, performance measurement frameworks are indispensable tools for diagnosing underperformance, directing corrective actions, and promoting accountability. They support alignment across the strategic, operational, and individual levels of tax organisations (Mansor & Tayib, 2012). Crandall (2010) noted that regular and integrated performance evaluation fosters a cohesive system in which objectives at all tiers reinforce each other, ultimately enabling responsive and effective governance. Integrating these practices allows tax administrations to better navigate complex fiscal environments, improve service delivery, and ensure a more equitable distribution of the tax burden across economic actors (Mansor, 2018).

2.2 Balanced Scorecard (BSC)

The Balanced Scorecard (BSC), which was first introduced by Kaplan and Norton (1992), emerged as a response to the limitations of traditional performance measurement systems that focused narrowly on short-term financial results. Designed to offer a holistic view of organisational performance, the BSC integrates financial and non-financial metrics within a structured framework, thereby providing a comprehensive tool for strategic alignment and operational execution (Kaplan, 2010). Its evolution into a strategic management system was marked by the introduction of the strategy map, which articulates how value creation unfolds through a chain of interconnected cause-and-effect relationships across four perspectives: Financial, Customer, Internal Process, and Learning and Growth (Kaplan & Norton, 2004, 2006, 2008).

This causal architecture distinguishes BSC from other performance frameworks. The four perspectives are not merely coexisting dimensions but are designed to operate sequentially, where improvements in organisational learning and growth – particularly in human capital – enhance internal processes, which then lead to improved customer satisfaction and ultimately financial outcomes (Kaplan & Norton, 1996; Zahoor & Sahaf, 2018; Cohen et al., 2008). The BSC translates an organisation's mission and strategy into measurable objectives, enabling a structured approach to performance management that is both comprehensive and actionable (Brui, 2018).

The BSC's influence extends well beyond the private sector. Its adaptability has facilitated its use in non-profit organisations and public institutions, including tax administrations, where financial returns are not the sole measure of success (Kober & Northcott, 2021; Malina, 2013). In public sector settings, strategic alignment between policy goals and service delivery can be effectively monitored through the BSC, which allows organisations to evaluate both output and outcome measures across multiple

dimensions (Greatbanks & Tapp, 2007; Greiling, 2010; Hoque & Adams, 2011; Philbin, 2011; Fajriah & Meiyanti, 2022). By bridging the divide between abstract strategy and operational detail, the BSC supports improvements in organisational efficiency, effectiveness and accountability (Anand et al., 2005; Atkinson, 2006; Ayoup, 2018a; Amer et al., 2022).

Central to the BSC's utility is its embedded causal logic, which enables strategic coherence (Kober & Northcott, 2021). Each performance indicator is selected to reflect distinct objectives and reinforce a broader strategic pathway (Kaplan & Norton, 1996). Strategy maps were introduced to visualise this logic, offering a clear articulation of how improvements in one domain contribute to gains in another (Kaplan & Norton, 2004). This causal reasoning has been the subject of considerable academic scrutiny, with some scholars questioning its empirical verifiability, while others highlight its analytical and practical benefits (Nørreklit, 2000; Nørreklit & Mitchell, 2007; Chenhall, 2009; Hoque, 2014). Recent studies provide empirical support for the claim that strategic alignment among BSC dimensions can improve performance outcomes, especially when non-financial indicators serve as precursors to financial success (Perera & Kariyawasam, 2024).

However, the operationalisation of the BSC remains challenging. Effective implementation requires careful planning, consistent communication, and institutional commitment (Chang, 2007; Budayan et al., 2020). Organisational alignment across strategic, tactical, and operational levels is difficult to sustain, often leading to fragmented execution and diminished impact (Breton et al., 2017). High failure rates and significant variations in BSC interpretation further complicate its application, indicating persistent tensions between its theoretical coherence and practical utility (Awadallah & Allam, 2015). Additionally, while the BSC is widely adopted as a reporting instrument, its potential as a dynamic management tool to drive real-time decision-making and adaptive reform is frequently underutilised (Northcott & Ma'amora Taulapapa, 2012).

The BSC adaptations for the public and non-profit sectors have involved reconfiguring the objectives to better reflect stakeholder-centred goals. Marr (2009) proposed replacing the customer perspective with a broader stakeholder focus and shifting emphasis from profit maximisation to effective service delivery and resource stewardship. Nonetheless, internal processes and learning perspectives retain their central importance because they directly influence the capacity of public institutions to deliver on strategic mandates (Marr, 2009).

In the context of tax administration, the BSC has proven to be a valuable tool for capturing performance across multiple dimensions, including financial outcomes, stakeholder engagement, operational processes, and institutional learning (Ayoup, 2018b; Gębczyńska & Brajer-Marczak, 2020). This multi-perspective approach enables tax authorities to evaluate their performance not only in terms of revenue collection but also in building taxpayer trust, enhancing compliance behaviour and fostering organisational adaptability (Nyukorong, 2022). Furthermore, the BSC supports iterative learning by identifying performance gaps, facilitating targeted resource allocation and guiding reform initiatives (Biro et al., 2003; Radnor & Lovell, 2003).

Collectively, the literature has demonstrated that the BSC's theoretical strength lies in its causal logic and practical relevance in aligning strategic intentions with measurable outcomes. However, its effective application requires careful adaptation to the

institutional and sectoral contexts in which it is deployed. For tax administrations operating under complex fiscal and administrative constraints, the BSC offers a measurement framework and strategic instrument to achieve long-term compliance and revenue objectives.

2.3 Indonesia's tax administration strategy map

Empirical research in the Indonesian context underscores the importance of tax administration reforms in enhancing revenue generation and improving the broader investment climate (Brondolo et al., 2008; Eka, 2019). These findings suggest that refining existing strategies can yield gains in administrative efficiency, transparency, and taxpayer compliance. The persistent nature of Indonesia's fiscal challenges requires a robust and adaptive performance management system that can translate its strategic objectives into actionable outcomes.

Empirical research highlights the central role that internal tax administration processes play in shaping taxpayer compliance. Gangl, Hofmann and Kirchler (2015) demonstrated that a strong service climate, with professional procedures and effective communication, enhances the perceived legitimacy of tax authorities and fosters voluntary cooperation. However, these services are currently inadequate. Gangl and co-authors (2014) showed that although supervision does not necessarily improve payment timeliness, it remains vital to promote taxpayer awareness and trust. The absence of a supportive service environment may render strict controls counterproductive (Gangl et al., 2014; Gangl et al., 2015). On the enforcement side, the effectiveness of audits and legal interventions is assessed on the basis of their scope, intensity, and outcomes. Slemrod (2019) underscored the importance of randomised controlled trials in revealing how enforcement instruments shape taxpayer behaviour, while Eberhartinger and co-authors (2021) offered a metric of enforcement capacity – average personnel per 100 firms – linking administrative resources to enforcement. These indicators inform strategic resource allocation and serve as tools to curb tax evasion. The literature calls for a balanced tax administration strategy in which service quality (Gangl et al., 2015) cultivates trust and voluntary compliance, whereas supervision and enforcement (Gangl et al., 2014; Slemrod, 2019; Eberhartinger et al., 2021) provide safeguards to uphold system integrity.

The BSC has become a central instrument in this effort. It provides a structured and multidimensional framework that facilitates the alignment of strategic goals and operational performance while promoting transparency and accountability within public institutions (Ayoup, 2018b; Lucianetti et al., 2019). In response to these imperatives, the Indonesian government institutionalised the BSC as part of its broader strategy to reform public sector governance. Its implementation, in tandem with strategy maps, supports the articulation of cause-and-effect relationships among performance indicators and enhances the clarity and coherence of strategic planning processes (Erawan et al., 2022).

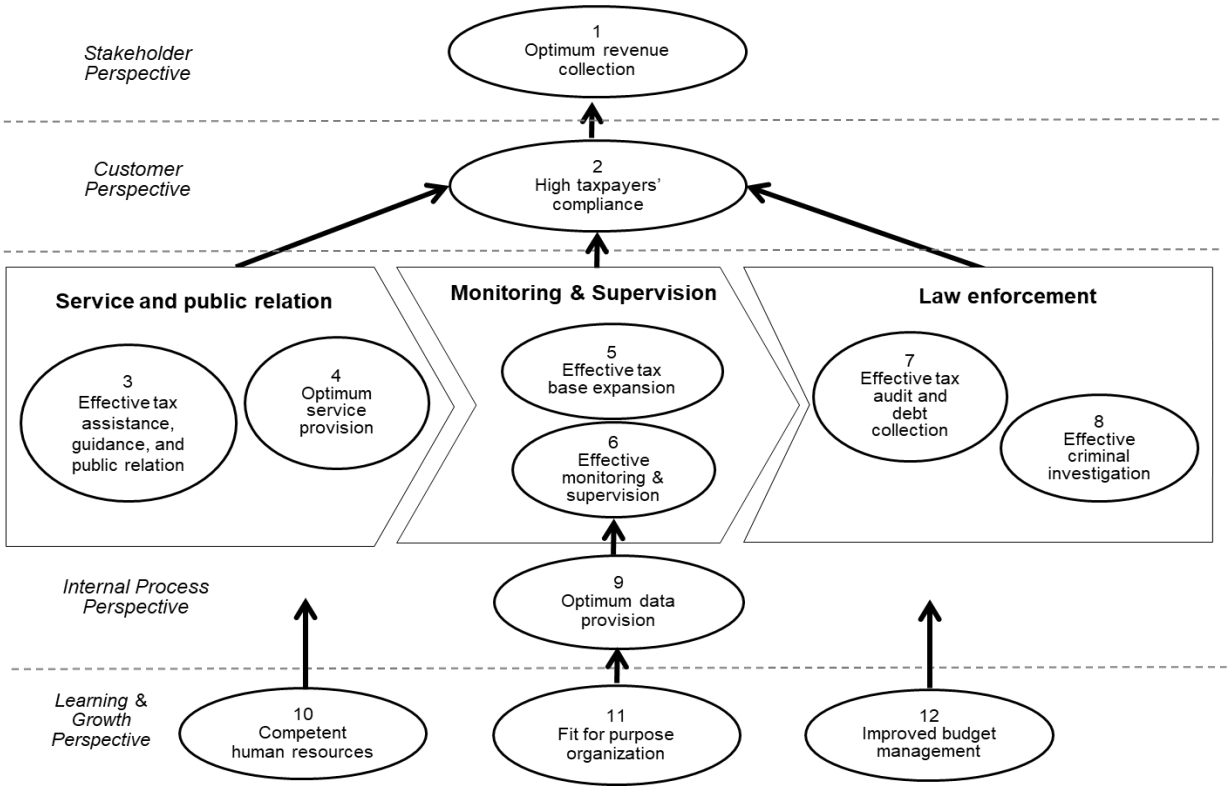
Specifically, the DGT adopted the BSC in accordance with Ministry of Finance Regulation No. 467/KMK.01/2014, which designated the BSC as the official performance management tool for all entities under the Ministry of Finance.[1] Notably,

[1] The Ministry of Finance Regulation No. 467/KMK.01/2014 can be accessed at https://e-ppid.kemenkeu.go.id/api/Medias/92612e70-de97-424e-965c-d6467862cd04 (accessed 19 November

the DGT's adaptation replaces the traditional financial perspective with a stakeholder perspective, reflecting the unique priorities of public-sector institutions. This modification aligns performance assessments with broader societal outcomes and public value creation.

Based on the Ministry of Finance Regulation No. 467/KMK.01/2014, the DGT's BSC framework encompasses four perspectives – stakeholders, customers, internal processes, and learning and growth – each designed to support strategic alignment and continuous organisational development. By integrating these dimensions, the DGT fosters an organisational culture oriented towards adaptability, responsiveness, and long-term performance improvement. Emphasising both internal processes (efficiency and capacity) and outputs (revenue collection) enables a comprehensive evaluation of tax administration performance (von Soest, 2007). This strategic model enhances the DGT's capacity to navigate the multifaceted challenges of tax administration by balancing revenue generation, taxpayer trust, and administrative effectiveness (DGT, 2023; Rivkin, 2004).

Fig. 1: Indonesia's Tax Administration Strategy Map



Source: DGT (2019, p. 9).

2024). This regulation has been updated by Ministry of Finance Regulation No. 300/KMK.01/2022 concerning Performance Management within the Ministry of Finance; however, the adoption of the Balanced Scorecard (BSC) framework remains in place.

Note: The graph is based on the DGT's official strategy map, adopting the Balanced Scorecard (BSC) framework as mandated by Ministry of Finance Regulation No. 467/KMK.01/2014. The causal linkages in the strategy map are central to this study, providing a structured basis for analysing performance relationships across perspectives; visually presenting them aids in understanding these interconnections. These linkages are hypothesised to be positive, expecting that improvements in one perspective enhance the subsequent perspective. The DGT modifies the financial perspective into a stakeholder perspective directly linked to financial data, particularly revenue collection, reflecting improved internal processes, learning, and growth.

Figure 1 presents the BSC framework as implemented within Indonesia's tax administration, delineating three strategic pillars designed to enhance taxpayer compliance: (1) service and public relations, (2) monitoring and supervision, and (3) law enforcement. The 'service and public relations' strategy prioritises taxpayer engagement through two principal objectives: providing tax assistance, guidance and outreach and optimising service quality and accessibility.

The monitoring and supervision pillar aims to expand the tax base by strengthening oversight mechanisms and enhancing the identification of non-compliant taxpayers. The 'law enforcement' component supports compliance through a combination of tax audits, debt recovery measures, and criminal investigations targeting serious violations of tax laws. Notably, three elements in the learning and growth perspective – employee competence development, budget management, and organisational adaptability – exhibit positive causal links with these three internal business process pillars, reinforcing their effectiveness and sustainability. Collectively, these causal links form an integrated strategic architecture that enables the DGT to address multiple dimensions of compliance and ensure more effective revenue mobilisation.

3. METHODOLOGY

3.1 Data

Empirically examining causal linkages within the Balanced Scorecard (BSC) framework presents methodological challenges, particularly due to limited access to comprehensive and standardised data across organisational units. To address this issue, the study adopts a census approach, utilising hand-collected administrative data sourced directly from all small tax offices (i.e., *Kantor Pelayanan Pajak Pratama* – KPP) across Indonesia. The resulting dataset comprises performance metrics from 319 tax offices, providing a nationally representative overview of operational efficiency and effectiveness within the DGT. To preserve homogeneity and ensure analytical comparability, 33 tax offices classified as large or medium were deliberately excluded because of their unique mandates, resource structures, and strategic orientations, which do not reflect standard regular tax office operations.

The dataset includes KPIs central to the BSC framework adopted by the DGT, such as tax revenue collection rates, tax return processing times, audit effectiveness, taxpayer service quality, and compliance levels. This study uses all 19 KPI data points from 319 tax offices, all measured on a ratio scale. Each KPI is aligned with one of the BSC perspectives, as conceptualised in the DGT official strategy map. These indicators allow

for a multidimensional assessment of tax office performance, thereby enabling the identification of best practices, regional disparities, and strategic misalignments within Indonesia's tax administration landscape.

Table 1 details the geographic distribution of the examined offices across the five principal regions: Java, Sumatra, Sulawesi, and Kalimantan, and a combined region comprising Bali, Nusa Tenggara, Papua, and Maluku. Java dominates with 202 tax offices, a distribution that includes all large (4) and special (9) offices, underscoring its demographic and economic centrality to national revenue collection. Sumatra has 71 offices, comprising four medium and 67 small offices, reflecting its moderate economic scale and administrative demand. Each of the remaining three regions – Sulawesi, Kalimantan, and the combined eastern region – hosts one medium office and approximately 26 to 27 small offices, indicative of their lower population densities and emerging economic roles.

Table 1: Tax Offices Under Investigation

No.	Regions	Tax office types				Total
		Large	Special	Medium	Small	
1	Java	4	9	13	176	202
2	Sumatra	-	-	4	67	71
3	Sulawesi	-	-	1	25	26
4	Kalimantan	-	-	1	26	27
5	Bali, Nusra, Papua, and Maluku	-	-	1	25	26
	Total	4	9	20	319	352

Source: author's elaboration.

The comprehensive KPI data presented in Table 2 facilitate a detailed analysis aimed at examining causal linkages among KPIs from four perspectives of the strategy map. Owing to constraints in data availability, this study focuses exclusively on data for financial year 2019. The following two factors justify the focus of this study. First, the conceptualisation of the strategy map implemented by the DGT remains fundamentally consistent. Second, the 2019 data reflect the standard operating conditions before the disruptions caused by the Covid-19 pandemic, providing a baseline for assessing typical business processes.

For policy-makers and tax administrators, these metrics serve as critical instruments to establish benchmarks, monitor progress over time, and inform strategic decisions to enhance tax compliance and revenue collection. KPI analysis not only facilitates the identification of causal linkages within the strategy map, but also identifies specific drivers of effective tax administration, ultimately contributing to a more resilient and adaptable tax system in Indonesia.

Table 2: Description of KPI Data Used in the Analysis

No.	Strategic Objectives	Code	Key Performance Indicators (KPI)	KPI Formula
	Stakeholder perspectives			
1.	Maximise state tax revenue	*S1a*	Percentage of tax revenue realisation	(Tax revenue received from routine sources/Target of tax revenue from routine sources) × 100%
		S1b	Percentage of effort tax revenues	(Tax revenue received from extra effort/Target of tax revenue from extra effort) × 100%[2]
		S1c	Growth in gross tax revenues	((Current year tax revenue–Previous year tax revenue) / Previous year tax revenue) × 100%
	Customer perspectives			
2.	Enhance taxpayer compliance	*C2a*	Formal compliance rate for Corporate Taxpayers and Individual Business Owners	(Total number of annual income tax returns submitted by corporate and individual resident taxpayers/Total number of registered corporate and individual resident taxpayers required to file annual returns) × 100%
		C2b	Payment compliance rate for Corporate Taxpayers and Individual Business Owners	[(60% × Number of corporate and non-employee individual resident taxpayers who made payments / Total registered corporate and individual resident taxpayers required to file annual returns) + (40% × Number of corporate and individual resident taxpayers who made payments above a specified threshold / Total registered corporate and individual resident taxpayers required to file annual returns)]
	Internal process perspectives			
3.	Optimising dissemination and service effectiveness	*IP3a*	Effectiveness rate of dissemination activities	((Counselling activity ratio × 100%) × 50%) + (Behavioural change ratio × 50%)
4.	Optimising tax services	*IP4a*	E-filing participation rate	(Number of e-Filing submissions/Number of targeted e-Filing taxpayers) × 100%
5.	Maximising tax base expansion	*IP5a*	Payment compliance rate of new taxpayers acquired through extensification efforts	(Number of new taxpayers who made payments/Target of new taxpayers who made payments) × 100%

[2] Effort is measured by the amount of revenue collected from previous fiscal years based on supervision or enforcement activities.

6.	Enhance taxpayer supervision	*IP6a*	The completion rate of data and/or information clarification requests	(Percentage of Supervision Reports (LHP2DK) for Annual Tax Returns × 50%) + (Percentage of LHP2DK for Periodic Tax Returns × 50%)
7.	Improve audit and enforcement measures	*IP7a*	Audit completion rate	(Number of realised special audit proposals/Target number of special audit proposals) × 100%
		IP7b	Rate of uncontested tax assessments	(Number of Tax Assessment Letters (SKP) not appealed/Number of SKP issued) × 100%
		IP7c	Active engagement rate in preventive billing	(number of preventive billings completed on time/Number of targeted preventive billings) × 100%
8.	Strengthen investigative processes	*IP8a*	Rate of IDLP (information, data, and whistleblowing report) submissions	(Number of IDLP submissions to Regional Offices/Target of IDLP submissions to Regional Offices) × 100%
9.	Ensure accurate tax data	*IP9a*	Timeliness of tax return documentation handling	(Number of tax returns packaged on time/Number of tax returns required to be packaged) × 100%
		IP9b	Provision rate of potential tax data	(Number of tax-related data made available/Number of tax-related data planned to be made available) × 100%
	Learning and growth perspectives			
10.	Develop competent human resources	*LG10a*	Compliance with training hours standards	(Percentage of employees meeting face-to-face training hours standard × 70%) + (Percentage of employees meeting e-learning hours standard × 30%)
11.	Establish an effective organisation	*LG11a*	Effectiveness of Organisational Performance Dialogue and Monitoring of Action Plans	(Realised points of organisational performance dialogue (DKO) assessment elements and Action Plan Monitoring/Maximum possible points of DKO assessment elements and Action Plan Monitoring) × 100%
12.	Quality budget management	*LG12a*	Quality rate of the execution of the budget	[90% × (9% × Budget absorption against net allocation + 32% × Achievement of actual outputs + 42% × Efficiency + 17% × Consistency)] + [10% × (Budget Implementation Performance Score from Directorate General of Treasury)]

Source: summarised from DGT (2019).

3.2 Empirical approach

Path analysis offers a robust empirical approach for examining complex interrelationships among variables, allowing for the simultaneous assessment of direct and indirect effects within a hypothesised model (Stage et al., 2004). Unlike traditional regression techniques, path analysis facilitates the exploration of structured causal pathways across multiple variables, albeit without definitively establishing causation (Edwards & Lambert, 2007). This method has gained wide application across various disciplines, including quality management, regional development, and behavioural sciences, where it has proven effective in uncovering the intricate dynamics underlying performance outcomes (Anderson et al., 1995; Fynes & Voss, 2001; Surall & Steppacher, 2018).

Path analysis, a form of multiple regression, explores causality within a structured framework (Stage et al., 2004).[3] It tests causal models by running sequential regressions, where a variable can be either an outcome or a predictor. These regressions identify direct and indirect effects, leading to an ultimate dependent variable, if specified. The approach analyses how variables contribute to outcomes within a hypothesised causal structure (Stage et al., 2004). In path analysis, exogenous variables are independent factors, whereas endogenous variables depend on exogenous variables and mediators (Awogbemi et al., 2022). The exogenous variables start the causal chain. Their effects on endogenous variables are examined directly and indirectly through mediators, with total effects decomposed into direct and indirect contributions (Stage et al., 2004; Awogbemi et al., 2022). This decomposition identifies the influence of exogenous factors on outcomes, facilitated by path diagrams and Structural Equation Modelling (SEM) (Stage et al., 2004).

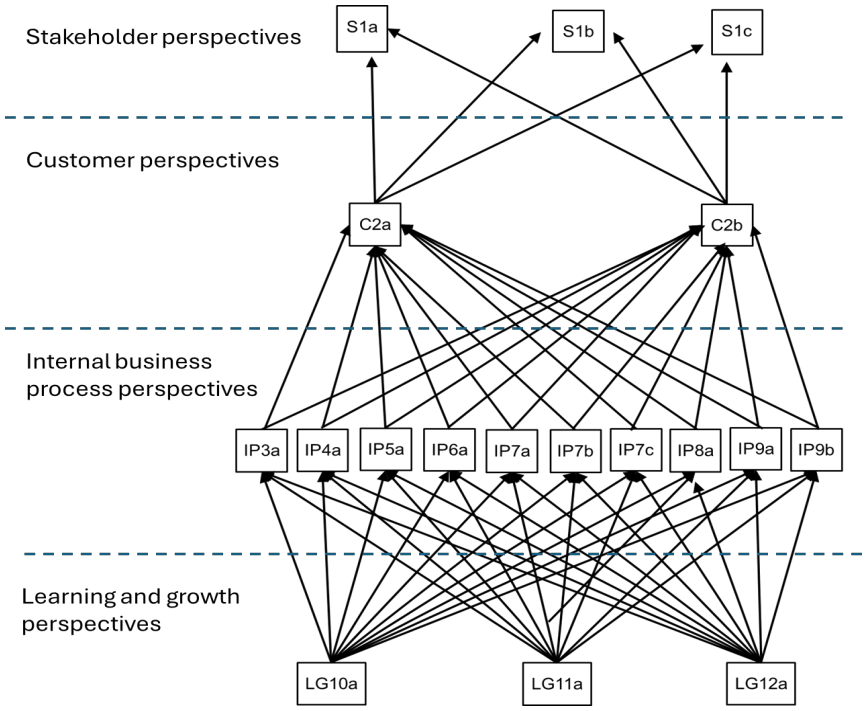
Utilising IBM SPSS Amos v.26, this study applies path analysis to evaluate the causal linkages embedded within the BSC strategy map implemented by Indonesia's DGT. Specifically, it investigates how strategic objectives within the strategy map – framed through the BSC lens – affect tax compliance and revenue collection across tax offices, both at national and regional levels. This statistical method provides an empirical basis for evidence-informed policy-making.

In taxation research, path analysis has been increasingly employed to test and refine theoretical models by elucidating the mechanisms linking tax-related behaviours with their antecedents. This analytical technique provides nuanced insights into the behavioural and institutional factors shaping compliance and revenue performance (Bauer et al., 2020; Rosid & Romadhaniah, 2023; Kanagaretnam et al., 2024). For example, Bauer and co-authors (2020) applied path analysis to explore the relationship between tax aggressiveness and financial opacity, whereas Kanagaretnam and co-authors (2024) examined how institutional quality moderates corporate tax evasion.

[3] Path analysis can be expressed algebraically using an econometric model or visually via a path diagram. The econometric model specifies structural relationships among variables using equations, thereby enabling statistical estimation and hypothesis testing (Kline, 2016). The visual path model depicts causal flows and mediating mechanisms within complex systems (Bollen, 1989). It helps researchers achieve conceptual clarity and is valuable for model development and communication. Bollen (1989) noted that path diagrams bridge theoretical constructs and empirical testing, enhancing model transparency and interpretability. For this reason, this study adopted the latter approach.

Figure 2 presents the hypothesised BSC path model, integrating the four strategic perspectives: learning and growth, internal business processes, customer, and stakeholder. In accordance with Kaplan and Norton's (1996) conceptual framework, the model posits that those improvements in learning and growth – reflected in competent human resources, sound organisational structures and efficient budget management – lead to enhanced internal processes, such as quality service delivery, expanded tax bases and effective supervision. These operational gains are expected to positively influence taxpayer compliance, which ultimately contributes to improved financial outcomes, namely revenue collection. The arrows in the model represent the assumed unidirectional causal flow, reinforcing the logic of cascading strategic influence.

Figure 2: Path Model Under Investigation



Note: *S1a* = Percentage of tax revenue realisation; *S1b* = Percentage of effort tax revenue realisation; *S1c* = Percentage growth in gross tax revenues; *C2a* = Formal compliance rate for Corporate Taxpayers and Individual Business Owners; *C2b* = Payment compliance rate for Corporate Taxpayers and Individual Business Owners; *IP3a* = Effectiveness rate of extension activities (%); *IP4a* = E-filing participation rate (%); *IP5a* = Payment compliance rate of new taxpayers acquired through extensification efforts; *IP6a* = Completion rate of requests for data and/or information clarification (%); *IP7a* = Audit completion rate (%); *IP7b* = Rate of uncontested tax assessments (%); *IP7c* = Active engagement rate in preventive billing (%); *IP8a* = Rate of IDLP (Investigation, Detection, and Prosecution) submissions (%); *IP9a* = Timeliness of tax return documentation handling; *IP9b* = Provision rate of potential tax data; *LG10a* = competent human resources; *LG11a* = Fit for purpose organisation; *LG12a* = Improved budget management.

4. RESULTS AND DISCUSSIONS

4.1 Results

4.1.1 Descriptive statistics

Table 3 (Appendix) presents evidence of significant regional disparities in tax performance metrics between Java and non-Java regions. For example, indicator *S1a* demonstrated a more concentrated distribution in Java, characterised by a narrower range and lower standard deviation relative to the national average. This pattern reflects a relatively homogeneous operational environment that is likely supported by consistent economic activity and administrative infrastructure. Conversely, the standard deviation for *S1a* in non-Java regions reaches 13.90, indicating greater variability and operational heterogeneity in tax performance in these areas.

This disparity extends to other indicators, such as *S1b*, *S1c*, *C2a*, and *IP3a*, which reveal wider data dispersion in non-Java regions. Such variability reflects the complex regional dynamics that influence taxpayer behaviour, administrative effectiveness and compliance rates across Indonesia's archipelagic geography. Notably, extreme values observed in certain variables – such as *IP7c*, which records a maximum of 10,980 in non-Java regions compared to only 780 in Java – suggest the presence of outliers or region-specific economic phenomena. The variables *IP5a* and *IP6a* also display considerable differences in both mean values and standard deviations, further highlighting the distinct administrative challenges in areas outside Java.

In contrast, Java exhibits greater consistency across several indicators, including *LG12a*, suggesting a more standardised application of tax administration practices. This uniformity may be attributed to more centralised oversight, better resource allocation and established infrastructure within the region. The elevated maximum values and pronounced variability in non-Java regions underscore the necessity of geographically differentiated policy responses. The observed volatility may stem from factors such as geographic remoteness, infrastructural limitations, and region-specific industry structures. These findings advocate the design of decentralised and adaptive tax administration strategies that account for each region's unique context.

Tables 4 and 5 (Appendix) complement this analysis by presenting a correlation matrix of key performance indicators across 319 tax offices. This matrix quantifies the strength and direction of bivariate associations, enabling researchers to identify patterns and detect issues like multicollinearity, which can distort results (Kim, 2019). By highlighting high inter-correlations, the matrix helps in decisions on subsequent analyses, ensuring data structure appropriateness (Holgado-Tello et al., 2010; Watkins, 2018). Incorporating a correlation matrix enhances transparency in data reporting, allowing researchers to assess the dataset's structure and ensure that further statistical procedures are based on a sound foundation (Asfahani, 2024).

Table 4 presents the correlation analysis of key tax performance indicators at the national level, revealing statistically significant relationships that inform the causal structure of the BSC framework. The strongest positive correlation was observed between *S1a* and *S1c* ($r = 0.581$, $p < 0.01$), indicating that improvements in one dimension were closely aligned with enhancements in the other. A similarly robust association was evident between *C2b* and *C2a* ($r = 0.637$, $p < 0.01$), suggesting that compliance outcomes and collection performance are interdependent. The positive

correlation between *LG12a* and *IP5a* ($r = 0.182$, $p < 0.01$) further supports the inference that learning and growth initiatives – particularly those related to internal capabilities – can improve internal process outcomes.

In contrast, several negative correlations indicate inverse relationships among variables, implying that gains in one domain may coincide with declines in others. For instance, *IP4a* and *C2a* ($r = -0.179$, $p < 0.01$) exhibited a moderate negative correlation, suggesting that administrative process enhancements may inadvertently hinder compliance outcomes. Additional inverse relationships, such as those between *IP7a* and *IP6a* ($r = -0.147$, $p < 0.01$) and *IP9b* and *C2b* ($r = -0.112$, $p < 0.05$), may reflect trade-offs resulting from resource reallocation or differing regional implementation practices in the field. The significance of these correlations ($p < 0.01$ and $p < 0.05$) affirms their reliability and underscores their importance for evidence-based policy formulation.

As Table 5 shows, subgroup analysis by region reveals further insights into the structural differences between Java and non-Java tax offices. In the Java group ($n = 176$), the most pronounced positive correlation was observed between *S1a* and *S1c* ($r = 0.721$, $p < 0.01$), reflecting a particularly strong operational dependence between these two stations. Additional correlations – such as *C2a* and *C2b* ($r = 0.614$, $p < 0.01$) and *IP5a* and *C2b* ($r = 0.567$, $p < 0.01$) – underscore the alignment of internal processes with compliance and collection outcomes. In contrast, the outside-Java group ($n = 143$) exhibited weaker positive correlations, such as *LG11a* and *LG12a* ($r = 0.257$, $p < 0.01$), *IP7a* and *LG11a* ($r = 0.308$, $p < 0.01$), and *IP9a* and *LG10a* ($r = 0.233$, $p < 0.01$), indicating moderate but less cohesive relationships among the performance indicators.

Negative correlations within the Java group revealed notable inverse dynamics. For example, *IP6a* and *LG12a* exhibit a strong negative correlation ($r = -0.313$, $p < 0.01$), potentially indicating tensions between technological investment outcomes and resource allocation. Other inverse relationships, such as between *C2a* and *IP4a* ($r = -0.287$, $p < 0.01$) and between *IP7b* and *IP9a* ($r = -0.120$, $p < 0.05$), further reflect the complex trade-offs in operational execution. In the outside-Java group, negative correlations were generally weaker, for example, *LG11a* and *C2a* ($r = -0.248$, $p < 0.01$), *IP7c* and *LG12a* ($r = -0.130$), and *IP9a* and *IP9b* ($r = -0.139$), suggesting more dispersed or context-specific interactions between variables.

Overall, the comparative analysis indicates that the tax offices in Java exhibit stronger and more statistically coherent correlations – both positive and negative – than their non-Java counterparts. This pattern may reflect a higher degree of systemic alignment, operational standardisation or integrated policy implementation within Java. Conversely, the weaker and more variable correlations in non-Java regions suggest that performance indicators may be influenced by localised conditions, decentralised practices or infrastructural disparities, reinforcing the need for region-specific strategies in tax administration.

4.1.2 Path analysis results

Figure 3 (Appendix) illustrates the path analysis of 56 hypothesised relationships within the BSC framework applied to Indonesia's tax administration. Table 6 (Appendix) provides the detailed results of the path analysis. Overall, most relationships were positive, with 61% at the national level (i.e., 34 out of 56), 57% at the Java level (i.e., 32 out of 56), and 59% at the non-Java level (i.e., 33 out of 56). Nationally, 14 relationships (25.0%) showed statistically significant positive effects, and six

relationships (10.73%) displayed significant negative effects. The remaining 36 relationships (64.29%) were statistically insignificant, suggesting that most causal pathways did not exert a uniform influence across the national sample. A regional breakdown reveals a similar pattern: in Java, 12 positive (21.4%) and four negative (7.14%) paths are significant, while 71.6% are insignificant; in non-Java regions, 10 positive (17.8%) and four negative (7.14%) relationships are significant, with 75.0% being statistically insignificant. These figures suggest that regional dynamics mediate the strength and direction of causal pathways embedded in the BSC framework.

Structurally, the BSC model is operationalised through four perspectives: learning and growth, internal business processes, customer and financial. Learning and growth indicators (*LG10a*: human resources, *LG11a*: organisational effectiveness, and *LG12a*: budgeting) influence internal processes (*IP3a-IP9b*), which in turn shape customer outcomes (*C2a*: formal compliance, *C2b*: payment compliance) and ultimately affect financial performance (*S1a-S1c)*. For example, *LG12a* significantly improved *IP5a* nationally (β = 0.173), whereas *LG11a* enhanced *IP7a* (β = 0.264) and *LG12a* supported *IP7a* (β = 0.170) and *IP7b* (β = 0.176). In non-Java regions, *LG12a* positively influenced *IP4a* (β = 0.138) and *IP9b* (β = 0.167), demonstrating region-specific pathways linking structural capabilities to operational effectiveness.

At the national level, the most prominent causal pathway begins with taxpayer outreach (*IP5a*), which exerts strong effects on formal (*C2a*, β = 0.329) and payment compliance (*C2b*, β = 0.470). Audit completion (*IP7a*) also contributes significantly to both *C2a* (β = 0.122) and *C2b* (β = 0.108), while payment compliance rate (*C2b*) has a negative influence on revenue collection (*S1a*, β = -0.106 and *S1b*, β = -0.157) as well as digital participation through e-filing (*IP4a*) negatively affects formal compliance (β = -0.178).

The negative relationship between tax payment indicators and revenue collection indicates an imbalance in taxpayer compliance and revenue targets. The tax payment variable emphasises minimal criteria by combining participation breadth and payment magnitude. However, a higher score does not ensure proportional revenue increases if payments are below the effective collection threshold or reflect low-value compliance. Revenue collection depends on the absolute value of payments relative to targets. If compliance improves mainly through low-value contributions, aggregate revenue may still fall short, indicating an inverse correlation. This could signal inefficiencies in taxpayer segmentation or overly optimistic revenue targets not aligned with the tax base's capacity or behaviour (Bird & Zolt, 2008), highlighting the need to balance quantity and quality in compliance strategies.

Learning and growth indicators further support internal process improvements: *LG10a* strengthens *IP4a* (β = 0.122) and *IP9a* (β = 0.157); *LG11a* improves *IP3a* (β = 0.094), *IP5a* (β = 0.110), and *IP7a* (β = 0.160); and *LG12a* boosts *IP7a* (β = 0.196) and *IP7b* (β = 0.110). At the customer-financial interface, formal compliance significantly increases tax revenue realisation (*S1a*, β = 0.120), whereas payment compliance is negatively associated with effort-based realisation (*S1b*, β = -0.157). These findings underscore the importance of outreach, audits, and organisational capacity in shaping national compliance and revenue outcomes.

In Java, taxpayer outreach (*IP5a*) continues to dominate as the key predictor of formal compliance (β = 0.271) and payment compliance (β = 0.405). However, audit-related indicators display weaker significance than in the national model. Internal capacity remained influential: *LG11a* improved *IP7a* (β = 0.264), while *LG12a* supported *IP7a*

(β = 0.170) and *IP7b* (β = 0.176). E-filing (*IP4a*) had a pronounced negative impact on formal compliance (β = -0.291). Notably, no significant positive pathways link compliance (*C2a* or *C2b*) to fiscal outcomes (*S1a*-*S1c*) in Java, indicating a potential decoupling between taxpayer behaviour and revenue performance, possibly due to saturation effects or declining marginal returns in mature administrative settings.

In contrast, the non-Java region exhibits stronger and more direct links between internal processes, compliance, and revenue. Outreach (*IP5a*) had the highest path coefficients for *C2a* (β = 0.332) and *C2b* (β = 0.572), followed by audit resolution (*IP7b*), which also positively influenced *C2a* (β = 0.173). Learning and growth indicators remain vital: *LG10a* improves *IP3a* (β = 0.237), whereas *LG12a* affects *IP4a* (β = 0.138) and *IP9b* (β = 0.167). Critically, formal compliance is significantly associated with *S1a* (β = 0.232) and *S1c* (β = 0.174), whereas payment compliance continues to exert a negative influence on *S1b* (β = -0.202). These results imply a more tightly integrated feedback loop in non-Java regions, where compliance behaviour drives fiscal performance more directly.

Customer outcomes (*C2a* and *C2b*) function as mediators in this model. Formal compliance enhances financial performance nationally and in non-Java models, particularly through *S1a* and *S1c*, whereas payment compliance has a consistently negative impact on *S1b* in both models. This bifurcation suggests that formal compliance (likely linked to declarations and reporting accuracy) translates more reliably into predictable revenue, whereas payment compliance may be hindered by enforcement constraints and capacity limitations.

Across internal business processes, *IP5a* remains a consistently strong predictor of compliance, with its effects being more pronounced in non-Java (β = 0.572 for *C2b*) than in Java (β = 0.405) and national (β = 0.470) models. Audit-related indicators show regionally contingent effects: in Java, their influence is attenuated; in non-Java, *IP7b* significantly supports compliance (β = 0.173), emphasising the role of procedural integrity in less formalised environments. These variations reflect how maturity levels, institutional contexts, and taxpayer characteristics shape the relative effectiveness of administrative strategies.

The comparative analysis underscores that, while the non-Java region has fewer statistically significant paths overall, it exhibits the strongest causal effects, particularly from intermediate indicators to compliance and compliance to revenue. This suggests that in developing country contexts, performance drivers, such as outreach, audit resolution, and procedural fairness, play a pivotal role in translating reform efforts into fiscal outcomes. The learning and growth variables (*LG10a*, *LG11a*, and *LG12a*) exhibited differentiated regional effects, revealing structural disparities. In Java, *LG11a* and *LG12a* influence audit processes (for example, *IP7a*, β = 0.264, and β = 0.176, respectively), reflecting institutional maturity. In the non-Java context, *LG10a* drives *IP3a* (β = 0.237), and *LG12a* enhances *IP9b* (β = 0.167), suggesting the need for foundational investments in human and technical capacity. At the national level, *LG12a*'s broad influence, spanning *IP5a*, *IP7a*, and *IP7b*, signals its central role in bridging strategic design and operational execution. Taken together, these findings validate the BSC's conceptual structure: improvements in learning and growth feed into internal processes that shape customer behaviour and ultimately affect financial outcomes. However, the strength and structure of these linkages vary significantly across regions, necessitating context-sensitive policies and management responses.

4.2 Discussion

The findings reinforce the BSC framework's potential as a strategic tool for improving tax compliance and revenue outcomes in Indonesia's decentralised tax administration. The significant influence of service-oriented and supervisory indicators – particularly those related to taxpayer outreach and compliance monitoring (e.g., *IP5a*) – on formal and payment compliance (*C2a* and *C2b*) supports prior studies that identified supervision as a key compliance driver (Chang et al., 2020; Dibie & Dibie, 2020). These results demonstrate that embedding structured supervisory mechanisms within the BSC framework is critical for reducing compliance gaps and aligning tax administration strategies with regional governance dynamics, echoing Bird and Zolt's (2008) argument regarding tailored administrative approaches in complex fiscal environments.

The main contribution of this study is the provision of empirical evidence on causal linkages among the four perspectives within the BSC framework, as adopted in the DGT strategy map. Using KPI data, this study systematically maps learning and growth, internal processes, customer, and financial perspectives using path analysis, thereby offering practical insights into how strategic initiatives in capacity-building and operations translate into compliance behaviour and fiscal outcomes. This empirical approach fills a critical gap in performance management research by validating the BSC's theoretical assumptions in the context of large-scale public tax administration.

A notable contribution of this study lies in its comparative regional analysis, which reveals important differences in the strength and structure of causal linkages between Java and non-Java tax offices. Java's tighter integration among BSC components, particularly the strong effects of internal processes on compliance outcomes, reflects the benefits of administrative coherence, established institutional routines, and higher resource capacity. This finding reinforces the notion that mature administrative environments may yield more consistent performance outcomes through top-down alignment. In contrast, non-Java regions exhibit looser interconnections and stronger dependencies on outreach and audit resolutions. These regional disparities highlight the need for decentralised strategies that prioritise service delivery, local resource adaptation and responsive compliance support, which is consistent with the differentiated policy frameworks proposed by Wells and Weiner (2005) and Alm and co-authors (2010).

Public sector adaptation of the BSC, as proposed by Marr (2009), provides a useful lens through which to interpret these regional variations. Rather than focusing exclusively on financial metrics, this model advocates performance systems centred on service equity, organisational learning and stakeholder engagement. For the DGT, shifting emphasis towards these dimensions, especially in underserved non-Java regions, may yield greater compliance and trust improvements than traditional revenue-focused measures. This shift is particularly relevant in emerging and informal economies, where enforcement-based strategies often underperform without complementary efforts to enhance taxpayer services and administrative fairness.

The path analysis results further highlight the strategic importance of internal business processes and learning and growth perspectives in driving tax administration performance. Investments in organisational capabilities, budget planning and human capital development (*LG10a-LG12a*) have measurable impacts on intermediate outputs, such as audit completion and taxpayer outreach, which in turn shape compliance behaviour. These findings echo earlier calls by Radnor and Lovell (2003) and Chavan

(2009) that tax administrations should strengthen organisational learning to sustain operational adaptability. Particularly in non-Java regions, where administrative maturity is still evolving, such capacity-building is not only beneficial but also necessary for translating strategies into compliance outcomes.

The observed limitations in linking compliance metrics (*C2a* and *C2b*) to revenue outcomes (*S1a*-*S1c*), especially in Java, suggest that the BSC model requires refinement to fully capture the economic complexity of compliance behaviour more fully. This supports earlier critiques by Wenzel and Taylor (2003) and Wells and Weiner (2005), who noted that standard BSC applications often underrepresent the influence of contextual variables. Incorporating additional explanatory factors, such as taxpayer literacy, sectoral composition, and digital accessibility, would provide a more nuanced understanding of the compliance-to-revenue chain, particularly in high-capacity regions where diminishing marginal returns may obscure policy effectiveness. The decoupling of compliance and revenue in Java suggests that even well-performing offices may require structural innovation to maintain responsiveness to revenue mobilisation.

Furthermore, the negative association between payment compliance (*C2b*) and effort-based revenue indicators (*S1b*) indicates potential inefficiency in enforcement or settlement mechanisms. This recurring pattern across regions highlights the need for better integration of audit resolution, dispute management, and taxpayer communication. As Blaufus and co-authors (2024) argued, coordinated actions among compliance and enforcement units improve procedural fairness, reduce taxpayer resistance, and boost voluntary compliance – an especially pertinent insight for improving Indonesia's audit strategies.

In response to these findings, the DGT would benefit from reinforcing a BSC model that reflects Marr's (2009) public sector recommendations of prioritising stakeholder trust, continuous institutional learning and equitable service delivery. This model should be adapted to Indonesia's administrative diversity by strengthening the linkages between learning and growth, internal operations, and revenue outcomes in ways that reflect regional conditions. Integrating socioeconomic metrics – such as regional GDP per capita, digital literacy, and informality indices – can strengthen the explanatory power of compliance strategies and reveal more granular intervention points.

Ultimately, this study provides empirical support for regionally adaptive BSC implementation in Indonesia. In Java, efforts should focus on addressing diminishing returns through innovation and better aligning digital initiatives with taxpayer realities. In non-Java regions, expanding outreach, training, and audit capacity remains essential. Nationally, strategic coherence across all four BSC perspectives anchored in evidence-based causality can serve as the foundation for a more equitable, efficient, and accountable tax administration system. Aligning these strategies with local needs will ensure that tax compliance efforts contribute not only to fiscal stability but also to broader goals of inclusive and responsive governance.

5. CONCLUSIONS AND RECOMMENDATIONS

This study reaffirms the utility of the BSC as a strategic performance framework for enhancing tax compliance and revenue mobilisation in Indonesia. By empirically validating causal linkages across four BSC perspectives – learning and growth, internal processes, customer (stakeholder), and financial – this research provides actionable insights for the DGT. The integration of supervisory and service-oriented strategies,

particularly in regions characterised by compliance disparities, such as non-Java areas, demonstrates that a flexible, stakeholder-centred BSC model is more effective in addressing regional tax administration challenges (Chang et al., 2020; Bardey & Mejía, 2019). Aligning with Marr's (2009) proposition for public-sector BSC adaptation, this approach emphasises strategic resource management and institutional learning over revenue maximisation, enabling more equitable and context-sensitive policy design.

A central recommendation is to reconceptualise the traditional 'customer' perspective as a broader stakeholder orientation, thereby enhancing taxpayer engagement and service responsiveness across diverse regions. Empirical evidence from Alm and co-authors (2019) highlights the role of behavioural and service design interventions in fostering voluntary compliance. Embedding such behavioural nudges in service and supervision strategies can reduce reliance on coercive enforcement and promote more inclusive compliance regimes. In this regard, the BSC framework should serve not only as a reporting mechanism but also as an iterative management tool that captures behavioural, regional, and institutional diversity.

Equally important is the prioritisation of internal processes and learning and growth perspectives, particularly in the form of capacity development, technological integration and organisational adaptability (Wynter & Oats, 2021). These dimensions were found to be essential precursors to effective compliance outcomes, especially in non-Java regions where administrative maturity is evolving. A stakeholder-focused BSC grounded in continuous institutional learning and adaptive performance management would empower the DGT to tailor compliance interventions and respond dynamically to shifting policy environments.

To further enhance strategic planning, the BSC should be expanded to incorporate socioeconomic and behavioural indicators, allowing for more granular diagnostics of region-specific compliance patterns. Establishing continuous feedback loops within the BSC framework – facilitated through real-time data and iterative evaluation – can strengthen its diagnostic capacity and improve the alignment between compliance efforts and fiscal outcomes. This is particularly relevant given the ambiguous and often weak linkages observed between compliance and financial metrics, which suggests the need for a more refined causal framework (Nørreklit, 2000; Wenzel & Taylor, 2003; Wells & Weiner, 2005; Nørreklit & Mitchell, 2007; Chenhall, 2009; Hoque, 2014).

Based on these findings, four key policy recommendations are proposed. First, the DGT should adopt a regionally adaptive BSC model centred on stakeholder outcomes, equitable service delivery and effective resource utilisation. Second, the agency should institutionalise a culture of continuous learning by investing in staff development, technology and evidence-based decision-making. Third, strategic reforms must prioritise regional equity by strengthening performance accountability in under-resourced regions, ensuring that tax administration advances not only compliance but also public trust and inclusive development. Fourth, consistent use of valid and reliable key performance indicators (KPIs) across all organisational levels is essential to ensure BSC implementation reflects accurate performance diagnostics, supports causal interpretation, and enhances managerial accountability. Standardising KPI definitions, data collection practices, and validation protocols reinforces the credibility and utility of BSC as a decision-making tool.

This study has several limitations. While only applicable in the Indonesian context, this study relies exclusively on secondary administrative data for the financial year 2019,

which may not capture dynamic behavioural, socioeconomic, or institutional changes over time. The cross-sectional design precludes a temporal assessment of causal pathways and limits its generalisability to post-pandemic contexts. Additionally, the absence of primary data, such as taxpayer perceptions and qualitative insights from local offices, constrains the interpretive depth of regional disparities.

Future research should incorporate longitudinal designs, multiyear datasets, and mixed method approaches to explore how causal linkages evolve across policy cycles and economic shifts. Integrating taxpayer survey data and contextual indicators – such as informality rates, compliance attitudes, and digital inclusion – will strengthen the explanatory power of the BSC model and support more granular, responsive tax policy interventions. Ultimately, a more dynamic, data-enriched BSC framework is essential to advancing Indonesia's long-term goals of equitable, efficient, and accountable tax administration.

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7. APPENDIX

Table 3: Descriptive Statistics (in Percentage)[61]

KPI	National (n=319)				Java (n=176)				Outside Java (n=143)			
	Minimum	Maximum	Mean	SD	Minimum	Maximum	Mean	SD	Minimum	Maximum	Mean	SD
S1a	3.63	147.68	90.93	11.49	70.05	147.68	89.81	8.96	3.63	120.30	92.32	13.90
S1b	41.94	324.68	106.12	32.18	41.94	259.81	107.27	30.02	48.92	324.68	104.69	34.72
S1c	-280.56	3,954.15	401.82	496.53	-208.30	3,294.12	389.27	410.30	-280.56	3,954.15	417.27	586.70
C2a	27.67	132.05	74.89	17.72	38.83	132.05	81.99	16.76	27.67	107.73	66.14	14.74
C2b	19.23	90.54	51.82	11.78	22.38	90.54	54.92	11.65	19.23	81.56	48.01	10.80
IP3a	62.64	123.60	86.68	9.56	66.60	100.00	89.10	8.65	62.64	123.60	83.71	9.81
IP4a	86.74	173.45	111.76	12.47	87.00	139.00	108.94	8.99	86.74	173.45	115.22	15.06
IP5a	54.05	238.14	111.35	16.71	58.61	238.14	114.19	18.98	54.05	152.44	107.87	12.62
IP6a	86.33	807.67	137.20	58.10	86.33	255.77	130.21	29.33	96.96	807.67	145.80	79.78
IP7a	30.58	377.53	126.47	50.20	38.61	377.53	138.26	54.19	30.58	264.83	111.97	40.49
IP7b	80.69	103.85	98.12	2.25	80.69	100.30	98.20	2.22	89.13	103.85	98.02	2.28
IP7c	10.20	10,980.00	248.81	619.86	10.20	780.00	212.93	122.79	80.00	10,980.00	292.97	915.60
IP8a	33.33	1,200.00	134.56	90.51	66.67	1,200.00	139.58	115.22	33.33	400.00	128.37	43.79
IP9a	81.99	100.00	99.03	1.83	81.99	100.00	99.17	1.79	91.28	100.00	98.85	1.86
IP9b	52.50	10,287.50	529.35	1,045.08	73.24	10,287.50	383.17	825.93	52.50	8,440.00	709.26	1,243.44
LG10a	79.90	100.00	99.11	2.04	79.90	100.00	99.02	2.36	91.38	100.00	99.23	1.57
LG11a	75.00	100.00	99.02	2.07	90.78	100.00	99.07	1.55	75.00	100.00	98.97	2.57
LG12a	69.33	119.55	94.79	5.70	69.33	119.55	95.86	6.43	76.94	108.26	93.48	4.32

Note: S1a = Percentage of tax revenue realisation; *S1b* = Percentage of effort tax revenue realisation; *S1c* = Percentage growth in gross tax revenues; *C2a* = Formal compliance rate for Corporate Taxpayers and Individual Business Owners; *C2b* = Payment compliance rate for Corporate Taxpayers and Individual Business Owners; *IP3a* = Effectiveness rate of extension activities (%); *IP4a* = E-filing participation rate (%); *IP5a* = Payment compliance rate of new taxpayers acquired through extensification efforts; *IP6a* = Completion rate of requests for data and/or information clarification (%); *IP7a* = Audit completion rate (%); *IP7b* = Rate of uncontested tax assessments (%); *IP7c* = Active engagement rate in preventive billing (%); *IP8a* = Rate of IDLP (Investigation, Detection, and Prosecution) submissions (%); *IP9a* = Timeliness of tax return documentation handling; *IP9b* = Provision rate of potential tax data; *LG10a* = competent human resources; *LG11a* = Fit for purpose organisation; *LG12a* = Improved budget management.

[61] A visual representation (i.e., histogram) of the descriptive statistics is provided in Figures 4-6 (Appendix).

Table 4: Correlation Matrix at National Level (n=319)

	S1a	*S1b*	*S1c*	*C2a*	*C2b*	*IP3a*	*IP4a*	*IP5a*	*IP6a*	*IP7a*	*IP7b*	*IP7c*	*IP8a*	*IP9a*	*IP9b*	*LG10a*	*LG11a*	*LG12a*
S1a	1																	
S1b	.227**	1																
S1c	.581**	.215**	1															
C2a	0.053	-0.010	0.057	1														
C2b	-0.030	-0.101	0.022	.637**	1													
IP3a	-0.077	0.058	-0.021	0.013	-0.013	1												
IP4a	0.076	0.058	0.031	-.179**	-0.065	-0.044	1											
IP5a	0.036	-0.019	0.075	.354**	.486**	0.076	-0.008	1										
IP6a	0.081	.286**	0.060	-0.065	-0.068	-0.068	0.032	0.015	1									
IP7a	-0.058	-0.067	.110*	.197**	.184**	0.010	-0.059	.123*	-.147**	1								
IP7b	-0.029	-0.023	-0.030	0.015	0.041	0.023	0.071	-0.045	0.006	0.041	1							
IP7c	-0.089	0.031	-0.051	-0.032	-0.019	0.070	-0.051	-0.015	-0.002	-0.006	0.032	1						
IP8a	-0.061	-0.028	-0.076	0.031	-0.048	0.061	-0.056	-0.047	-0.019	0.090	0.015	-0.014	1					
IP9a	-0.042	-0.036	-0.039	.181**	.146**	0.030	0.029	.128*	-0.011	.112*	-0.007	0.035	0.013	1				
IP9b	0.068	-.121*	0.054	-0.002	-.112*	-0.097	0.035	-0.031	-0.002	0.009	0.032	-0.014	0.004	-0.069	1			
LG10a	-0.100	0.027	-0.090	-0.031	0.015	0.020	.125*	0.028	0.044	-0.013	-0.088	0.001	0.001	.158**	-0.006	1		
LG11a	-0.083	-0.012	0.013	-0.050	0.024	0.097	0.009	.120*	0.077	.174**	0.000	0.028	0.015	-0.012	0.064	-0.061	1	
LG12a	.162**	-0.021	0.091	0.038	.138*	0.072	0.079	.182**	-.138*	.207**	0.105	-0.061	-0.004	0.016	0.019	0.042	0.068	1

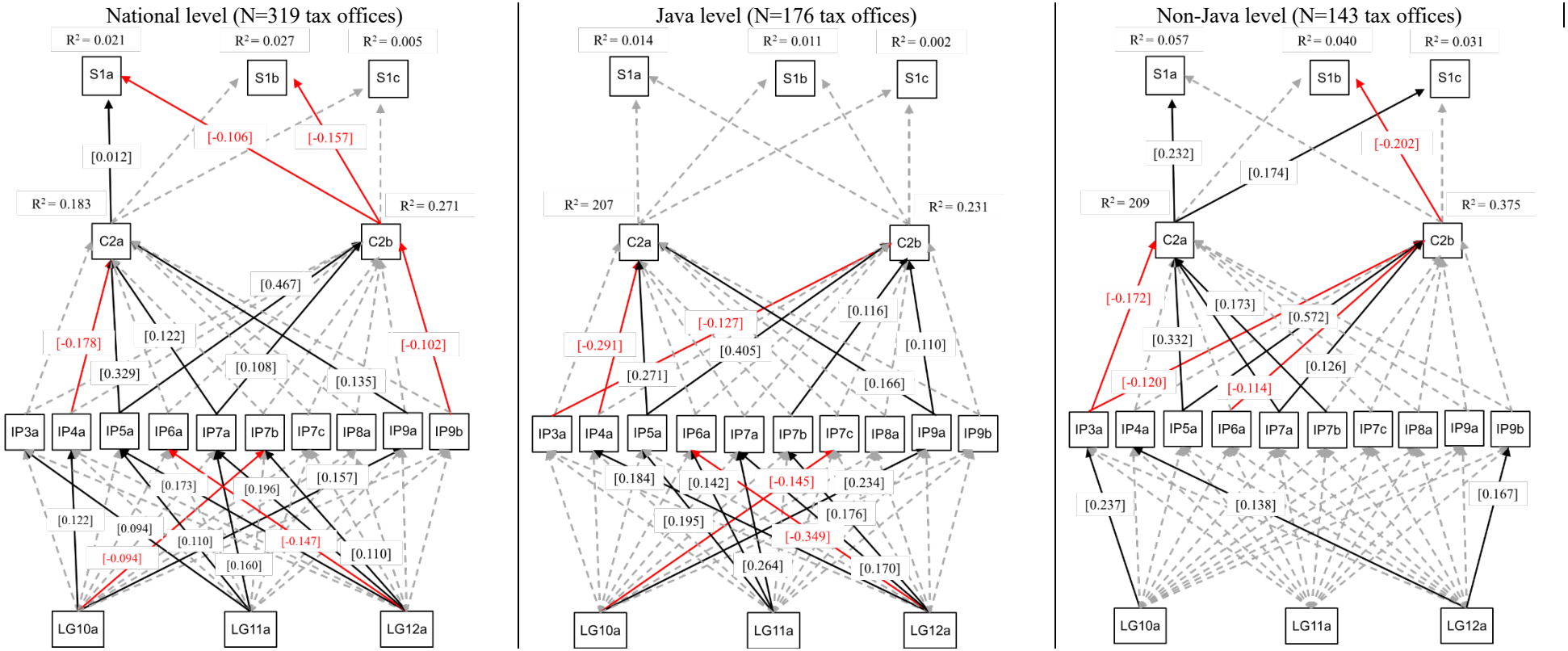
** The correlation was significant at the 0.01 level (2-tailed).
* The correlation was significant at the 0.05 level (2-tailed).

Table 5: Correlation Matrix for Java (Above Diagonal, N=176) and Non-Java Levels (Below Diagonal, N=143)

	S1a	*S1b*	*S1c*	*C2a*	*C2b*	*IP3a*	*IP4a*	*IP5a*	*IP6a*	*IP7a*	*IP7b*	*IP7c*	*IP8a*	*IP9a*	*IP9b*	*LG10a*	*LG11a*	*LG12a*
S1a	1	0.100	.721**	0.073	0.005	0.088	-0.042	.201**	0.007	-0.070	-0.047	-0.031	-0.090	0.001	-0.016	-0.122	-0.045	0.092
S1b	.328**	1	0.132	-0.035	-0.087	0.030	0.122	-0.007	0.061	-0.094	0.003	0.026	-0.045	-0.097	-0.038	0.030	-0.144	0.018
S1c	.505**	.281**	1	0.026	0.045	0.086	0.078	.149*	-0.069	0.120	0.020	-0.024	-0.094	-0.051	0.013	-0.095	-0.035	0.141
C2a	0.161	-0.028	0.132	1	.614**	-0.113	-.287**	.297**	0.139	0.069	-0.144	0.094	0.020	.185*	0.041	0.016	0.138	-0.139
C2b	-0.001	-0.155	0.020	.560**	1	-0.145	-0.047	.412**	0.076	0.095	0.038	-0.068	-0.095	0.140	-0.034	0.053	.214**	0.046
IP3a	-0.146	0.065	-0.089	-0.154	-0.057	1	.180*	0.007	-0.055	-.149*	0.000	-0.103	0.033	-0.052	0.059	-0.078	0.088	0.090
IP4a	0.095	0.039	-0.003	0.091	0.054	-0.068	1	0.013	-0.038	-0.007	.181*	-0.033	-0.068	0.067	0.084	0.126	-0.065	.163*
IP5a	-0.101	-0.063	0.008	.336**	.567**	0.055	0.082	1	0.059	0.097	-0.120	-0.001	-0.051	0.105	0.033	0.045	.216**	.173*
IP6a	0.088	.417**	0.099	-0.083	-0.089	-0.026	0.009	0.048	1	-.235**	-0.114	0.057	-0.047	0.108	0.068	-0.025	0.051	-.313**
IP7a	0.005	-0.064	0.137	0.139	0.156	0.047	0.023	0.030	-0.085	1	0.078	0.022	0.052	0.017	0.102	-0.035	.308**	.237**
IP7b	-0.008	-0.052	-0.070	.188*	0.020	0.024	0.019	0.063	0.069	-0.043	1	-0.016	0.039	-0.120	0.001	-0.073	0.033	.167*
IP7c	-0.118	0.044	-0.066	-0.024	0.012	0.144	-0.080	-0.006	-0.015	0.016	0.054	1	0.070	0.057	.188*	-0.143	-0.046	-0.130
IP8a	-0.021	-0.006	-0.079	-0.053	-0.003	0.105	-0.025	-0.107	0.021	.196*	-0.067	-0.061	1	0.048	0.083	-0.015	0.020	-0.008
IP9a	-0.060	0.019	-0.025	0.126	0.110	0.065	0.045	0.137	-0.047	.216**	0.115	0.051	-0.114	1	-0.139	.233**	-0.022	0.017
IP9b	0.088	-.173*	0.071	0.113	-0.108	-0.141	-0.047	-0.045	-0.052	0.005	0.071	-0.052	-0.127	0.007	1	0.007	0.076	-0.019
LG10a	-0.109	0.030	-0.101	-0.066	-0.009	.225**	0.131	0.019	0.096	0.087	-0.116	0.031	0.101	0.048	-0.043	1	-0.138	0.033
LG11a	-0.099	0.070	0.040	-.248**	-0.138	0.099	0.051	0.034	0.092	0.068	-0.026	0.040	0.011	-0.009	0.065	0.015	1	.257**
LG12a	.341**	-0.108	0.061	0.097	0.159	-0.106	0.142	0.082	-0.027	-0.023	-0.019	-0.063	-0.064	-0.038	0.149	0.108	-0.134	1

** The correlation was significant at the 0.01 level (2-tailed).
* The correlation was significant at the 0.05 level (2-tailed).

Fig. 3: Path Analysis Results



Note: significant at the 0.01 level, standardised regression weight; dashed line = not significant relationship; black line = significant positive relationship, red line = significant negative relationship; *S1a* = Percentage of tax revenue realisation; *S1b* = Percentage of effort tax revenue realisation; *S1c* = Percentage growth in gross tax revenues; *C2a* = Formal compliance rate for Corporate Taxpayers and Individual Business Owners; *C2b* = Payment compliance rate for Corporate Taxpayers and Individual Business Owners; *IP3a* = Effectiveness rate of extension activities (%); *IP4a* = E-filing participation rate (%); *IP5a* = Payment compliance rate of new taxpayers acquired through extensification efforts; *IP6a* = Completion rate of requests for data and/or information clarification (%); *IP7a* = Audit completion rate (%); *IP7b* = Rate of uncontested tax assessments (%); *IP7c* = Active engagement rate in preventive billing (%); *IP8a* = Rate of IDLP (Investigation, Detection, and Prosecution) submissions (%); *IP9a* = Timeliness of tax return documentation handling; *IP9b* = Provision rate of potential tax data; *LG10a* = competent human resources; *LG11a* = Fit for purpose organisation; *LG12a* = Improved budget management.

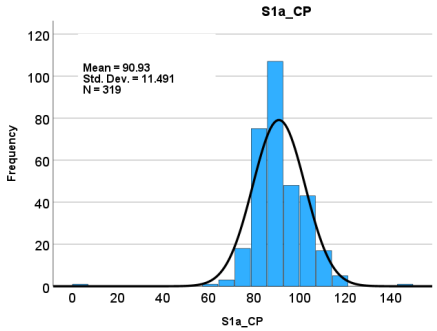
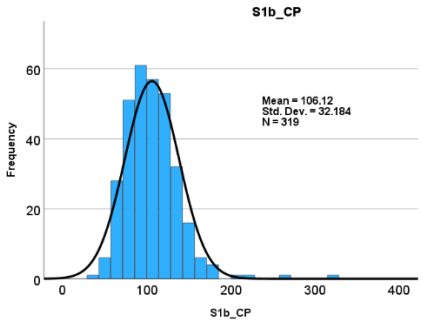
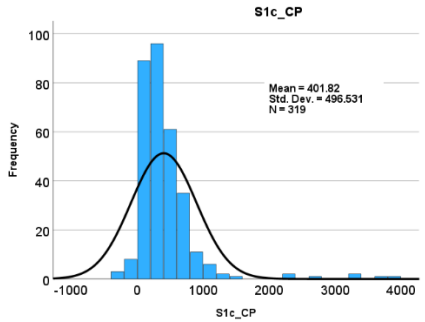
Table 6: Path Analysis Regression Results

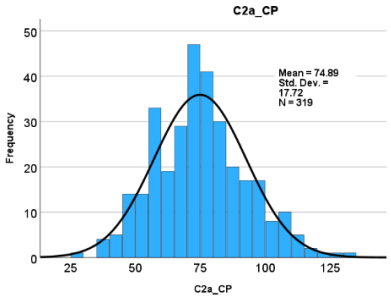
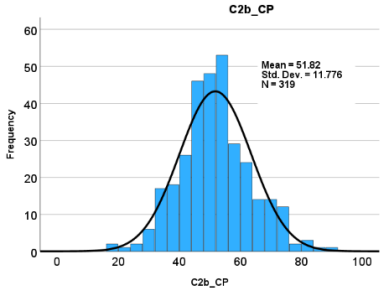
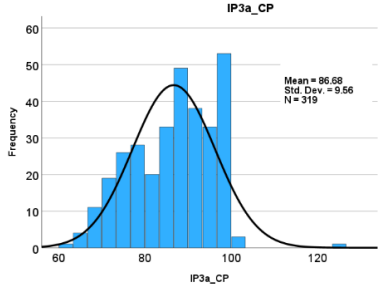
	Panel A: National level (N = 319 tax offices)							Panel B: Java level (N = 176 tax offices)							Panel C: Non-Java level (N = 143 tax offices)						
	Estimate (unstd)	**Estimate (std)**	**S.E.**	**C.R.**	**P value**	**Direction & sig.**		**Estimate (unstd)**	**Estimate (std)**	**S.E.**	**C.R.**	**P value**	**Direction & sig.**		**Estimate (unstd)**	**Estimate (std)**	**S.E.**	**C.R.**	**P value**	**Direction & sig.**	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Impact on *S1a*			$R^2 = 0.021$									$R^2 = 0.014$							$R^2 = 0.057$		
C2a	0.079	0.12	0.037	2.121	0.034	(+)	S	0.06	0.11	0.041	1.448	0.148	(+)	NS	0.221	0.232	0.08	2.766	0.006	(+)	S
C2b	-0.105	-0.106	0.056	-1.879	0.06	(-)	S	-0.049	-0.063	0.059	-0.833	0.405	(-)	NS	-0.170	-0.132	0.108	-1.571	0.116	(-)	NS
Impact on *S1b*					$R^2 = 0.027$							$R^2 = 0.011$							$R^2 = 0.040$		
C2a	0.165	0.089	0.104	1.581	0.114	(+)	NS	0.054	0.03	0.138	0.393	0.694	(+)	NS	0.199	0.084	0.201	0.992	0.321	(+)	NS
C2b	-0.434	-0.157	0.156	-2.775	0.006	(-)	S	-0.273	-0.106	0.196	-1.39	0.164	(-)	NS	-0.649	-0.202	0.272	-2.387	0.017	(-)	S
Impact on *S1c*					$R^2 = 0.005$							$R^2 = 0.002$							$R^2 = 0.031$		
C2a	2.016	0.071	1.618	1.246	0.213	(+)	NS	-0.064	-0.003	1.892	-0.034	0.973	(-)	NS	6.998	0.174	3.404	2.056	0.04	(+)	S
C2b	-1.007	-0.024	2.426	-0.415	0.678	(-)	NS	1.653	0.047	2.688	0.615	0.539	(+)	NS	-4.248	-0.078	4.612	-0.921	0.357	(-)	NS
Impact on *C2a*					$R^2 = 0.183$							$R^2 = 0.207$							$R^2 = 0.209$		
IP3a	-0.047	-0.026	0.093	-0.505	0.613	(-)	NS	-0.077	-0.04	0.129	-0.599	0.549	(-)	NS	-0.258	-0.172	0.112	-2.305	0.021	(-)	S
IP4a	-0.251	-0.178	0.071	-3.514	***	(-)	S	-0.536	-0.291	0.124	-4.308	***	(-)	S	0.049	0.05	0.073	0.667	0.505	(+)	NS
IP5a	0.345	0.329	0.053	6.483	***	(+)	S	0.236	0.271	0.059	4.004	***	(+)	S	0.386	0.332	0.087	4.444	***	(+)	S
IP6a	-0.014	-0.047	0.015	-0.936	0.349	(-)	NS	0.053	0.094	0.038	1.391	0.164	(+)	NS	-0.018	-0.099	0.014	-1.326	0.185	(-)	NS
IP7a	0.043	0.122	0.018	2.399	0.016	(+)	S	0.015	0.05	0.021	0.733	0.464	(+)	NS	0.046	0.126	0.027	1.686	0.092	(+)	S
IP7b	0.313	0.04	0.396	0.792	0.428	(+)	NS	-0.246	-0.033	0.503	-0.489	0.625	(-)	NS	1.114	0.173	0.48	2.32	0.02	(+)	S
IP7c	-0.001	-0.039	0.001	-0.778	0.437	(-)	NS	0.007	0.053	0.009	0.787	0.431	(+)	NS	0.000	-0.003	0.001	-0.039	0.969	(-)	NS
IP8a	0.005	0.024	0.01	0.472	0.637	(+)	NS	0	0.002	0.01	0.037	0.97	(-)	NS	0.002	0.007	0.025	0.089	0.929	(+)	NS
IP9a	1.299	0.135	0.487	2.669	0.008	(+)	S	1.539	0.166	0.624	2.467	0.014	(+)	S	0.307	0.039	0.589	0.521	0.603	(+)	NS
IP9b	0.000	0.018	0.001	0.352	0.724	(-)	NS	0.001	0.061	0.001	0.902	0.367	(+)	NS	0.001	0.089	0.001	1.194	0.232	(+)	NS
Impact on *C2b*					$R^2 = 0.271$							$R^2 = 0.231$							$R^2 = 0.375$		
IP3a	-0.082	-0.067	0.059	-1.404	0.16	(-)	NS	-0.171	-0.127	0.089	-1.908	0.056	(-)	S	-0.133	-0.12	0.073	-1.811	0.07	(-)	S
IP4a	-0.059	-0.063	0.045	-1.309	0.191	(-)	NS	-0.082	-0.063	0.086	-0.947	0.343	(-)	NS	-0.004	-0.005	0.048	-0.079	0.937	(-)	NS
IP5a	0.329	0.47	0.034	9.8	***	(+)	S	0.249	0.405	0.041	6.071	***	(+)	S	0.492	0.572	0.057	8.655	***	(+)	S
IP6a	-0.013	-0.063	0.01	-1.323	0.186	(-)	NS	0.022	0.056	0.027	0.839	0.401	(+)	NS	-0.016	-0.114	0.009	-1.729	0.084	(-)	S
IP7a	0.025	0.108	0.011	2.261	0.024	(+)	S	0.010	0.045	0.014	0.671	0.502	(+)	NS	0.034	0.126	0.018	1.9	0.057	(+)	S
IP7b	0.360	0.069	0.249	1.445	0.148	(+)	NS	0.609	0.116	0.349	1.745	0.081	(+)	S	0.035	0.007	0.314	0.111	0.911	(+)	NS
IP7c	0.000	-0.017	0.001	-0.347	0.729	(-)	NS	-0.008	-0.085	0.006	-1.275	0.202	(-)	NS	0.000	0.025	0.001	0.377	0.706	(-)	NS
IP8a	-0.005	-0.039	0.006	-0.815	0.415	(-)	NS	-0.008	-0.078	0.007	-1.17	0.242	(-)	NS	0.01	0.039	0.016	0.589	0.556	(+)	NS
IP9a	0.466	0.073	0.306	1.521	0.128	(+)	NS	0.719	0.11	0.432	1.662	0.097	(+)	S	0.055	0.009	0.385	0.142	0.887	(+)	NS
IP9b	-0.001	-0.102	0.001	-2.12	0.034	(-)	S	0.000	-0.005	0.001	-0.075	0.94	(-)	NS	-0.001	-0.1	0.001	-1.506	0.132	(-)	NS
Impact on on *IP3a*					$R^2 = 0.014$							$R^2 = 0.018$							$R^2 = 0.074$		
LG10a	0.108	0.023	0.261	0.415	0.678	(+)	NS	-0.267	-0.073	0.278	-0.959	0.338	(-)	NS	1.477	0.237	0.506	2.918	0.004	(+)	S
LG11a	0.433	0.094	0.259	1.675	0.094	(+)	S	0.326	0.058	0.439	0.743	0.458	(+)	NS	0.304	0.08	0.311	0.978	0.328	(+)	NS
LG12a	0.108	0.065	0.094	1.156	0.248	(+)	NS	0.104	0.077	0.105	0.995	0.32	(+)	NS	-0.275	-0.121	0.186	-1.481	0.139	(-)	NS
Impact on *IP4a*					$R^2 = 0.021$							$R^2 = 0.050$							$R^2 = 0.038$		
LG10a	0.746	0.122	0.339	2.199	0.028	(+)	S	0.404	0.106	0.284	1.419	0.156	(+)	NS	1.106	0.116	0.792	1.396	0.163	(+)	NS
LG11a	0.066	0.011	0.336	0.197	0.844	(+)	NS	-0.566	-0.097	0.449	-1.261	0.207	(-)	NS	0.396	0.068	0.486	0.814	0.416	(+)	NS
LG12a	0.16	0.073	0.122	1.311	0.19	(+)	NS	0.258	0.184	0.107	2.412	0.016	(+)	S	0.482	0.138	0.291	1.657	0.097	(+)	S
Impact on *IP5a*					$R^2 = 0.045$							$R^2 = 0.066$							$R^2 = 0.009$		

LG10a	0.223	0.027	0.449	0.496	0.62	(+)	NS	0.544	0.068	0.595	0.914	0.361	(+)	NS	0.074	0.009	0.674	0.11	0.912	(+)	NS
LG11a	0.890	0.11	0.445	1.999	0.046	(+)	S	2.393	0.195	0.939	2.547	0.011	(+)	S	0.222	0.045	0.414	0.538	0.591	(+)	NS
LG12a	0.508	0.173	0.161	3.152	0.002	(+)	S	0.355	0.12	0.224	1.588	0.112	(+)	NS	0.255	0.087	0.247	1.029	0.303	(+)	NS
Impact on *IP6a*					$R^2 = 0.030$							$R^2 = 0.116$							$R^2 = 0.018$		
LG10a	1.580	0.056	1.574	1.004	0.316	(+)	NS	0.078	0.006	0.894	0.088	0.93	(+)	NS	4.936	0.097	4.24	1.164	0.244	(+)	NS
LG11a	2.550	0.091	1.56	1.635	0.102	(+)	NS	2.694	0.142	1.412	1.909	0.056	(+)	S	2.698	0.087	2.604	1.036	0.3	(+)	NS
LG12a	-1.496	-0.147	0.565	-2.648	0.008	(-)	S	-1.594	-0.349	0.336	-4.74	***	(-)	S	-0.476	-0.026	1.557	-0.305	0.76	(-)	NS
Impact on *IP7a*					$R^2 = 0.069$							$R^2 = 0.122$							$R^2 = 0.013$		
LG10a	-0.278	-0.011	1.332	-0.209	0.835	(-)	NS	-0.088	-0.004	1.647	-0.053	0.957	(-)	NS	2.275	0.088	2.158	1.054	0.292	(+)	NS
LG11a	3.887	0.16	1.32	2.944	0.003	(+)	S	9.251	0.264	2.6	3.557	***	(+)	S	1.003	0.064	1.325	0.757	0.449	(+)	NS
LG12a	1.729	0.196	0.478	3.617	***	(+)	S	1.43	0.17	0.619	2.308	0.021	(+)	S	-0.229	-0.024	0.793	-0.289	0.773	(-)	NS
Impact on *IP7b*					$R^2 = 0.020$							$R^2 = 0.035$							$R^2 = 0.014$		
LG10a	-0.103	-0.094	0.061	-1.685	0.092	(-)	S	-0.078	-0.082	0.071	-1.096	0.273	(-)	NS	-0.166	-0.114	0.122	-1.362	0.173	(-)	NS
LG11a	-0.015	-0.013	0.061	-0.241	0.809	(-)	NS	-0.034	-0.024	0.112	-0.306	0.76	(-)	NS	-0.023	-0.026	0.075	-0.306	0.759	(-)	NS
LG12a	0.043	0.11	0.022	1.969	0.049	(+)	S	0.061	0.176	0.027	2.288	0.022	(+)	S	-0.005	-0.01	0.045	-0.116	0.908	(-)	NS
Impact on *IP7c*					$R^2 = 0.005$							$R^2 = 0.037$							$R^2 = 0.006$		
LG10a	1.637	0.005	17.008	0.096	0.923	(+)	NS	-7.519	-0.145	3.908	-1.924	0.054	(-)	S	21.549	0.037	48.952	0.44	0.66	(+)	NS
LG11a	9.631	0.032	16.853	0.571	0.568	(+)	NS	-2.863	-0.036	6.168	-0.464	0.643	(-)	NS	11.083	0.031	30.059	0.369	0.712	(+)	NS
LG12a	-6.851	-0.063	6.102	-1.123	0.262	(-)	NS	-2.21	-0.116	1.469	-1.504	0.133	(-)	NS	-13.212	-0.062	17.981	-0.735	0.462	(-)	NS
Impact on *IP8a*					$R^2 = 0.000$							$R^2 = 0.001$							$R^2 = 0.016$		
LG10a	0.101	0.002	2.489	0.04	0.968	(+)	NS	-0.589	-0.012	3.736	-0.158	0.875	(-)	NS	3.028	0.109	2.33	1.3	0.194	(+)	NS
LG11a	0.671	0.015	2.466	0.272	0.786	(+)	NS	1.588	0.021	5.897	0.269	0.788	(+)	NS	-0.014	-0.001	1.431	-0.01	0.992	(-)	NS
LG12a	-0.076	-0.005	0.893	-0.086	0.932	(-)	NS	-0.226	-0.013	1.405	-0.161	0.872	(-)	NS	-0.771	-0.076	0.856	-0.901	0.368	(-)	NS
Impact on *IP9a*					$R^2 = 0.025$							$R^2 = 0.055$							$R^2 = 0.004$		
LG10a	0.14	0.157	0.05	2.827	0.005	(+)	S	0.178	0.234	0.056	3.147	0.002	(+)	S	0.063	0.053	0.1	0.631	0.528	(+)	NS
LG11a	-0.002	-0.003	0.049	-0.051	0.96	(-)	NS	0.01	0.009	0.089	0.115	0.908	(+)	NS	-0.012	-0.016	0.061	-0.189	0.85	(-)	NS
LG12a	0.003	0.009	0.018	0.166	0.868	(+)	NS	0.002	0.007	0.021	0.088	0.93	(+)	NS	-0.02	-0.045	0.037	-0.534	0.593	(-)	NS
Impact on *IP9b*					$R^2 = 0.004$							$R^2 = 0.008$							$R^2 = 0.033$		
LG10a	-1.421	-0.003	28.682	-0.05	0.96	(-)	NS	7.433	0.021	26.687	0.279	0.781	(+)	NS	-49.174	-0.062	65.568	-0.75	0.453	(-)	NS
LG11a	31.741	0.063	28.42	1.117	0.264	(+)	NS	48.196	0.09	42.122	1.144	0.253	(+)	NS	42.748	0.088	40.262	1.062	0.288	(+)	NS
LG12a	2.642	0.014	10.29	0.257	0.797	(+)	NS	-5.456	-0.042	10.034	-0.544	0.587	(-)	NS	48.154	0.167	24.084	1.999	0.046	(+)	S

Note: S = statistically significant at the 0.10 level, NS = otherwise; *S1a* = Percentage of tax revenue realisation; *S1b* = Percentage of effort tax revenue realisation; *S1c* = Percentage growth in gross tax revenues; *C2a* = Formal compliance rate for Corporate Taxpayers and Individual Business Owners; *C2b* = Payment compliance rate for Corporate Taxpayers and Individual Business Owners; *IP3a* = Effectiveness rate of extension activities (%); *IP4a* = E-filing participation rate (%); *IP5a* = Payment compliance rate of new taxpayers acquired through extensification efforts; *IP6a* = Completion rate of requests for data and/or information clarification (%); *IP7a* = Audit completion rate (%); *IP7b* = Rate of uncontested tax assessments (%); *IP7c* = Active engagement rate in preventive billing (%); *IP8a* = Rate of IDLP (Investigation, Detection, and Prosecution) submissions (%); *IP9a* = Timeliness of tax return documentation handling; *IP9b* = Provision rate of potential tax; *LG10a* = competent human resources; *LG11a* = Fit for purpose organisation; *LG12a* = Improved budget management.

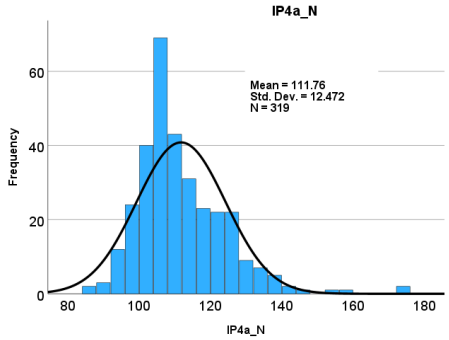
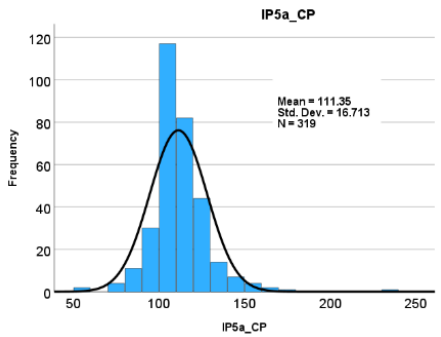
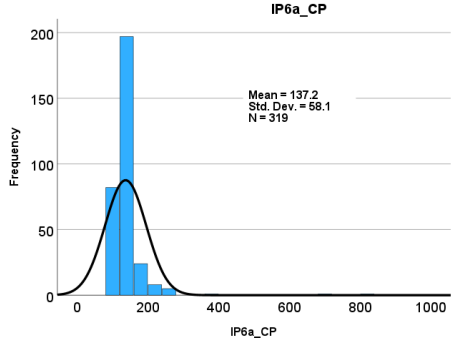
Fig. 4: Histograms for *S1a*, *S1b*, *S1c*, *C2a*, *C2b*, and *IP3a*

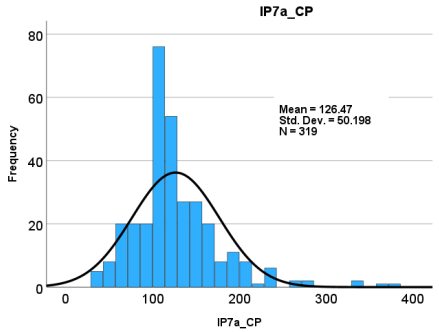
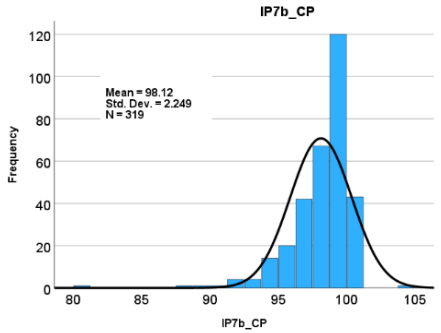
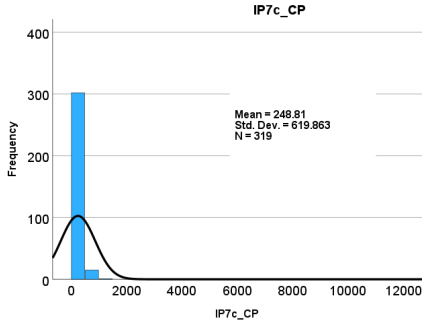
Panel A: *Percentage of tax revenue realisation*	**Panel B**: *Percentage of effort tax revenue realisation*	**Panel C:** *Growth in gross tax revenues (GDP)*
		

Panel D: *Formal compliance rate for corporate and individual taxpayers.*	**Panel E**: *Payment compliance rate for Corporate and Individual Taxpayers*	**Panel F**: *Effectiveness rate of extension activities*
		

Source: author's elaboration.

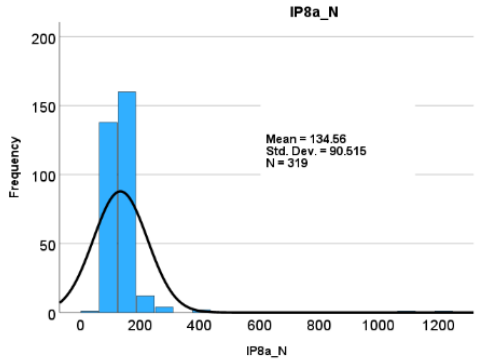
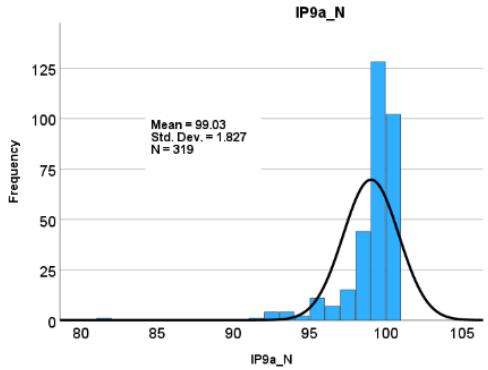
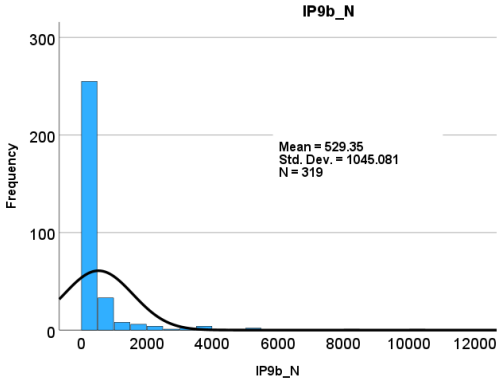
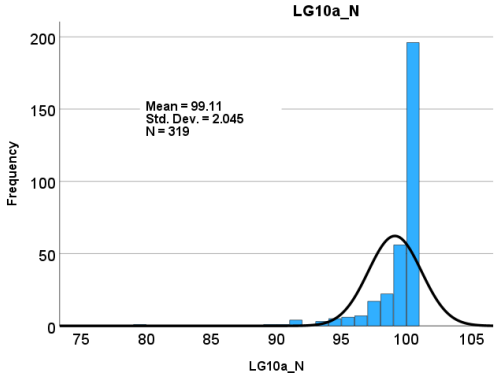
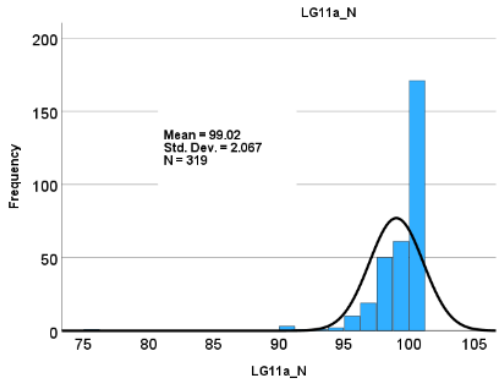
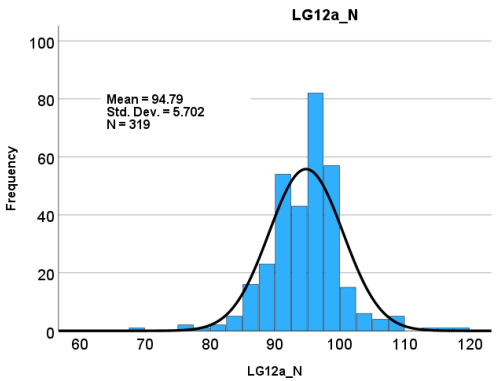
Fig. 5: Histograms for *IP4a*, *IP5a*, *IP6a*, *IP7a*, *IP7b*, and *IP7c*

Panel G: *E-filing participation rate*	**Panel H**: *Payment compliance rate of new taxpayers acquired through extensification efforts*	**Panel I**: *Completion rate of data and/or information clarification requests*
		

Panel J: *Audit completion rate*	**Panel K**: *Rate of uncontested tax assessments*	**Panel L**: *Active engagement rate in preventive billing*
		

Source: author's elaboration.

Fig. 6: Histograms for *IP8a*, *IP9a*, *IP9b*, *LG10a*, *LG11a*, and *LG12a*

Panel M: *Rate of IDLP (Investigation, Detection, and Prosecution) submissions*	**Panel N**: *Timeliness of tax return documentation handling*	**Panel O**: *Provision rate for potential tax data*
		
Panel P: *Competent human resources*	**Panel Q**: *Fit for purpose organisation.*	**Panel R**: *Improved budget management*
		

Source: author's elaboration.