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## Article

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# Enhancing Tax Compliance in the Energy Sector: PLS-SEM Analysis of Tax Administration Strategies

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## ABSTRACT

The energy sector often constitutes a significant portion of a country's gross domestic product (GDP). It includes industries related to oil, gas, electricity, and renewable energy sources. The size of this sector means that it has a substantial economic impact, contributing to overall economic growth and, in turn, increasing tax revenue. In the context of revenue generation challenges faced by tax authorities, this research explores the pivotal role of tax administration strategies in enhancing tax compliance within the energy sector. Employing a quantitative research methodology with a survey design, this study utilizes structured questionnaires distributed to randomly selected individual taxpayers involved in the energy sector in Indonesia, collecting 178 samples. The research leverages Partial Least Squares Structural Equation Modeling (PLS-SEM) to rigorously test its hypotheses. The findings underscore the critical importance of effective tax administration for augmenting tax compliance within the energy sector and, consequently, increasing tax revenues. The findings empirically prove that tax education, the imposition of law enforcement, and administrative efficiency emerge as key drivers, significantly and positively influencing tax compliance in the energy sector. The findings emphasize the importance of educating individuals and businesses within the energy sector about their tax obligations. Energy companies and workers should be well-informed about tax laws and regulations to encourage voluntary compliance.

**Keywords:** Tax Compliance, Energy Sector, Tax Administration, PLS-SEM, Indonesia

**JEL Classifications:** H23, K32

## 1. INTRODUCTION

In the realm of fiscal governance within energy sector, the mobilization of tax revenues essential for underpinning fundamental state functions is beset by significant challenges (Mallick, 2021). These challenges prominently encompass issues related to inadequate tax literacy, diminished trust, and suboptimal utilization of administrative capacity (Bassey et al., 2022; Bashir et al., 2021). Governments, as part of their fundamental role, levy taxes on various facets such as individual and corporate earnings, profits, assets, and consumption to fulfill critical objectives encompassing the provisioning of public services, poverty alleviation, and the stimulation of economic growth (Shahzad, 2020; Irianto, 2020).

Consequently, taxes are regarded as a civic obligation incumbent upon individuals and entities, serving as a tangible manifestation of their endorsement of an efficacious governmental system and as a means to furnish the requisite financial resources for its operational sustenance (Atuguba, 2021; Hao et al., 2021). It is noteworthy to discern that while both paradigms underscore the necessity of affording the government due legitimacy in the collection of taxes, particularly within the energy sector, disparities emerge with regard to taxpayer behavior. These disparities manifest themselves through adherence to government-imposed regulations as opposed to voluntary and enthusiastic contributions toward state finances (Faccia and Mosteanu, 2019; Bashir et al., 2022; Fang et al., 2023). Essentially, though taxation is obligatory in nature, the attitudes

and willingness of taxpayers to comply with this obligation can exhibit considerable divergence. Moreover, research conducted by Arthur et al. (2022) reveals that, despite having substantial taxable populations, the governments have persistently encountered challenges in mobilizing tax revenues effectively. Adalety et al. (2022) have asserted that inadequate levels of tax compliance are a significant contributor to revenue issues. This deficiency in compliance is reflected in the actions of citizens who either refrain from registering as taxpayers, underreport their tax obligations, submit tax returns belatedly, or fail to fulfill their tax obligations altogether (Hsu et al., 2021; Kamilah and Khan, 2021; Drumond et al., 2021; Ologbenla, 2021).

In Indonesia, tax compliance levels, including those within the energy sector companies, are relatively lower. This situation constrains the government's capacity to amass sufficient tax revenues to cover essential expenditures and stimulate economic advancement. Prior research, as noted by Mallick (2021), has demonstrated the multifaceted nature of factors influencing tax compliance. Hokamp (2022) has introduced an income tax evasion model identifying four economic variables: income level, tax rate, fine magnitude, and the likelihood of audit. This model has significantly shaped the enforcement paradigm and has played a pivotal role in guiding various tax administration reforms, underlining the imperative for more rigorous enforcement measures. In contrast, Fernandes et al. (2021) underscore the role of tax administration as both a service provider and facilitator. They complement the enforcement paradigm by emphasizing the importance of tax administrations undertaking reforms to enhance their services and deter tax evasion effectively. This approach aims to boost tax compliance by proactively providing taxpayers with information that reduces uncertainties and simplifies the complexities associated with tax compliance, thus making them more inclined to adhere to tax regulations (Sun et al., 2020; Chien et al., 2021). Nonetheless, there exists a dearth of empirical evidence regarding the correlation between tax administration and tax compliance within the energy sector of Indonesia. The investigation conducted by Batrancea et al. (2019) explored the impact of effective tax administration on tax compliance but did not delve into the tax administration paradigm's specific influence on tax compliance. Prior research predominantly examined tax compliance in a generalized context, without specifying distinct taxpayer categories. Consequently, the primary objective of this study is to scrutinize tax compliance within the energy sector through the lens of four distinct paradigms, namely: Tax education, support services, law enforcement, and administrative efficiency, employing the model adopted from Olaniyi et al. (2023). This research endeavors to assess the degree to which these four paradigms exert influence on tax compliance within the energy sector, offering valuable insights into the dynamics of tax compliance within this particular domain.

## 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The tax-to-Gross Domestic Product (GDP) ratio of these countries serves as a telling indicator of this low compliance. Mawejje and

Sebudde (2019) have highlighted that the lower average ratio of personal income tax revenue to GDP. Several contributing factors, including ineffective tax administration, deficient taxpayer education and advisory services, diminished taxpayer morale, a lack of institutional capacity to tax, subpar management of tax revenues, and an absence of technological infrastructure, collectively exacerbate the issue of high tax non-compliance (Li et al., 2023; Olaniyi et al., 2023). Given its contribution to GDP, personal income tax is regarded as inefficient and unsatisfactory. A significant challenge lies in the limited number of registered and active personal income taxpayers, potentially stemming from a lack of clarity regarding the scope of taxable individuals. Indeed, evidence suggests that high-income earners often remain unregistered and do not fulfill their tax obligations (Rulandari and Rahmayani, 2023). Ineffectual tax collection in this sector results in substantial revenue losses for tax administrations (Ganyam et al., 2019; Xu et al., 2022; Levinson, 2019).

Tax administration encompasses a multifaceted array of functions, encompassing the implementation and enforcement of tax laws, taxpayer registration, the processing and validation of tax returns, tax collection, provision of quality services to taxpayers, and the imposition of penalties upon violators (Budiharseno and Tiranda, 2020; Balogun, 2019; Bassey et al., 2022). Within the realm of domestic revenue generation, tax administration plays a pivotal role by enabling governments to amass the requisite tax revenues essential for funding public goods and services. Consequently, tax authorities bear the responsibility of equipping taxpayers with comprehensive information and support to facilitate compliance with tax obligations, thereby streamlining the tax compliance process. Balan et al. (2022) posit that effective tax administration can enhance tax compliance and curtail tax avoidance by prioritizing the provision of excellent tax services to taxpayers while simultaneously displaying proficiency in detecting and penalizing instances of tax avoidance. Alm and Torgler (2011) advocate for a service-oriented approach in taxation matters, entailing the provision of tax education to educate and assist taxpayers in fulfilling their tax reporting duties, offering support services to facilitate the process of tax filing and payment. Additionally, the deployment of Law enforcement serves a dual purpose: Augmenting tax compliance and acting as a deterrent against non-compliance (Oladele et al., 2019). Lastly, the significance of transparent and equitable tax administration in bolstering administrative efficiency is underscored (Enyi et al., 2019; Chien et al., 2021).

Tax compliance pertains to the degree to which taxpayers demonstrate their willingness to meet their tax responsibilities in accordance with established tax laws and regulations, encompassing the timely and accurate submission of tax returns. Within the scope of this study, a tax compliance framework is employed, delineating three facets of tax compliance, specifically compliance in reporting, completion, and payment (Anto et al., 2021 Shahzad, 2020; Bashir et al., 2021). Reporting compliance evaluates the precision of the financial information provided, while filing compliance gauges the extent to which taxpayers submit their tax returns punctually. In contrast, payment compliance measures the proportion of taxes remitted in accordance with

the reported financial gains (Alem and Tewabe, 2022; Fang et al., 2023). Taxpayers bear the responsibility of registering with tax authorities, accurately reporting income and expenses, and promptly filing the requisite returns as per the applicable tax provisions. However, non-compliance among individuals subject to taxation can manifest in various forms, encompassing non-registration, inaccuracies in tax reporting, or inadequate tax payments, as elucidated by Oladele et al. (2019) and Hokamp (2022). Non-compliance may manifest as deliberate, reflecting a purposeful disregard for tax regulations or the deliberate provision of erroneous tax information. Conversely, unintentional non-compliance may arise due to a lack of awareness concerning tax laws and compliance requisites (Mpofu, 2022; Bassey et al., 2022; Rulandari and Rahmayani, 2023).

Taxpayer decisions regarding tax compliance are shaped by their assessments of the costs and benefits associated with tax avoidance. When taxpayers perceive a high likelihood of being subjected to audits and severe penalties, they are more inclined to abstain from tax evasion. Conversely, if the penalties are lenient, and the chances of an audit are low, taxpayers may be tempted to engage in tax evasion (Mannan, 2020; Hsu et al., 2021; Drumond et al., 2021). Consequently, the severity of penalties and the probability of detection are influential factors impacting tax compliance. Another approach underscores the role of tax administration as not only an enforcer but also a facilitator and service provider to taxpayers, thereby fostering tax compliance. As posited by Enyi et al. (2019), several strategies can enhance compliance, including providing guidance and counsel to taxpayers, ensuring the accessibility of information regarding tax obligations, and simplifying the payment process. In a study conducted by Olaniyi et al. (2023), the research delves into the influence of economic factors, particularly tax audits and tax fines, on tax compliance. The findings reveal a positive correlation between tax audits, tax fines, and tax compliance. However, Oladele et al. (2019) present inconclusive findings regarding how tax enforcement tools affect compliance among specific taxpayer groups. Additionally, Kwok and Yip (2018) note that the effectiveness of audits can yield varying impacts on the level of tax compliance. Furthermore, research by Batrancea et al. (2019) investigates how the simplicity of information provided by tax administration, preventative measures, and tax morale influence the compliance of individual income taxpayers with tax filing, reporting, and payment obligations. Adalety et al. (2022) undertook a study examining the simplification of information at various junctures of communication between tax authorities and taxpayers. These stages encompass the solicitation of tax return submissions, tax payment processes, and subsequent interactions concerning late filing or payment of taxes. By streamlining the information relayed to taxpayers and enhancing tax compliance, tax administration stands to diminish the costs associated with enforcement measures. Enyi et al. (2019) underscore the significance of providing tax education, particularly considering that individuals newly introduced to the tax system may encounter challenges in grasping its complexities. Such educational efforts play a pivotal role in fostering taxpayers' appreciation of the importance of taxation and their commitment to fulfilling their tax obligations. However, research by Mawejje and Sebudde (2019)

has revealed that despite endeavors to enhance tax education, its impact may not significantly influence actual compliance but rather contribute to a better understanding of taxation. Consequently, this study diverges from previous research that predominantly concentrated on evaluating the effects of specific enforcement services on tax compliance. Instead, this research explores the influence of tax administration on tax compliance within the energy sector, employing proxies such as tax education, support services, law enforcement, and administrative efficiency (Sun et al., 2020; Levinson, 2019; Bashir et al., 2022; Bakri et al., 2022). The research's primary objectives are confined to four hypotheses, a deliberate choice driven by the existing variability in prior findings and the substantial contribution that the use of these four proxies can make to our understanding of tax administration. Hence, the ensuing hypotheses are posited:

Hypothesis 1: Tax education has a significant influence on energy sector tax compliance

Hypothesis 2: Support service has a significant influence on energy sector tax compliance

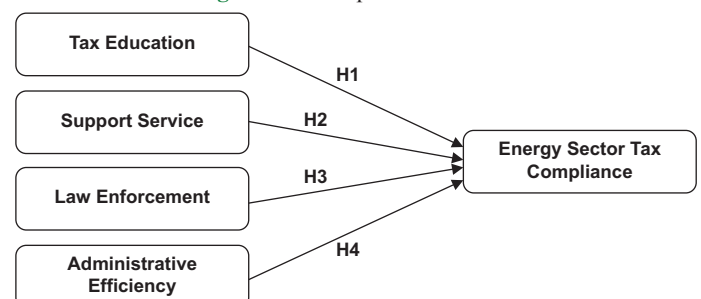
Hypothesis 3: Law enforcement has a significant influence on energy sector tax compliance

Hypothesis 4: Administrative efficiency has a significant influence on energy sector tax compliance.

### 3. RESEARCH METHOD

In this study, a quantitative research approach was employed, utilizing a cross-sectoral survey design to gather primary data for the purpose of evaluating the impact of tax administration on energy sector tax compliance. The study's target population consisted of individual income taxpayers spanning various sectors within Indonesia. Non-probability sampling methods were employed to select participants, with samples drawn from individual taxpayers representing diverse backgrounds, including varying business sectors, age groups, genders, education levels, and years of experience. The primary data collection instrument employed in this research was a structured questionnaire. A total of 250 questionnaires were distributed to respondents through survey methodologies. However, 61 of the distributed questionnaires were not returned. Of the 189 returned questionnaires, 11 were found to be incomplete, resulting in a final dataset of 178 fully completed questionnaires used for analysis. The variable of energy sector tax compliance was gauged through indicators assessing reporting, filing, and payment practices, employing a seven-point Likert Scale. Similarly, tax administration was measured via indicators encompassing tax education and counseling, support services,

Figure 1: Conceptual framework





law enforcement, and administrative efficiency (Figure 1), also employing a seven-point Likert scale. For data analysis, this research applied Partial Least Square Structural Equation Modeling (PLS-SEM). PLS-SEM follows a two-step process, commencing with an assessment of the measurement model and subsequently the structural model. The measurement model is initially evaluated by scrutinizing external loadings or construct indicator loadings, along with assessments of reliability and validity.

## 4. RESULTS

The research findings present a nuanced understanding of energy sector tax compliance and tax administration, with a focus on five critical variables. Respondents, on average, demonstrated a moderate level of compliance with tax obligations specific to the energy sector, as indicated by a mean score of 3.49. This suggests that while there is a baseline level of compliance, there is an opportunity for improvement in enhancing compliance within this sector. Tax education, with an average score of 3.21, revealed a relatively lower level of understanding among respondents regarding tax matters. Additionally, law enforcement efforts received a moderate score of 2.94, signifying that respondents perceived a need for enhanced efforts in this domain. On a more positive note, respondents perceived relatively higher levels of support services (mean score of 3.91) and administrative efficiency (mean score of 3.11) within the tax administration. Despite this, there is still room for improvement in the tax education and law enforcement aspects of tax administration. The findings underscore the importance of targeted efforts to enhance tax education and enforcement to further improve energy sector tax compliance (Table 1).

Statistical analysis assesses the measurement model through reliability and validity tests, as well as structural model tests through the average variation extracted (AVE > 0.5) and composite reliability (> 0.7) (Hair et al., 2019). Table 2 shows tax education construct includes three indicators, with standardized loading factors of 0.829, 0.85, and 0.52, respectively. For the variable of support service, the construct comprises four indicators, with standardized loading factors of 0.823, 0.692, 0.566, and 0.857, respectively. These substantial loading factors signify a strong association between these indicators and the Support Service construct, confirming their reliability in gauging respondents' perceptions of support services provided by tax authorities. Moreover, Law Enforcement is assessed through three indicators with standardized loading factors of 0.928, 0.543, and 0.66, respectively. These high loading factors underscore the reliability and effectiveness of these indicators in measuring the Law Enforcement construct. The variable of Administrative Efficiency construct employs four indicators with standardized loading factors of 0.57, 0.683, 0.721, and 0.763, respectively. Lastly, the Energy Sector Tax Compliance construct comprises three indicators, with standardized loading factors of 0.754, 0.807, and 0.797, respectively. These high loading factors indicate the reliability and validity of these indicators in measuring respondents' perceptions of tax compliance within the energy sector.

Furthermore, Fornell and Larcker criteria were used to evaluate discriminant validity. Table 3 presents the results regarding

**Table 1: Descriptive statistics**

No.	Description	Mean	SD
1.	Energy sector tax compliance	3.49	0.72
2.	Tax education	3.21	0.78
3.	Support service	3.91	0.81
4.	Law enforcement	2.94	0.69
5.	Administrative efficiency	3.11	0.71

**Table 2: Reliability and validity**

Constructs	Indicators	Std. Loading factor
Tax education	EDU1	0.829
	EDU2	0.85
	EDU3	0.52
Support service	SERV1	0.823
	SERV2	0.692
	SERV3	0.566
	SERV4	0.857
Law enforcement	LAW1	0.928
	LAW2	0.543
	LAW3	0.66
Administrative efficiency	ADM1	0.57
	ADM2	0.683
	ADM3	0.721
	ADM4	0.763
Energy sector tax compliance	COM1	0.754
	COM2	0.807
	COM3	0.797

discriminant validity, assessed using the Fornell and Larcker criterion. This criterion examines the extent to which each construct is distinct from the others by comparing the square root of the Average Variance Extracted (AVE) of each construct with the correlations between constructs. The square root of the AVE for Tax Education is 0.726, which is higher than the correlations between Tax Education and the other constructs (Support Service: 0.434, Law Enforcement: 0.207, Administrative Efficiency: 0.316, Energy Sector Tax Compliance: 0.198). This demonstrates discriminant validity, indicating that Tax Education is distinct from the other constructs. In term of Energy Sector Tax Compliance, the square root of the AVE for Energy Sector Tax Compliance is 0.703, which is higher than the correlations between Energy Sector Tax Compliance and the other constructs, indicating discriminant validity for this construct as well. Overall, this demonstrates that each construct has discriminant validity, as the square root of the AVE for each construct is higher than its correlations with other constructs. This confirms that the constructs are distinct from each other and can be reliably measured in the study.

Table 4 presents the results of the hypotheses testing, indicating the beta ( $\beta$ ) values, t-values, and corresponding P-values for each hypothesis. Firstly, the hypothesis that tax education positively influences energy sector tax compliance is supported. The beta value of 0.230 is statistically significant with a high  $t = 4.166$  and a  $P = 0.000$ , indicating a strong positive relationship between tax education and energy sector tax compliance. This suggests that as tax education improves, there is a significant increase in energy sector tax compliance.

The second hypothesis that support service positively influences energy sector tax compliance is also supported. The beta value of

**Table 3: Discriminant validity-Fornell and Larcker criterion**

Constructs	Tax education	Support service	Law enforcement	Administrative efficiency	Energy sector tax compliance
Tax education	0.726				
Support service	0.434	0.721			
Law enforcement	0.207	0.091	0.706		
Administrative efficiency	0.316	0.371	0.164	0.666	
Energy sector tax compliance	0.198	0.113	0.152	0.245	0.703

**Table 4: Hypotheses testing**

Hypotheses	$\beta$	T-value	P-value	R <sup>2</sup>	Decision
Tax education -> Energy sector tax compliance	0.230	4.166	0.000	0.337	Accepted
Support service -> Energy sector tax compliance	0.119	3.369	0.000		Accepted
Law enforcement -> Energy sector tax compliance	0.109	2.671	0.001		Accepted
Administrative efficiency -> tax compliance	0.204	3.261	0.000		Accepted

0.119 is statistically significant with a  $t = 3.369$  and a  $P = 0.000$ . This implies that improved support services provided by tax authorities lead to a significant increase in energy sector tax compliance. The third hypothesis that law enforcement positively influences energy sector tax compliance is supported as well. The beta value of 0.109 is statistically significant with a  $t = 2.671$  and a  $P = 0.001$ . This suggests that more effective law enforcement efforts contribute to a significant improvement in energy sector tax compliance.

Lastly, the fourth hypothesis that administrative efficiency positively influences tax compliance is also supported. The beta value of 0.204 is statistically significant with a  $t = 3.261$  and a  $P = 0.000$ . This indicates that enhanced administrative efficiency within tax administration positively impacts overall tax compliance.

These findings highlight the importance of these factors in enhancing compliance within the energy sector. The results of this study confirm the significant role of tax administration in influencing the level of energy sector tax compliance, providing an important contribution to the existing literature on factors influencing tax compliance. This finding is in line with the results of a study conducted by Enyi et al. (2019) and Bashir et al. (2022). Specifically, four hypotheses tested using the bootstrap procedure show that tax education has a positive and significant influence on the level of energy sector tax compliance. These results are consistent with the findings found by Kwok and Yip (2018); Fang et al. (2023); and Sun et al. (2020), which highlighted the importance of tax education in increasing tax compliance. Therefore, the findings of this study add to the evidence that tax education plays a role as a predictor factor in the level of energy sector tax compliance. Apart from that, the results of this research also show that the use of Law enforcement has a positive and significant influence on the level of energy sector tax compliance. This finding is also in line with the results of research by Oladele et al. (2019) and Chien et al. (2021), which emphasizes the importance of using tax fines in increasing tax compliance. Furthermore, this research indicates that administrative efficiency has a positive and significant impact on the level of energy sector tax compliance. However, support services do not have

a positive or significant influence on the level of energy sector tax compliance. This finding contrasts with research conducted by Alm and Torgler (2011) and Levinson (2019), which found that services to taxpayers can influence the level of compliance in tax reporting.

## 5. CONCLUSION

The results of this study confirm that tax education, law enforcement, and administrative efficiency are significant factors in predicting the level of energy sector tax compliance. However, this research also verifies that support services do not have a significant impact on energy sector tax compliance. These empirical findings provide an important contribution to the existing literature by offering evidence of the influence of the multidimensional tax administration paradigm on the level of energy sector tax compliance. This research highlights that the right combination of tax education, law enforcement, and administrative efficiency can encourage energy sector tax compliance. The results of this research also have important implications for policy and future research. Therefore, policymakers in Indonesia should prioritize taxpayer education and improve the quality of services to encourage voluntary compliance. Additionally, attention should be focused on strengthening tax law enforcement strategies.

This research provides valuable contributions to research by offering empirical evidence regarding the impact of a multidimensional tax administration paradigm (tax education, support service, law enforcement, and administrative efficiency) on energy sector tax compliance. Furthermore, this research also contributes to policy formulation by emphasizing the need to implement effective and efficient models of education, law enforcement, and bureaucracy to increase the effectiveness of tax administration.

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