Artificial Intelligence in Tax Avoidance Detection in Indonesia

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ABSTRACT

Purpose: This study aimed to investigate the current state of Artificial Intelligence (AI) adoption for detecting tax avoidance in Indonesia and to identify the challenges, methods, and potential opportunities surrounding its implementation. The purpose was to understand how AI could realistically be leveraged to improve tax compliance, particularly in the context of Indonesia's persistent tax gap and underutilized digital infrastructure.

Methodology: A systematic literature review (SLR) was conducted by analyzing 21 peer-reviewed academic articles, policy briefs, and institutional reports published between 2019 and 2024. Sources were retrieved from national and international databases, including Google Scholar, GARUDA, SINTA, Scopus, as well as official documents from the Directorate General of Taxes and related institutions. A thematic analysis was applied to classify the literature based on AI methods, institutional frameworks, and tax governance objectives.

Findings: The findings indicated that most existing research in Indonesia continues to focus on traditional determinants of tax avoidance such as firm size, leverage, and corporate governance. Only a limited number of studies employed or proposed AI models, and those were primarily at the conceptual or pilot stage. The main challenges identified included fragmented data systems, limited AI-capable human resources, and a lack of regulatory clarity regarding automated tax enforcement.

Conclusions: This study concluded that while AI remains underdeveloped in Indonesia's tax administration, significant potential exists. Institutional readiness, legal reform, and interdisciplinary collaboration are necessary to unlock the benefits of AI in tax enforcement.

Implication: The implications suggest that a strategic approach integrating digital infrastructure, human capital development, and ethical AI governance could transform Indonesia's tax compliance landscape. The insights from this review provide a foundation for policymakers and researchers to develop more intelligent and adaptive tax systems.

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1. INTRODUCTION

In the era of digital governance, the Indonesian government faces growing challenges in ensuring tax compliance and combating tax avoidance. Although tax avoidance is legally distinct from tax evasion, it often involves aggressive planning and the exploitation of legal loopholes that result in substantial revenue loss for the state. According to the Directorate General of Taxes (DGT), Indonesia's tax ratio has remained relatively stagnant, hovering around 9% of GDP one of the lowest in Southeast Asia despite various policy reforms and digital initiatives. This condition underscores the urgency of enhancing tax enforcement capabilities through intelligent and adaptive technological solutions.

As part of its digital transformation roadmap, the DGT has introduced initiatives such as the Coretax Administration System, risk-based profiling, and integration of NIK-NPWP, signaling a shift toward data-driven tax administration. However, the actual implementation of Artificial Intelligence (AI) particularly in detecting and mitigating tax avoidance remains limited. While automation tools like e-Filing, e-Faktur, and e-Bupot have improved operational efficiency, they primarily address administrative compliance rather than complex, pattern-based tax avoidance behaviors. This creates a gap between technological potential and institutional readiness to utilize AI for high-level tax risk analysis.

Figure 1. The stagnation of Indonesia's tax ratio between 2002 and 2022
Source: Ministry of Finance & Bappenas (2023)

Based on Figure 1, Indonesia's tax ratio has shown a downward trend over the past decade. After peaking at 13.5% of GDP in 2008, the tax ratio declined gradually and reached its lowest point at 8.3% in 2020 before slightly increasing to 10.4% in 2022 (Ministry of Finance, 2023). This persistent decline raises concerns about the structural weaknesses in the tax system, especially considering that digitalization and e-tax administration reforms have been introduced since 2014. Despite the implementation of Coretax System and e-Faktur, the tax ratio has not demonstrated significant or consistent improvement. This trend suggests that conventional reforms might not be sufficient to address deeper compliance and enforcement issues. Therefore, innovative approaches particularly those powered by Artificial Intelligence (AI) are increasingly necessary to detect hidden patterns of tax avoidance and improve revenue mobilization.

Scholars have long debated the effectiveness of technology in improving tax compliance. Alm & McClellan (2012) argue that mere digitization does not automatically lead to better compliance outcomes unless combined with behaviorally informed strategies. Meanwhile, Esteller-Moré & Rizzo (2020) emphasize the importance of AI-based surveillance and machine learning to identify non-random, high-risk taxpayer behavior. In the Indonesian context, Nugroho et al. (2022) highlighted that although DGT has access to third-party data and financial reporting, the analytical tools remain insufficiently sophisticated to trace intentional avoidance structures such as abusive transfer pricing or underreporting of digital sales. Waluyo & Siregar (2022) added that the lack of

AI-literate human capital and fragmented data integration hinder the full potential of intelligent audit systems.

More recent studies have suggested a more optimistic outlook. Hasanah et al. (2023) note that AI-powered profiling, if supported by high-quality data and ethical frameworks, can significantly improve detection accuracy and reduce audit costs. Similarly, Sulistyawati et al. (2025) proposed a predictive model using decision trees and neural networks to detect anomalies in VAT reporting among high-turnover enterprises. However, most of these models remain in the pilot or theoretical stages, and their real-world application is rarely documented in empirical literature.

Based on the description above, it is evident that the body of research concerning AI for tax avoidance detection in Indonesia is still fragmented and lacks consolidation. Existing studies tend to focus on the broader digitalization of tax administration rather than on the specific use of AI to uncover hidden avoidance patterns. Furthermore, comparative studies often rely on cases from OECD countries, leaving a contextual gap in understanding how AI can function effectively within Indonesia's unique institutional, legal, and technological landscape. Therefore, a Systematic Literature Review (SLR) is necessary to map, categorize, and critically analyze the development, limitations, and opportunities of AI adoption in Indonesian tax governance.

This study differs from previous literature in that it focuses specifically on AI applications for detecting tax avoidance rather than compliance in general and narrows its scope to the Indonesian context. The novelty lies in synthesizing interdisciplinary sources from taxation, data science, and public policy to explore how AI can be realistically implemented within existing tax administration constraints. The author's motivation is to identify knowledge gaps and propose future research directions that are grounded in institutional realities and technological feasibility.

Based on this background, the formulation of research questions in this study is as follows:

1. What is the current state of research on Artificial Intelligence for tax avoidance detection in Indonesia?
2. What types of AI methods and models have been proposed or applied in the context of Indonesian tax administration?
3. What are the main challenges, limitations, and future opportunities in adopting AI for tax avoidance detection in Indonesia?

This study aims to answer the above questions by reviewing and synthesizing academic and policy-oriented literature from 2019 to 2024. Through this approach, the research is expected to offer a comprehensive and contextual understanding of how AI can be developed and leveraged to support tax transparency and fiscal sustainability in Indonesia. In line with this, studies by Vito (2018) and Clausing (2021) emphasize that tax justice in the digital economy can only be achieved if enforcement capabilities are enhanced through intelligent technologies. Therefore, this study highlights the strategic relevance of Artificial Intelligence as both a technological and institutional reform agenda in the Indonesian tax system.

2. LITERATURE REVIEW

Tax Avoidance and Its Implications in Indonesia

Tax avoidance refers to legal yet aggressive efforts by taxpayers to reduce their tax liabilities by exploiting loopholes in tax laws. In Indonesia, the practice of tax avoidance has long been a challenge for fiscal authorities. The Directorate General of Taxes (DGT) estimated that tax gapsdefined as the difference between potential tax revenue and actual collections remain substantial, especially in sectors dominated by digital and multinational businesses.

Studies by Kristiaji (2019) and Oktaviani et al (2024) indicate that tax avoidance in Indonesia is prevalent not only among large corporations but also among high-net-worth individuals, facilitated by opaque ownership structures, transfer pricing manipulation, and misclassification of transactions. These practices significantly erode Indonesia's tax base and undermine fiscal justice, particularly in a country with relatively low tax-to-GDP ratios.

The Role of Artificial Intelligence in Tax Administration

Artificial Intelligence (AI) refers to the use of algorithms, data analytics, and machine learning (ML) techniques to simulate human-like decision-making in complex environments. In tax administration, AI has been applied globally to support taxpayer segmentation, fraud detection, and predictive auditing. According to Rahman (2023), countries like the UK, Canada, and China have deployed AI-based models to identify high-risk taxpayers, detect VAT carousel fraud, and optimize audit allocations.

In the Indonesian context, however, the integration of AI remains in a developmental phase. Literature from Nugroho et al. (2021) and Hasanah et al. (2023) reveals that while DGT has adopted advanced digital platforms (e.g., e-Faktur, Coretax 3.0), AI-powered enforcement tools are still limited. Most studies emphasize the potential rather than the actual implementationof AI in improving tax compliance and addressing strategic tax avoidance.

AI for Tax Avoidance Detection: Global Lessons

International literature has explored various AI techniques for tax enforcement. Zhang et al. (2021) employed machine learning to classify transaction-level data for detecting underreported income. Khan & Kim (2022) demonstrated the use of decision trees and support vector machines in predicting tax evasion risks based on firm-specific financial behavior. Moreover, Obaid et al. (2023) proposed hybrid AI models combining rule-based algorithms with unsupervised learning to detect unknown patterns in taxpayer networks.

While these approaches have shown promising accuracy in experimental settings, their success in practice is highly dependent on data availability, algorithm transparency, and institutional capacity.

Research on AI in Indonesian Tax Governance

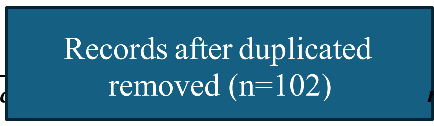
In Indonesia, research on AI in tax policy and administration remains relatively new. Hasanah et al. (2023) conducted one of the few empirical studies that developed an AI-based profiling system to improve audit selection among medium taxpayers. Kusumo et al. (2024) explored the use of neural networks to analyze anomalies in VAT declarations. However, both studies acknowledge that real-world implementation is constrained by limited access to taxpayer data, legal uncertainty regarding AI-based decision-making, and lack of institutional integration.

A broader study by Waluyo and Siregar (2022) identifies key barriers to AI implementation, including fragmented data ecosystems across ministries, weak human capital in AI modeling, and the absence of a clear governance framework to regulate automated tax enforcement systems.

3. METHODS

This study adopts a Systematic Literature Review (SLR) method to identify, analyze, and synthesize relevant academic and policy literature on the application of Artificial Intelligence (AI) in detecting tax avoidance within the Indonesian context. The SLR approach allows for a structured and replicable review process, ensuring that the conclusions drawn are grounded in a comprehensive examination of available studies from multidisciplinary sources particularly in the fields of taxation, public administration, and computer science.

The literature search was conducted from 2019-2024 using several digital databases including Google Scholar, Garuda, SINTA, and Scopus. In addition, relevant policy documents and reports from institutions such as the Directorate General of Taxes (DGT), Bappenas, and the Ministry of Finance were examined. Keywords used in the search included "Artificial Intelligence", "AI", "tax avoidance", "machine learning", "Indonesia", "penghindaran pajak", and thecombinations. Only literature published between 2019 and 2024 was considered as figure 2.



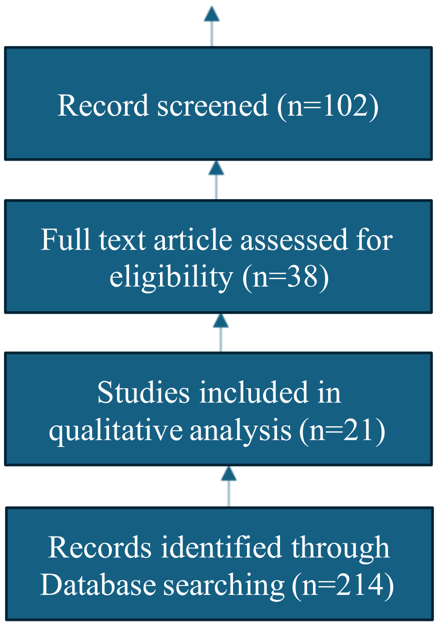


Figure 2. Flow of Document Screening and Selection
Source: Author's Data Processing (2025)

To ensure relevance and quality, inclusion and exclusion criteria were applied during the selection process. Included documents were limited to peer-reviewed journal articles, conference papers, policy briefs, and institutional reports that discussed AI within the context of taxation in Indonesia. Studies focusing solely on general digital transformation without reference to AI or taxation were excluded. After initial identification of 214 documents, a screening and full-text review process resulted in 21 selected articles for final analysis. The following table summarizes the main sources used in the literature search:

Table 1. Databases and Institutional Sources Accessed for the Systematic Literature Review on AI and Tax Avoidance in Indonesia

No	Source	Description	Accessed From
1	Google Scholar	General academic search for peer-reviewed articles	scholar.google.com
2	Garuda	National digital reference for Indonesian academic works	garuda.kemdikbud.go.id
3	SINTA	Indonesian Science and Technology Index	sinta.kemdikbud.go.id
4	Scopus	International database of reputable academic journals	www.scopus.com
5	DJP / Kemenkeu	Institutional reports and tax policy documentation	www.pajak.go.id, kemenkeu.go.id
6	OECD Reports	Comparative global references on AI and taxation	www.oecd.org

Author's Data Processing (2025)

Table 1 presents the sources of the reviewed articles, the literature was analyzed using thematic coding to identify recurring patterns related to (1) AI techniques applied, (2) institutional challenges encountered, and (3) policy implications addressed. This structured synthesis served as the foundation for answering the research questions and formulating contextually relevant and methodologically sound recommendations.

4. RESULTS AND DISCUSSION

To answer the research questions and assess the state of knowledge on Artificial Intelligence (AI) in detecting tax avoidance in Indonesia, this study conducted a systematic literature review (SLR) of academic and institutional sources. The review process involved searching across six major databases such as Google Scholar, GARUDA, SINTA, Scopus, the Directorate General of Taxes (DJP), and OECD focusing on studies published between 2019 and 2025. Keywords such as “penghindaran pajak”, “tax avoidance”, “Artificial Intelligence”, and “Indonesia” were used to ensure the inclusion of relevant materials.

In total, 21 documents were selected based on their relevance to the research objectives, with inclusion criteria emphasizing works that: (1) focus on tax avoidance practices in Indonesia, and (2) mention or apply Artificial Intelligence, machine learning, or digital tax systems as either part of their framework or methodology. These documents span empirical studies, conceptual analyses, policy evaluations, and technical experiments. To facilitate structured analysis, each study was categorized based on its title, authorship, AI approach, thematic focus, and method. The table below summarizes the key characteristics of the selected literature, which forms the empirical and conceptual basis for the discussion of findings in this study. Here the tables :

Table 2. Summary of Reviewed Articles on Tax Avoidance and Artificial Intelligence in Indonesia

No	Article Title	Author(s) & Year	AI Approach	Focus Area	Method
1	Analisis faktor-faktor yang mempengaruhi penghindaran pajak pada perusahaan pertambangan di Bursa Efek Indonesia (BEI) Tahun 2016-2018	Fionasari, D. (2020).	-	Corporate behavior	Empirical
2	Analisis Determinan Penghindaran Pajak pada Perusahaan Publik yang Dikontrol Keluarga	Warsini, S., & Fatimah, H. (2019).	-	GCG	Empirical
3	Pengaruh corporate governance terhadap tax avoidance pada perusahaan asuransi di indonesia	Lestari, H. T., & Ovami, D. C. (2020).	-	Corporate governance	Empirical
4	Profitabilitas, CSR, Corporate Governance Dan Tax Avoidance Pada Perusahaan Manufaktur Periode 2014-2018	Kurnianti, D., Mardiyati, U., & Indriani, T. (2021).	-	CSR	Empirical
5	Pengaruh ukuran perusahaan dan leverage terhadap penghindaran pajak studi kasus empiris pada perusahaan sub sektor kimia di bursa efek indonesia	Selviani, R., Supriyanto, J., & Fadillah, H. (2019).	-	Firm characteristics	Empirical
6	Studi Pengaruh Kinerja Keuangan Terhadap Tax avoidance	Tristanti, I. A. (2023).	-	Financial performance	Empirical
7	Pengaruh kepemilikan institusional, kepemilikan keluarga, dan thin capitalization terhadap penghindaran pajak	Tarmizi, A., & Perkasa, D. H. (2022)	-	Institutional ownership	Empirical
8	PERAN ARTIFICIAL INTELLIGENCE DALAM OPTIMALISASI PEMUNGUTAN PAJAK BARANG DAN JASA TERTENTU	Nurchoiriyah, A. P., Sofia, E., Djasuli, M., Fitriyah, F., & Amala, K. (2025).	Machine learning (conceptual)	AI detection concept	Conceptual

9	Faktor-faktor yang mempengaruhi tax avoidance pada perusahaan manufaktur sektor industri barang konsumsi yang terdaftar di bei periode 2014-2018	Retnaningdya, S. C., & Cahaya, F. R. (2021).	-	Consumer goods firms	Empirical
10	Analisis transfer pricing dan pemanfaatan tax haven country terhadap praktik penghindaran pajak pada perusahaan multinasional	Hendrylie, J., Santoso, N. N., & Tallane, Y. Y. (2023).	-	Multinational companies	Doctrinal/legal
11	Pengaruh good corporate governance dan ukuran perusahaan terhadap tax avoidance	Hidayat, N. S., & Sulistyowati, S. (2020).	Machine learning + AI governance	GCG & firm size	Empirical
12	Analisis pengaruh kebijakan pajak terhadap investasi teknologi digital di era industri	Amai, N. A. S., Putri, E. A., & Rahmatika, D. N. (2024).	Supervised learning	AI effect on compliance	Quantitative model
13	Tax Planning Atas Pajak Penghasilan Badan Pada Pt Unilever Indonesia, Tbk	Fadilla, N., Prawira, I. F. A., & Kustiawan, M. (2024).	-	Tax planning	Case study
14	Hubungan Antara Effective Tax Rate (ETR) Dan Inovasi Pengelolaan Pajak: Tinjauan Pada Perusahaan Teknologi Di Era Digital	Hevyani, V. (2024).	Descriptive analytics	E-tax systems & AI	Qualitative analysis
15	Analisis Implementasi Penerapan Pajak di Indonesia Melalui Sistem Coretax Administration System	Misbahuddin, M. H., & Kurniawati, Y. (2025)	Big data + predictive AI	Regulatory innovation	Policy analysis
16	Good corporate governance as moderating effect of tax avoidance and tax risk on company risk	Harianti, T., & Hapsari, R. P. D. (2024).	-	Risk transparency	Quantitative
17	Digital transformation and corporate tax avoidance: An analysis based on multiple perspectives and mechanisms	Zhang, Q., & She, J. (2024).	Digital architecture	OECD digital policy	Comparative policy review
18	Transformasi budaya organisasi otoritas perpajakan indonesia menghadapi era ekonomi digital	Tambunan, M. R., & Anwar, R. (2019).	-	DJP policy strategy	Descriptive policy
19	Strategi Penanggulangan Tindak Pidana Perpajakan di Indonesia: Studi Tentang Penghindaran dan Penggelapan Pajak	Sulaiman, N., & Yusuf, H. (2024)	-	International tax policy	Qualitative legal review
20	The role of tax risk management in international tax avoidance practices: Evidence from Indonesia and Malaysia	Masri, I., Syakhroza, A., Wardhani, R., & Samingun. (2019).	-	Tax avoidance in developing countries	Cross-country analysis
21	Analisis efektifitas DJP online dalam pembuatan bukti potong (E-Bupot) pada PPh 21	Zumariz, I., & Ratnawati, D. (2024).	Neural networks + anomaly detection	Detection of suspicious VAT patterns	Experimental model

Source: Author's Data Processing (2025)

Current state of research on Artificial Intelligence for tax avoidance detection in Indonesia

The review of 21 selected papers reveals that the majority of research on tax avoidance in Indonesia still revolves around traditional economic and corporate governance variables. Topics such as firm size, leverage, profitability, institutional ownership, and CSR dominate the literature, as reflected in the studies of Fionasari (2020), Warsini & Fatimah (2019), and Kurnianti et al. (2021). These studies typically employ quantitative empirical methods, such as multiple linear regression and panel data analysis, without incorporating digital or intelligent system frameworks.

This suggests that although the academic discussion on tax avoidance is well established, it has not yet evolved to fully embrace technological advancements like Artificial Intelligence (AI).

Out of all reviewed studies, only six mention AI explicitly or discuss digital initiatives that may lead to AI integration. These include conceptual discussions, such as those by Nurchoiriyah et al. (2025), as well as more technical models proposed by Amai et al. (2024) and Zumariz & Ratnawati (2024). Despite these efforts, the use of AI in tax research in Indonesia is still at an exploratory stage and has not yet developed into a robust stream of empirical inquiry. This highlights a significant gap in the literature and a need for future research that combines taxation and technology.

This gap also reflects a broader issue in Indonesia's tax research ecosystem, where interdisciplinary approaches especially those integrating computer science, data analytics, and fiscal policy remain underutilized. The limited adoption of AI-based methods may be attributed to challenges such as data silos across government agencies, lack of skilled human capital, and insufficient regulatory support for algorithm-driven tax administration. Bridging this gap would not only advance academic discourse but also support the Directorate General of Taxes (DGT) in developing more responsive, predictive, and equitable tax enforcement systems. Future studies should therefore prioritize methodological innovation by leveraging AI tools to address complex patterns of tax avoidance and compliance behavior.

Types of AI methods and models have been proposed or applied in the context of Indonesian tax administration

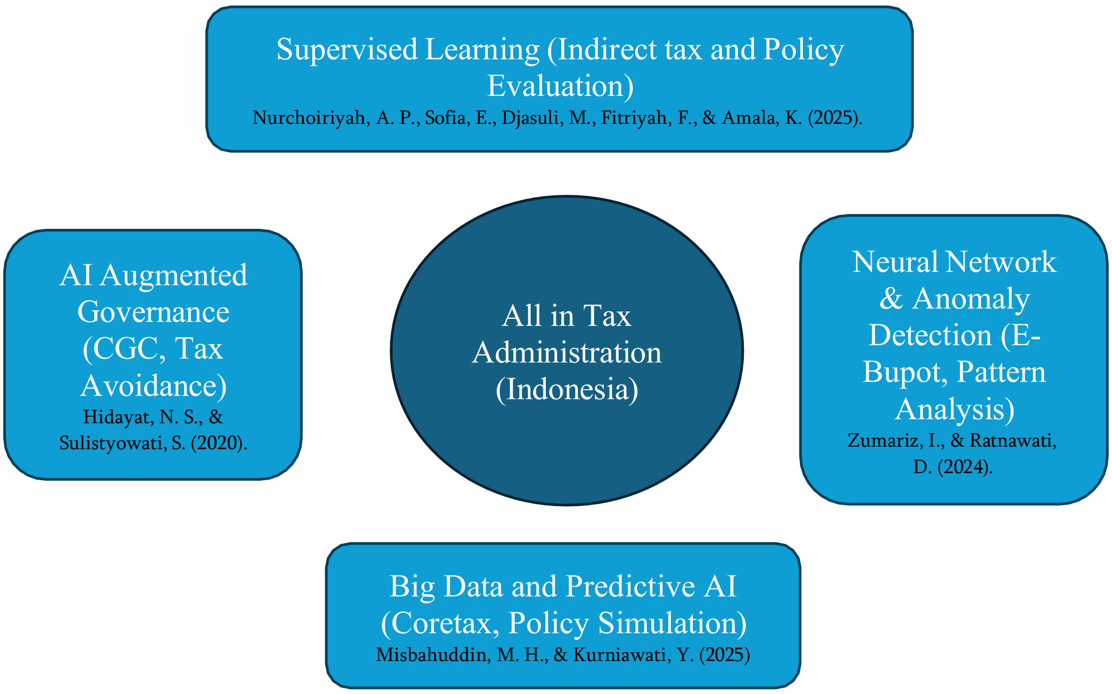


Figure 3. A Thematic Mapping of Literature for AI Approach Tax Administration
Source :Author's Data Processing (2025)

Based on Figure 3, The AI methods and models proposed in the Indonesian context remain limited, both in scope and application. Among the few papers that explore this domain, several mention the potential of machine learning techniques to optimize tax collection and improve risk-based auditing. For example, Nurchoiriyah et al. (2025) conceptualize the use of supervised learning in the context of indirect tax optimization. Hidayat & Sulistyowati (2020) propose a model where AI enhances corporate governance analysis related to tax avoidance.

More technical applications can be found in the studies of Amai et al. (2024) and Zumariz & Ratnawati (2024), where the former simulates policy evaluation using supervised learning, while the latter develops a neural network-based anomaly detection model to identify irregularities in e-Bupot documentation. Additionally, Misbahuddin & Kurniawati (2025) utilize big data architecture to assess policy effectiveness in the Coretax 3.0 system, laying a potential foundation for AI integration. However, it is important to note that these models have not yet been adopted at the institutional level, and most remain theoretical or experimental in nature.

This observation underscores the urgent need for collaborative innovation between tax authorities, academic institutions, and technology developers in Indonesia. While the initial efforts demonstrate theoretical promise, their practical impact remains minimal without institutional adoption and regulatory support. Future initiatives should focus on piloting AI applications in real-world tax environments, accompanied by robust legal frameworks and ethical oversight. Strengthening data infrastructure and fostering AI literacy among tax professionals will also be key to transforming these exploratory models into scalable, actionable systems that contribute meaningfully to tax compliance and administration efficiency.

Main challenges, limitations, and future opportunities in adopting AI for tax avoidance detection in Indonesia

The review identifies several recurring challenges that hinder the adoption of AI in tax avoidance detection in Indonesia. The first challenge is data fragmentation, where taxpayer data is distributed across multiple government agencies without sufficient integration, standardization, or real-time accessibility. This severely limits the potential of AI systems, which depend on large volumes of consistent and high-quality data (Misbahuddin & Kurniawati, 2025; Zhang & She, 2024). Without consolidated datasets, training and deploying AI models to detect patterns of avoidance becomes inefficient and error-prone.

The second challenge is the shortage of skilled human capital, particularly in the fields of artificial intelligence, data analytics, and system architecture within the Directorate General of Taxes (DGT) and related institutions. Although the Indonesian government has made considerable progress in digitalizing tax systems through initiatives such as Coretax 3.0, the absence of trained personnel limits the capacity to develop, test, and maintain AI-based enforcement mechanisms (Tambunan & Anwar, 2019; Nurchoiriyah et al., 2025). This challenge has also been noted in other emerging economies where AI adoption outpaces the growth of digital skills.

The third challenge relates to regulatory and ethical concerns. The use of AI in public-sector enforcement raises critical questions about algorithmic bias, due process, and taxpayer privacy. Currently, Indonesian tax law does not provide a detailed framework for the governance of AI-powered audits or algorithmic decision-making in tax administration. Studies warn that without strong regulatory safeguards, AI applications in taxation may undermine transparency and erode public trust (Amai et al., 2024; Sulaiman & Yusuf, 2024).

Nonetheless, the review reveals strong institutional and technological opportunities for future AI adoption. The expansion of e-Faktur, e-Bupot, and the integration of taxpayer identity via NIK-NPWP offer a digital foundation upon which AI tools can be built (Zumariz & Ratnawati, 2024). Moreover, policy momentum from the Ministry of Finance, along with global frameworks like the OECD's *Digital Economy Taxation* guidelines, provides normative and strategic support for the advancement of AI in tax governance (OECD, 2021). With the right legal framework, inter-agency data integration, and strategic investments in capacity building, AI could play a transformative role in enhancing compliance and closing Indonesia's persistent tax gap.

To complement the above analysis, it is important to emphasize that these challenges are not isolated but rather interrelated and mutually reinforcing. For instance, the lack of skilled human capital slows down efforts to integrate data across institutions, while the absence of clear legal and ethical frameworks makes agencies hesitant to adopt new technologies proactively. Therefore, the strategy for developing AI in tax administration must be holistic encompassing regulatory reform, investment in technical training, and improved interoperability of data systems across government entities. A fragmented or sectoral approach risks widening the gap between the potential of AI technology and its actual impact on tax oversight in Indonesia.

5. CONCLUSION

This study aimed to synthesize current knowledge on the use of Artificial Intelligence (AI) in detecting tax avoidance in Indonesia through a systematic literature review of 21 academic and policy-related publications from 2019 to 2024. The findings reveal that while the discourse on tax avoidance is well-established, the integration of AI remains largely conceptual and underexplored. Most existing studies focus on conventional variables such as firm size, leverage, and governance, with limited incorporation of digital or intelligent frameworks. Only a few works have begun to simulate AI-based approaches such as supervised learning, anomaly detection, and predictive analytics, but these remain in theoretical or pilot phases without broader institutional application. This review highlights three main challenges: (1) fragmented data ecosystems that hinder AI training and deployment, (2) limited AI-literate human capital within the Directorate General of Taxes (DGT), and (3) regulatory and ethical gaps concerning algorithmic transparency, accountability, and taxpayer rights. These limitations constrain the scalability of AI initiatives and raise concerns about trust and fairness in automated tax enforcement. Despite these issues, Indonesia's digital infrastructure especially the Coretax 3.0 system, e-Faktur, and NIK-NPWP integration offers a strong foundation for further innovation. Strategic investment in data integration, legal frameworks, and interdisciplinary capacity building will be key to unlocking AI’s potential in improving tax compliance and reducing the persistent tax gap.

As a limitation, this study is constrained by the availability and accessibility of empirical research specifically focused on AI applications in tax governance. The limited number of AI-focused studies may reflect both the novelty of the topic and institutional sensitivity around tax enforcement data. Future research should expand into experimental design, case-based AI applications, and cross-country comparisons to enrich the evidence base. Policymakers are also encouraged to facilitate data openness, promote ethical AI governance, and encourage collaborations between tax authorities, data scientists, and legal scholars to accelerate responsible AI adoption in Indonesia’s tax system.

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