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Synergy between e-fiscalization and artificial intelligence

Towards an Intelligent Tax Administration

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Abstract

This study examines the synergy between e-fiscalization and Artificial Intelligence (AI) as a transformative framework for modern tax administration. While e-fiscalization enables real-time digital reporting of transactions and generates large volumes of structured data, AI provides the analytical capacity to process and interpret it effectively. The research explores how integrating these technologies enhances financial transparency, strengthens compliance, and reduces tax evasion, particularly through advanced techniques such as machine learning, network analysis, and data mining. The paper adopts a mixed-methods approach, combining comparative analysis of tax performance indicators before and after the implementation of e-fiscalization with a case study focused on the Albanian tax system. Secondary data from institutional reports and international organizations are utilized to assess improvements in efficiency and risk detection. Findings suggest that AI-driven systems significantly improve the targeting of tax audits, enable real-time identification of fraudulent transactions such as fictitious invoicing schemes, and enhance taxpayer services through automated assistance tools. However, the study also identifies critical challenges, including data quality limitations, algorithmic transparency concerns, and cybersecurity risks. These issues highlight the necessity for robust regulatory frameworks and ethical guidelines governing AI deployment in public administration. The research concludes that the integration of AI into e-fiscalization systems represents a strategic necessity rather than a technological option, positioning tax administrations to move from reactive enforcement toward proactive, data-driven governance.

Keywords: *e-fiscalization, artificial intelligence (AI), tax administration, tax compliance, fraud detection, digital transformation*

INTRODUCTION

The tax administration system has undergone substantial transformation in recent years, largely driven by the implementation of digital fiscal reforms. The introduction of the e-fiscalization system in 2021 marked a pivotal shift in how Albanian economic transactions are recorded, monitored, and reported. This reform fundamentally altered business operations and reshaped the interaction between taxpayers and the tax authority, establishing a more transparent and technology-driven fiscal environment.

The primary objective of the e-fiscalization system was to ensure the real-time transmission of transactional data to a centralized online platform, thereby enabling the tax administration to access accurate and up-to-date information on business activities. Despite initial challenges faced by businesses, particularly in technological adaptation, investment in new equipment, and changes in operational procedures, the transition process was facilitated by targeted training and continuous institutional support. As a result, a relatively successful integration of the system was achieved across various sectors of the economy. Post-implementation evidence suggests that the e-fiscalization reform has yielded significant positive outcomes. Notably, there has been an increase in tax revenues collected by the General Directorate of Taxation, alongside a rise in contributions to social and health insurance schemes (Cani & Kolaj, 2023). Furthermore, value-added tax (VAT) revenues have shown considerable growth. These developments indicate that the system has contributed to reducing informality and tax evasion, while simultaneously strengthening the monitoring and control capacities of the tax administration (Cani *et al.,* 2023).

One of the key advantages of the e-fiscalization system lies in its ability to provide tax officials with real-time access to centralized business data, including daily transaction records. This capability has enhanced the efficiency of compliance assessment processes, allowing authorities to identify potentially non-compliant taxpayers more effectively. In instances where irregularities are detected through remote monitoring, targeted field inspections can be conducted to verify and address issues related to tax evasion or inaccurate reporting.

While tax administration personnel possess the expertise necessary to detect irregularities, the increasing volume and complexity of data present significant analytical challenges. In this context, the integration of Artificial Intelligence (AI) emerges as a critical advancement. AI-driven systems have the potential to process large datasets with high speed and precision, enabling the identification of patterns, anomalies, and risks that may not be readily observable through traditional methods. Consequently, tasks that would typically require extensive time and human effort can be executed more efficiently and accurately. Behavioral factors such as perceived usefulness, ease of use, and user attitudes significantly influence the acceptability of e-fiscalization systems, suggesting that the effectiveness of AI-driven tax solutions depends not only on technological advancement but also on taxpayer behavioral adaptation and trust (Cani *et al*., 2025).

The synergy between e-fiscalization and artificial intelligence represents a promising pathway toward the development of intelligent tax administration. By enhancing data transparency, strengthening predictive capabilities, and enabling real-time risk assessment, AI integration can further reduce tax evasion and improve compliance monitoring. Ultimately, this convergence of digital fiscal tools and advanced analytical technologies has the potential to transform tax administration into a more proactive, efficient, and data-driven system.

LITERATURE REVIEW

The integration of Artificial Intelligence (AI) into digital tax systems has emerged as a critical area of scholarly and policy interest, particularly in enhancing the efficiency, transparency, and intelligence of modern tax administrations. Recent literature highlights that the deployment of AI, Big Data analytics, and investigation techniques represents a new frontier in tax compliance enforcement. These technologies enable tax authorities to detect anomalies, reconstruct fraudulent transactions, and streamline tax investigation and audit processes with significantly greater accuracy and operational efficiency (Akpobari Fabeke Mbea, 2025). Such advancements are particularly relevant in digital fiscal environments, where the volume and complexity of transactional data require advanced computational capabilities.

From a theoretical perspective, AI is widely understood as a system capable of simulating human intelligence and cognitive functions, including reasoning, interpretation, inference, and learning (Mikalef & Gupta, 2021). This conceptualization is highly relevant to tax administration systems, where decision-making processes increasingly rely on intelligent systems capable of identifying patterns, predicting risks, and generating evidence-based insights. In this regard, AI significantly enhances the speed and quality of decision-making, enabling institutions to respond more effectively to operational and compliance-related challenges (Wang et al., 2019). The literature indicates that institutional support, trust, and technological readiness are key determinants of the successful adoption of e-fiscalization systems, which in turn establish the necessary foundation for the integration of Artificial Intelligence into tax administration systems (Cani et al., 2025).

In the field of public finance and taxation, AI has been increasingly recognized as a transformative tool for improving tax compliance, fraud detection, and taxpayer services. AI applications in tax administration contribute to more effective compliance monitoring, the detection of tax fraud, and the enhancement of taxpayer support services through automated assistance and real-time data processing (OECD, 2025). AI systems support tax authorities in both detecting and preventing fraudulent activities while simultaneously improving the quality and accessibility of taxpayer services (Pires, 2024).

The literature also underscores the complementary role of other emerging technologies in strengthening tax compliance behavior. Artificial intelligence, machine learning, and blockchain technologies significantly improve compliance outcomes by increasing transaction traceability, reducing opportunities for manipulation, and reinforcing trust in digital tax ecosystems (Belahouaoui & Alm, 2025). This perspective aligns closely with the objectives of e-fiscalization systems, which are designed to ensure real-time reporting and verification of business transactions.

More broadly, digitalization has been identified as a fundamental driver of transformation in tax administration. Digital technologies enhance monitoring, enforcement, and public service delivery by enabling more integrated and data-driven administrative systems (Gupta, 2017). In the public sector context, AI further strengthens this transformation by facilitating automation, predictive analytics, and improved decision-making processes (Sun & Medaglia, 2019). These capabilities are particularly valuable in e-fiscalization frameworks, where tax authorities must continuously monitor large-scale transactional flows and assess compliance risks in real time. Moreover, digitalization of the tax landscape has been shown to enhance transparency, efficiency, and fairness in tax collection processes, thereby creating a more suitable environment for the application of AI-based tools for improved compliance monitoring and fraud detection (Cani et al., 2024).

Beyond operational improvements, AI also holds significant potential for supporting tax policy design. AI can assist in the development of tax policies that better balance equity and economic efficiency through advanced simulation and predictive modeling tools (Zheng *et al*., 2020). This policy-oriented application broadens the role of AI from administrative enforcement to strategic fiscal governance.

Nevertheless, literature also raises important concerns regarding the governance implications of AI integration in tax administration. Those are key issues related to transparency, accountability, algorithmic fairness, and data governance (Ubaldi et al., 2019). These concerns are especially relevant in systems that rely heavily on automated decision-making, where institutional trust and legal compliance must be safeguarded through robust regulatory and ethical frameworks.

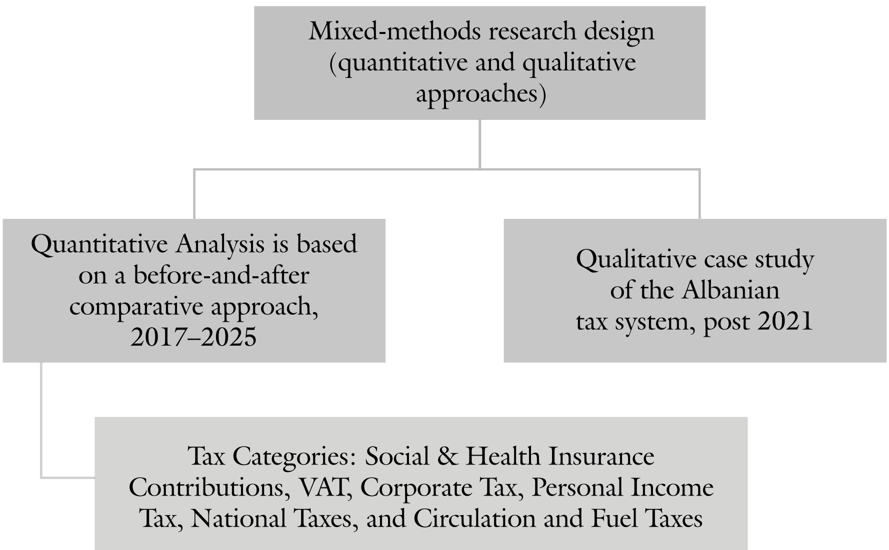
The existing literature strongly supports the view that integrating e-fiscalization systems with artificial intelligence can significantly enhance the effectiveness of tax administration. This synergy creates the foundation for an intelligent tax administration model characterized by real-time monitoring, predictive compliance control, improved taxpayer services, and stronger institutional governance.

METHODS AND RESULTS

This study adopts a mixed-methods research design, integrating both quantitative and qualitative approaches to provide a comprehensive assessment of the synergy between e-fiscalization and Artificial Intelligence (AI) in enhancing tax administration performance. The methodological framework is structured around two main components: (i) a comparative quantitative analysis of tax revenue indicators, and (ii) a qualitative case study of the Albanian tax system following the implementation of e-fiscalization in 2021.

The quantitative analysis is based on a before-and-after comparative approach, examining the evolution of key tax revenue categories over the period 2017–2025. This time frame allows for the evaluation of trends across four years before the implementation of e-fiscalization (2017–2021) and four years following its implementation (2021–2025). Such a design enables the identification of structural changes in revenue performance potentially attributable to the digital fiscal reform.

Figure 1: *Methodology framework*

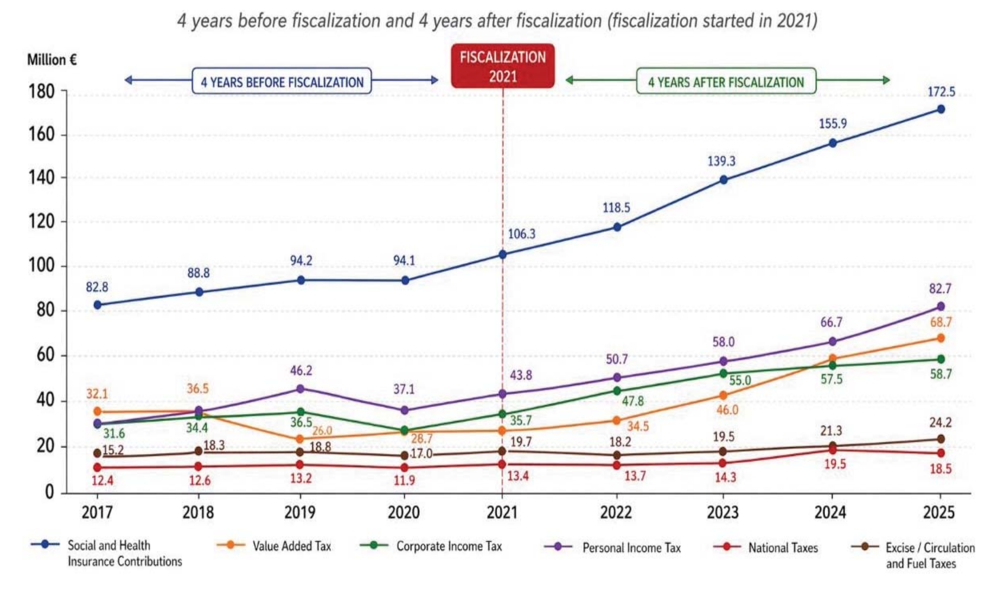


(Source: Author's processing)

The analysis focuses on the following main Tax Categories: Social and Health Insurance Contributions, Value Added Tax (VAT), Corporate Income Tax, Personal Income Tax, National Taxes, and Circulation and Fuel Taxes. Graphical visualization techniques are used to illustrate revenue dynamics and to highlight structural shifts in tax collection patterns (Figure 2). This approach allows for a clear identification of post-reform acceleration in revenue growth and improved consistency in tax collection. Also, the study employs a comparative and interpretative analytical framework. This integrated approach allows for a more robust evaluation of the effectiveness of e-fiscalization and its potential amplification through AI technologies.

The empirical analysis of tax revenue indicators over the period 2017–2025 reveals a clear and consistent upward trend across most revenue categories, particularly following the implementation of e-fiscalization in 2021. The comparative assessment between the pre-fiscalization period (2017–2020) and the post-fiscalization period (2021–2025) highlights significant structural improvements in tax collection performance. Revenues from social and health insurance contributions increased steadily from 82.8 mld lekë in 2017 to 94.1 mld in 2020, reflecting gradual growth before e-fiscalization. However, a more pronounced increase is observed after 2021, reaching 172.5 mld in 2025, representing more than a twofold increase over the study period. This trend suggests improved reporting accuracy and reduced informality in employment declarations. VAT revenues exhibit some volatility in the pre-fiscalization period, particularly a decline in 2019 (26 billion ALL), followed by a recovery in 2020. After the implementation of e-fiscalization, VAT revenues show a significant and continuous increase, rising from 30.4 mld in 2021 to 68.7 mld in 2025. This substantial growth reflects enhanced transaction traceability and real-time reporting, which are critical features of the e-fiscalization system. Corporate income tax revenues display moderate fluctuations before e-fiscalization, declining to 28.4 mld in 2020.

Figure 2: *Revenue Growth 2017-2025, before and after e-fiscalization*



(Source: Author's processing based on the annual report of GDT)

In contrast, the post-fiscalization period is characterized by a strong upward trend, with revenues increasing to 58.7 mld in 2025. This indicates improved monitoring of business activities and a reduction in profit underreporting.

Personal income tax shows considerable variability before 2021 but follows a clear growth pattern afterward. Revenues increased from 43.8 mld in 2021 to 82.7 mld in 2025, representing one of the most significant relative increases among all categories. This suggests strengthened compliance in income declaration and improved integration of payroll reporting systems. National taxes remain relatively stable throughout the study period, with only a modest increase from 12.4 mld all in 2017 to 18.5 mld all in 2025. Although growth is less pronounced compared to other categories, a gradual upward trend is still evident after fiscalization. Revenues from circulation and fuel taxes show moderate growth over time, increasing from 15.2 mld all in 2017 to 24.2 mld all in 2025. The trend is relatively stable, indicating that these taxes are less sensitive to fiscalization reforms and more influenced by external factors such as consumption patterns and fuel prices.

The results provide strong empirical evidence that the implementation of e-fiscalization in 2021 has had a positive and substantial impact on tax revenue performance in Albania. The observed post-reform trends indicate a transition toward a more efficient, transparent, and data-driven tax administration system. Furthermore, the magnitude and consistency of revenue growth suggest that the integration of advanced digital tools, potentially enhanced through Artificial Intelligence, can further strengthen compliance and optimize tax collection processes. While the observed improvements can be largely attributed to e-fiscalization, the findings strongly support the argument that Artificial Intelligence represents the next critical layer of transformation. The large volume of real-time data generated by fiscalization systems creates both an opportunity and a challenge: while data availability increases, the complexity of analysis also rises. In this context, AI technologies, such as machine learning, anomaly detection, and network analysis, can significantly enhance the effectiveness of tax administration by:

- Identifying hidden patterns of tax evasion
- Enabling predictive risk assessment
- Automating audit selection processes
- Improving taxpayer services through intelligent digital interfaces

The transition observed in the Albanian case, from fragmented and reactive enforcement toward integrated and proactive compliance management, is consistent with the broader literature on digital transformation in public finance. E-fiscalization provides the necessary data infrastructure, while AI offers the analytical capability to fully exploit this data.

CONCLUSIONS

This study demonstrates that the implementation of e-fiscalization in Albania has generated a significant and sustained improvement in tax revenue performance, particularly in the post-2021 period. The empirical evidence indicates not only higher revenue levels across key tax categories but also enhanced stability, transparency, and consistency in tax collection. These outcomes suggest a substantial reduction in informality and tax evasion, driven by real-time reporting and improved monitoring capabilities.

Beyond its direct fiscal impact, the study highlights the strategic importance of integrating Artificial Intelligence (AI) into e-fiscalization systems. While e-fiscalization establishes the necessary digital infrastructure for data collection, AI provides the analytical capacity required to transform this data into actionable insights. This synergy enables tax administrations to shift from traditional, reactive enforcement approaches toward proactive, predictive, and data-driven governance. However, the transition toward intelligent tax administration is not without challenges. Issues related to data quality, algorithmic transparency, and cybersecurity must be carefully addressed through robust regulatory frameworks and institutional safeguards. Ensuring ethical and accountable use of AI remains critical for maintaining public trust and system integrity.

The findings support the view that integrating e-fiscalization and AI is a strategic imperative for modern tax systems. The Albanian case provides empirical evidence that digital transformation, when effectively implemented, can significantly enhance compliance, improve revenue mobilization, and lay the foundation for a more efficient and intelligent tax administration.

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