THE ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING TAX COMPLIANCE MONITORING

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Abstract. Artificial intelligence (AI) has emerged as a transformative force in public administration, particularly within taxation. This study provides a theoretical analysis of AI's role in improving tax compliance monitoring by enhancing analytical accuracy, efficiency, and transparency. Drawing upon international experiences, notably Estonia's digital tax ecosystem, the research explores how AI technologies such as machine learning and predictive analytics can automate audit processes, detect fraud, and facilitate real-time analysis of electronic invoices. The findings indicate that AI not only reduces human bias and administrative workload but also strengthens fiscal discipline and public trust in tax systems. For emerging economies such as Uzbekistan, integrating AI into tax control presents both a challenge and an opportunity—requiring robust data infrastructure, professional capacity building, and adherence to ethical data governance. Overall, AI-based tax monitoring represents a new paradigm for intelligent, evidence-based fiscal management and sustainable economic governance.

Introduction

Tax compliance remains a persistent challenge for many countries, encompassing both developed and developing economies. Traditional tax control mechanisms often rely heavily on manual inspection and auditing, constrained by limited institutional capacity and resource inefficiency. In contexts where tax inspectorates face technological and analytical limitations, managing vast volumes of financial data becomes increasingly difficult. Consequently, potential tax evasion and underreporting may go undetected.

Another critical dimension of the issue lies in taxpayer behaviour. In many economies—particularly where the informal sector is extensive—the culture of voluntary compliance is underdeveloped. Low awareness of tax obligations and limited trust in fiscal institutions undermine willingness to comply, collectively reducing the effectiveness of tax administration.

In this regard, artificial intelligence (AI) presents transformative potential for modernising tax control systems. AI-driven analytics, machine learning, and

predictive algorithms can process vast datasets, identify non-compliance patterns, and enhance audit targeting. By improving transparency and efficiency, AI not only strengthens institutional capacity but also contributes to building a culture of compliance and fiscal discipline.

Literature Review

The integration of artificial intelligence into tax administration has become a growing trend among technologically advanced nations. According to the OECD (2023), AI-based solutions are now widely used to detect tax evasion, analyse extensive datasets, and automate audit selection. Countries such as the United Kingdom, Singapore, and Estonia have adopted innovative digital approaches to modernise their tax control systems, enhancing transparency and efficiency.

Estonia stands as one of the most successful models of digital tax governance. As part of its e-Government strategy, Estonia implemented an AI-supported tax monitoring framework that allows real-time cross-verification of taxpayer data through integrated digital platforms. Machine learning algorithms detect anomalies in transaction records, enabling authorities to identify high-risk entities efficiently. This has significantly reduced audit time, minimised human error, and increased voluntary compliance.

In contrast, developing countries such as Uzbekistan are still in the early stages of incorporating AI technologies into fiscal administration. While electronic invoicing and digital reporting systems have been partially introduced, challenges persist in data interoperability, institutional readiness, and public awareness. Nonetheless, Estonia's experience offers a valuable blueprint for constructing an AI-driven tax control ecosystem adaptable to the Uzbek context.

Research Aim and Objectives

The primary aim of this research is to provide a theoretical analysis of artificial intelligence's role in enhancing tax compliance monitoring. The study focuses on understanding how AI-based systems can strengthen fiscal governance, improve data-driven decision-making, and promote transparency in tax administration.

The objectives of the study are as follows:

1. To examine the conceptual framework of AI application in tax control, with emphasis on automation, predictive analytics, and intelligent data processing.
2. To analyse international experiences, notably Estonia's digital tax ecosystem as a model for effective AI integration.
3. To identify key challenges limiting AI adoption in developing countries, including data quality, institutional readiness, and human capital constraints.
4. To evaluate the potential theoretical contributions of AI to improving compliance behaviour and strengthening the integrity of tax control mechanisms.

Analysis and Discussion

Artificial intelligence has revolutionised data management in tax administrations by enabling advanced analytics and automation of monitoring functions. Two critical areas where AI demonstrates substantial impact are electronic invoice analysis and fraud detection.

AI-powered systems can process extensive invoice data submitted via electronic tax platforms. Through machine learning algorithms, tax authorities can identify inconsistencies, unusual transaction patterns, and deviations from standard reporting behaviour. Automated cross-verification minimises human error, accelerates audits, and enables real-time risk assessment. For instance, Estonia's e-Government infrastructure employs AI models that analyse millions of digital invoices daily, identifying anomalies that may indicate tax underreporting or misclassification.

Fraud detection is another significant area of AI application. Predictive analytics and anomaly detection algorithms flag suspicious entities or transactions based on behavioural and statistical indicators. Such models continuously learn from new data, improving their accuracy over time. For developing economies, implementing AI-based fraud detection systems can greatly reduce false reporting and enhance fiscal transparency. However, successful implementation depends on access to reliable data sources and adequate computational infrastructure.

Overall, AI-driven invoice analysis and fraud detection are powerful tools that transform tax control from a reactive process into a proactive, data-driven system of governance.

Conclusion and Recommendations. Artificial intelligence signifies a paradigm shift in the modernisation of tax compliance monitoring. Theoretically, AI provides a framework for transforming tax control into a data-driven, predictive, and transparent process. By automating analytical tasks, AI minimises human error, enhances decision-making accuracy, and allows real-time detection of irregularities. Collectively, these features strengthen fiscal discipline and build public trust.

Practically, AI offers significant opportunities for emerging economies such as Uzbekistan. The nation's gradual shift toward digital governance forms a foundation for introducing AI-supported audit tools, particularly in electronic invoice analysis and fraud detection. To realise this potential, developing a robust data infrastructure, training skilled tax professionals, and collaborating with international institutions such as the OECD and World Bank are crucial. Additionally, adopting ethical standards and data protection frameworks ensures accountability and transparency.

Uzbekistan has recently launched pilot initiatives integrating AI into its tax reporting and risk assessment systems under the State Tax Committee's digitalisation strategy. These early steps demonstrate growing institutional readiness and provide a path towards an intelligent, fair, and sustainable fiscal ecosystem.

In summary, AI not only enhances the technical efficiency of tax control but also serves as a catalyst for institutional reform and behavioural change. By combining advanced analytics with sound governance principles, nations can move towards a more intelligent and equitable fiscal system.

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