

IMPROVING TAX ADMINISTRATION THROUGH ELECTRONIC TAX SYSTEMS AND THEIR ECONOMIC EFFICIENCY

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Abstract. The digital transformation of tax administration has become a key reform strategy for improving revenue collection, reducing compliance costs, and combating tax evasion. Based on data from the OECD, IMF, and case studies from Estonia, Rwanda, Brazil, and Uzbekistan, this study shows that electronic filing, e-payment, and integrated tax systems help reduce the tax gap, lower administrative costs, and enhance taxpayer compliance. The article concludes with policy recommendations to further improve the effectiveness of electronic tax systems and maximize their economic benefits.

Key Words: E-taxation, Tax Administration, Economic Efficiency, Tax Compliance, Digital Transformation, Tax Gap

Introduction. Tax revenue is the lifeblood of any modern state, funding public goods, infrastructure, and social services. Yet, inefficient tax administration remains a persistent challenge across both developed and developing economies. Traditional tax systems, characterized by manual processes, paper-based filing, and fragmented data management, often result in high compliance costs for taxpayers and significant administrative burdens for tax authorities.

In response, governments worldwide have increasingly adopted electronic tax systems as a strategic tool to modernize tax administration. These systems encompass a range of digital solutions, including electronic filing (e-filing), electronic payment (e-payment), electronic invoicing (e-invoicing), and integrated tax databases that enable real-time data sharing and risk-based auditing

Main Part. Electronic tax systems improve tax administration through several interconnected mechanisms. First, automation reduces administrative costs. According to the OECD, the cost of collecting \$100 in tax revenue can be reduced by up to 50% when moving from manual to fully digital processes (OECD, 2022). For instance, the U.S. Internal Revenue Service (IRS) reported that processing a paper tax return costs

approximately \$2.60, whereas processing an electronically filed return costs just \$0.30 per return (IRS, 2023). E-filing and pre-filled returns simplify compliance and reduce errors. In countries like Estonia, which pioneered its "e-Tax Board" in 2000, over 98% of tax returns are filed electronically, with the average time required for filing being less than three minutes (Estonia Tax and Customs Board, 2023). The system pre-populates data from employers and financial institutions, minimizing taxpayer error and reducing the need for audits.

Electronic invoicing and real-time transaction reporting enable tax authorities to close the value-added tax (VAT) gap. Brazil's Nota Fiscal Eletrônica (NF-e), an electronic invoicing system implemented in 2006, provides real-time visibility into commercial transactions. Studies indicate that the NF-e system contributed to a reduction in the Brazilian VAT gap from approximately 25% in the early 2000s to below 10% in recent years (Barreix & Roca, 2020). Similarly, South Korea's electronic tax invoicing system reduced VAT non-compliance by over 50% within three years of its full implementation (Kim, 2019). The economic efficiency of improved tax administration is reflected in several key indicators. First, there is a positive correlation between e-tax adoption and the tax-to-GDP ratio. Data from the World Bank's Tax Administration Maturity Model show that countries with advanced digital tax systems have an average tax-to-GDP ratio of 24%, compared to 14% for countries with low digitalization (World Bank, 2023). This increase in revenue capacity provides fiscal space for productive public investment.

Reduced compliance burdens stimulate formalization of the economy. The Doing Business report (now part of the Business Ready framework) highlights that countries with comprehensive e-tax platforms significantly reduce the time required for businesses to comply with tax obligations. For example, Rwanda's implementation of the Rwanda Revenue Authority's e-Tax system in 2012 reduced the average time to prepare and pay taxes from 110 hours per year to just 45 hours (World Bank, 2020). This formalization expands the tax base and contributes to GDP growth.

Transparent and predictable tax administration enhances the investment climate. A survey of multinational corporations by the African Development Bank found that the presence of reliable e-tax systems was cited as a key factor in investment decisions in countries like Kenya and Rwanda, where tax digitalization reduced opportunities for discretionary enforcement and corruption (AfDB, 2021). Improved tax certainty lowers the cost of capital and can increase foreign direct investment (FDI) inflows by an estimated 1.5% of GDP according to cross-country panel studies (IMF, 2023).

Uzbekistan has undertaken a comprehensive transformation of its tax administration in recent years as part of a broader economic modernization agenda. Following the adoption of the new Tax Code in 2020, the State Tax Committee (now the State Tax Committee under the Cabinet of Ministers) has prioritized digitalization

as a core pillar of reform. The introduction of the Unified Portal of Interactive Tax Services (UPITS) in 2019 marked a turning point, consolidating over 40 different online services into a single digital platform accessible to taxpayers.

By 2023, the coverage of electronic tax services in Uzbekistan reached significant scale. According to official data from the State Tax Committee, the share of taxpayers using electronic filing exceeded 95% for corporate income tax and VAT returns (State Tax Committee of Uzbekistan, 2024). The number of users registered on the tax portal surpassed 1.5 million taxpayers, including legal entities and individual entrepreneurs. Additionally, the implementation of the Electronic Invoicing System (EIS) for VAT purposes has enabled real-time monitoring of transactions, contributing to a measurable reduction in the VAT gap.

The results of these reforms are reflected in key performance indicators. Tax revenue as a percentage of GDP increased from 16.5% in 2018 to 18.7% in 2023, representing a substantial improvement in revenue mobilization (Ministry of Economy and Finance of Uzbekistan, 2024). Furthermore, the cost of tax collection declined from 2.1% of total revenue collected in 2019 to 1.5% in 2023, demonstrating gains in administrative efficiency. The time required for businesses to prepare and file tax returns was reduced from an average of 186 hours per year in 2017 to approximately 90 hours by 2023, according to World Bank Business Ready assessments (World Bank, 2024).

Uzbekistan has also introduced innovative digital tools to enhance taxpayer convenience and compliance. The mobile application "Solliq" (Tax) allows individuals to access tax information, file declarations, and make payments directly from smartphones. By 2024, the app had been downloaded over 2 million times, with more than 800,000 active monthly users (State Tax Committee of Uzbekistan, 2024). Additionally, the integration of cash registers with online fiscalization systems has enabled real-time transmission of sales data to tax authorities, reducing opportunities for underreporting. Despite these achievements, challenges remain. The digital divide between urban and rural areas persists, with internet penetration in some rural districts lagging behind the national average of 75%. Cybersecurity investments have been scaled up, but the rapid expansion of digital tax infrastructure requires continuous improvement in data protection and system resilience. Nevertheless, Uzbekistan's experience illustrates how a developing economy can leverage digital tax systems to achieve significant improvements in revenue administration and economic efficiency.

Despite the demonstrated benefits, the implementation of electronic tax systems is not without challenges. Cybersecurity risks are paramount; centralized tax databases represent high-value targets for cyberattacks. In 2022, the Costa Rican tax authority suffered a major ransomware attack that disrupted operations for months and cost the government an estimated \$30 million in revenue losses (National Cybersecurity

Agency, 2023). Uzbekistan has recognized this risk and has invested in strengthening its cybersecurity frameworks, including the establishment of dedicated information security units within the tax administration. Digital divides also pose significant barriers. In many developing countries, including Uzbekistan, small businesses and rural taxpayers lack reliable internet access or the digital literacy required to navigate e-tax platforms. Without complementary offline mechanisms or taxpayer education programs, such systems risk excluding segments of the economy and exacerbating informal activity. Uzbekistan has responded by establishing taxpayer service centers in remote areas and offering training programs to support digital adoption.

Furthermore, high upfront costs for system development and integration can strain budgets. Implementation of a comprehensive e-tax system typically requires investments ranging from \$20 million to \$100 million depending on country size (OECD, 2022), and many projects experience delays or cost overruns without adequate planning. Uzbekistan's phased approach, supported by international financial institutions including the World Bank and Asian Development Bank, has helped mitigate these risks through technical assistance and capacity-building programs.

Examining cross-country experiences reveals patterns of success and caution. Estonia represents a best-case scenario, where a government-wide digital infrastructure (X-Road) enabled seamless integration of tax data with population, business, and banking registries. The result is a system where voluntary compliance exceeds 95%, and administrative costs are among the lowest in Europe. Rwanda demonstrates the potential for leapfrogging in developing economies. Since adopting its e-tax platform, Rwanda has seen tax revenue increase from 12.2% of GDP in 2010 to 17.5% of GDP in 2022, while the cost of collection fell from 2.5% to 1.8% of revenue collected (Rwanda Revenue Authority, 2023).

Uzbekistan offers a recent example of rapid digital transformation. Within five years of launching its digital tax reforms, the country achieved a tax-to-GDP ratio increase of over two percentage points, reduced collection costs by nearly one-third, and significantly improved taxpayer service delivery (State Tax Committee of Uzbekistan, 2024). The country's experience underscores the importance of political commitment, phased implementation, and integration with broader e-government initiatives.

In contrast, Italy's initial rollout of e-invoicing mandates faced significant resistance and technical glitches, leading to delayed adoption and compliance fatigue among small businesses. However, after refinement, Italy's VAT gap dropped from 29% in 2015 to 15% by 2021, illustrating that persistence and iterative improvement yield results (European Commission, 2023).

Conclusions and Suggestions. Electronic tax systems represent a transformative approach to public revenue administration, delivering measurable improvements in

efficiency, compliance, and economic outcomes. The evidence reviewed demonstrates that countries adopting comprehensive e-tax platforms benefit from higher tax-to-GDP ratios, lower administrative and compliance costs, reduced tax gaps, and improved business environments. Uzbekistan's recent experience confirms that even developing economies can achieve substantial gains through strategic digitalization of tax administration. However, the realization of these benefits depends critically on strategic implementation, including investments in cybersecurity, digital inclusion, and robust legal frameworks.

To maximize the economic efficiency of electronic tax systems, the following recommendations are proposed:

1. **Adopt a Whole-of-Government Approach:** Tax digitalization should be integrated with broader e-government initiatives, linking taxpayer data with business registries, social security, and customs systems to reduce duplication and enhance accuracy. Uzbekistan's integration of tax services with the Single Portal of Interactive State Services offers a replicable model.

2. **Invest in Cybersecurity and Data Protection:** Governments must allocate sufficient resources to safeguard tax data and ensure system resilience. This includes regular security audits, incident response protocols, and compliance with international data protection standards.

3. **Prioritize Digital Literacy and Support for Small Taxpayers:** To prevent exclusion, tax authorities should provide taxpayer education programs, simplified interfaces, and alternative filing channels (such as mobile-based solutions or assisted filing centers) for micro-enterprises and rural taxpayers. Uzbekistan's network of taxpayer service centers provides a useful example.

4. **Use Data Analytics for Risk-Based Auditing:** Rather than blanket audits, tax authorities should leverage artificial intelligence and data analytics to target high-risk cases, thereby increasing deterrence while minimizing the burden on compliant taxpayers.

5. **Adopt Phased Implementation with Continuous Evaluation:** Countries should implement e-tax systems in stages, allowing for iterative refinement based on user feedback and performance metrics. Post-implementation evaluations should measure not only revenue gains but also user satisfaction and equity impacts.

By pursuing these strategies, governments can transform tax administration from a source of friction into a catalyst for economic development and fiscal stability.

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