EFFECTIVENESS OF DIGITAL TAX ADMINISTRATION INSTRUMENTS IN MANAGING TAX ARREARS

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Abstract. *The effectiveness of tax arrears management increasingly depends on the capacity of tax authorities to employ digital administrative instruments that enhance compliance, improve monitoring, and ensure timely intervention. This study examines the role of digital tax administration tools in the management of tax arrears, with particular attention to their impact on collection efficiency, taxpayer discipline, risk identification, and the reduction of administrative costs. The analysis emphasizes that digital instruments, including automated notifications, taxpayer personal accounts, electronic payment systems, risk-based monitoring platforms, and data-driven compliance control mechanisms, contribute to a more proactive and differentiated approach to tax debt management. In contrast to conventional enforcement methods that primarily respond to arrears after their emergence, digital instruments enable earlier detection of non-compliance, strengthen preventive administration, and improve communication between tax authorities and taxpayers. The study argues that the integration of digital technologies into tax administration not only increases the effectiveness of arrears recovery but also supports the development of a more transparent, responsive, and sustainable tax management system. As a result, the expansion of digital tax administration instruments should be regarded as an important institutional direction for improving tax arrears management in modern fiscal systems.*

Keywords: *tax arrears, digital tax administration, tax compliance, tax debt management, electronic tax services, risk-based monitoring, taxpayer personal account, automated notifications, fiscal efficiency, tax enforcement.*

Introduction

In contemporary fiscal systems, the effective management of tax arrears has become one of the central conditions for maintaining budget stability, strengthening tax discipline, and improving the overall quality of tax administration. Tax arrears are not merely a technical outcome of delayed payment; rather, they represent a complex administrative and economic phenomenon that affects public revenue collection, distorts the principle of equity in taxation, and increases the operational burden on tax authorities[1]. When tax liabilities remain unpaid for extended periods, the consequences extend beyond the immediate loss of budget revenues and influence the credibility, efficiency, and institutional capacity of the tax system as a whole. For this reason, the issue of tax arrears management has gradually moved from the narrow sphere of enforcement procedures to the broader field of strategic tax administration.

The growing digital transformation of public administration has significantly changed the instruments available for addressing this problem. In particular, digital tax administration has created new opportunities for tax authorities to detect risks earlier, monitor taxpayer behavior more accurately, communicate more effectively, and apply differentiated measures depending on the characteristics of the taxpayer and the scale of the debt. Traditional approaches to tax arrears management have largely relied on ex post enforcement measures, such as penalties, compulsory collection procedures, and legal recovery mechanisms. Although such instruments remain important, they are often costly, administratively burdensome, and less effective when applied uniformly across different categories of taxpayers. By contrast, digital

instruments make it possible to shift from a reactive to a preventive and data-driven model of tax administration[2].

The relevance of this topic is determined by several interrelated factors. First, the expansion of electronic tax services, automated taxpayer accounts, online filing systems, digital payment channels, and risk-based control platforms has fundamentally altered the operational environment of tax administration. These instruments have enabled tax authorities to process large volumes of information in real time, identify irregularities more quickly, and intervene before minor payment problems evolve into significant tax arrears[3]. Second, digital instruments contribute to the reduction of administrative asymmetry between tax authorities and taxpayers by improving access to information, simplifying compliance procedures, and facilitating timely reminders and notifications. Third, in conditions of increasing fiscal pressure and limited administrative resources, the efficiency of digital tools becomes especially important because they allow tax authorities to achieve greater compliance outcomes with lower procedural costs.

The academic significance of the issue also derives from the fact that digital tax administration cannot be understood solely as a technological innovation. Its importance lies in its institutional and managerial implications. Digital instruments influence not only the speed of tax administration but also the logic of interaction between the tax authority and the taxpayer[4]. They support the transition from a uniform enforcement model toward a differentiated system based on taxpayer segmentation, behavioral patterns, payment risks, and compliance history. In this context, the management of tax arrears increasingly depends on the extent to which tax administrations are capable of integrating digital platforms, analytics, automated communication systems, and electronic monitoring mechanisms into a coherent administrative framework.

From this perspective, the effectiveness of digital tax administration instruments in managing tax arrears constitutes an important research problem. It is necessary to determine whether these instruments merely accelerate existing administrative procedures or whether they also improve the substantive quality of arrears management by preventing non-payment, strengthening voluntary compliance, and increasing recovery efficiency. It is equally important to assess the extent to which digital mechanisms can complement rather than replace conventional enforcement tools. Such an approach makes it possible to examine tax arrears management not as a purely coercive process, but as a multidimensional system in which preventive, communicative, analytical, and enforcement instruments function in combination[5].

This study proceeds from the assumption that the integration of digital tax administration instruments enhances the effectiveness of tax arrears management by enabling earlier risk identification, improving taxpayer communication, reducing compliance costs, and supporting more targeted intervention strategies. Accordingly, the article focuses on the institutional role of digital tax tools in strengthening tax discipline and increasing the overall efficiency of arrears management within modern tax systems.

Main Part

The effectiveness of digital tax administration instruments in managing tax arrears should be evaluated not only through their technological sophistication, but also through their measurable contribution to revenue mobilization, compliance control, and early intervention. Recent international evidence indicates that digitalization has altered the operational logic of tax administration from a predominantly reactive enforcement model toward a more preventive and data-driven model. According to the OECD, e-filing rates across the three principal tax types increased by 17 to 23 percentage points between 2014 and 2022, while e-payment rates rose by around 10 percentage

points since 2018 and reached approximately 90 percent. The same report notes that the use of virtual assistants and artificial intelligence among the surveyed administrations has almost doubled since 2018. These trends suggest that digital administration is no longer a peripheral innovation, but an increasingly central institutional mechanism for influencing taxpayer behavior and improving arrears management capacity[6].

A more detailed view of current digital capacity is provided by the OECD's 2025 survey of Forum on Tax Administration members. In jurisdictions where an approved digital identity is required, 66.0 percent of administrations reported that between 81 and 100 percent of individual taxpayers use digital identity to access secure digital services, while the comparable figure for businesses was 86.5 percent. The same survey shows that 76.9 percent of administrations automatically process personal income tax returns and send assessments without human intervention; the corresponding shares are 64.8 percent for corporate income tax and 74.0 percent for value added tax. In addition, 48.1 percent of administrations already provide automated responses to requests for payment arrangements in personal income tax cases, with similar figures of 44.4 percent for corporate income tax and 42.0 percent for VAT. These indicators are particularly important for tax arrears management because payment arrangements, automated assessments, and secure digital access reduce administrative lag and allow tax authorities to intervene before temporary non-payment develops into persistent debt[7].

The institutional value of digitalization is further reinforced by cross-country empirical research. An IMF note on digital tax administration finds that greater digital adoption is associated with higher tax revenue collection and a lower VAT compliance gap; its estimates suggest that increasing e-filing adoption by half could raise tax revenues by about 1.6 percent of GDP in low-income countries[8]. The same study also reports a significant revenue effect from e-audits and data analytics, which it links to stronger compliance risk

management. In analytical terms, this is highly relevant for tax arrears policy: if digital filing, analytics, and automated controls increase timely reporting and improve the detection of risk, they also strengthen the administrative conditions under which arrears can be prevented rather than merely enforced after they accumulate[9].

World Bank evidence supports the same conclusion from the perspective of taxpayer costs and administrative efficiency. Its recent analysis emphasizes that e-payments reduce compliance costs by minimizing travel, queuing, and manual interaction with tax officials, while also improving the timeliness and reliability of compliance information available to tax administrations. The World Bank also notes that integrated taxpayer portals function as "virtual tax offices," enabling taxpayers to view liabilities, file returns, and make payments through a single digital interface. This matters for arrears management because direct e-payment through tax portals reduces data-entry errors, improves data protection, and provides real-time updates to taxpayer records. Conversely, reliance on fragmented third-party payment systems can increase complexity, transaction costs, and security risks, thereby weakening the continuity of compliance. From this perspective, digital tax administration instruments are effective not only because they automate processes, but because they lower the frictions that often contribute to delayed payment[10].

The Uzbek experience demonstrates that these general patterns are not merely theoretical. According to the Tax Committee of the Republic of Uzbekistan, tax revenues in 2024 reached 199.5 trillion UZS against an approved forecast of 196.5 trillion UZS, which represented an increase of 33.5 trillion UZS, or 20.2 percent, compared with 2023. Within that same period, additional tax assessments generated through the analysis of tax reports and the elimination of discrepancies amounted to 486.3 billion UZS, of which 418.7 billion UZS were collected. At the same time, the Committee reported that the number of newly launched software products aimed at improving tax

administration and reducing the hidden economy reached 74, while the number of ministries and organizations connected through electronic data exchange rose to 60 and the number of integration directions reached 238. These figures are significant because they show that revenue growth and control enhancement in Uzbekistan have been accompanied by the expansion of digital infrastructure rather than by reliance on traditional enforcement alone[11].

The same source provides more direct evidence of how digital integration can improve the identification of taxable activity and, indirectly, reduce arrears risk. Following the integration of aggregator information systems into the tax administration database from December 2023, the number of registered aggregators in Uzbekistan reached 155 by 1 January 2025. Through these platforms, more than 497.9 thousand citizens were legalized as self-employed, and 319.1 million receipts worth 5.9 trillion UZS were issued in 2024. After integration, the aggregators paid a total of 156.8 billion UZS in taxes in 2024, including 66.2 billion UZS in VAT; according to the Tax Committee, this sector had paid almost no tax in 2023. In methodological terms, this example illustrates the preventive power of digital administration: once transactions become visible through integrated digital reporting, hidden obligations are formalized earlier, the probability of unrecorded liabilities decreases, and the future stock of tax arrears can be contained more effectively.

At the same time, the need for effective arrears management in Uzbekistan remains substantial. Official data show that, as of 1 January 2025, 901 manufacturing enterprises with tax debts exceeding 100 million UZS had total arrears of 1,361.3 billion UZS, of which 438.1 billion UZS, or 32.2 percent, was concentrated in only ten enterprises. In construction, 915 enterprises with tax debts above the same threshold accounted for 812.2 billion UZS in arrears, and 350.6 billion UZS, or 43.2 percent, was concentrated in the ten largest debtors. In addition, unpaid land and property taxes of employees of organizations amounted to 337.9 billion UZS across 495,771 tax objects as of

1 January 2025. These figures indicate that tax arrears in Uzbekistan are simultaneously concentrated among a narrow group of large debtors and dispersed across a wide mass of smaller liabilities. Such a structure strongly supports the use of differentiated digital instruments: large debtors require intensive digital monitoring, data matching, and rapid collection workflows, whereas mass small-scale debt calls for automated reminders, portal-based payment options, and digital communication tools that prevent escalation[12].

This differentiated approach is consistent with Uzbekistan's regulatory framework on tax risk management. The relevant regulation establishes the procedure for identifying taxpayers with tax risk and classifying them by risk level, thereby providing an institutional basis for digital segmentation and targeted intervention. Such a framework is especially important in the context of digital administration because the effectiveness of digital tools depends not merely on automation, but on the quality of risk selection embedded in the system. In other words, taxpayer portals, electronic accounts, automated notifications, and digital reporting systems become significantly more effective when they are connected to a structured model of compliance risk assessment rather than used as isolated service instruments.

International experience also shows that digital administration is increasingly evaluated through user-centered metrics rather than through internal processing capacity alone. The OECD reports that 90.7 percent of surveyed tax administrations measure taxpayer experience in using online services; among those, 89.8 percent use surveys, 71.4 percent use online feedback channels, 55.1 percent conduct user testing, and 53.1 percent employ web analytics. This finding is relevant for tax arrears management because digital tools are effective only when taxpayers actually use them and understand them. The management of arrears therefore depends not only on legal enforcement capacity, but also on whether digital systems are accessible, trusted, and behaviorally effective. If taxpayers encounter barriers in access,

payment, or understanding, the preventive function of digital administration weakens and arrears become more likely.

Taken together, the available evidence suggests that the effectiveness of digital tax administration instruments in managing tax arrears lies in four interrelated functions. First, they improve visibility by converting taxpayer activity into traceable digital data. Second, they enhance timeliness by enabling faster filing, payment, assessment, and response. Third, they strengthen selectivity by allowing tax authorities to classify taxpayers by risk and intervene in a differentiated manner. Fourth, they lower compliance frictions by making filing and payment easier and more secure. The Uzbek case demonstrates that digitalization is already contributing to higher revenues, broader formalization, and stronger data integration, while the persistence of significant arrears confirms that digital instruments must be further linked to risk-based debt management and targeted enforcement. Accordingly, the effectiveness of digital tax administration should be assessed not as a substitute for arrears enforcement, but as the institutional foundation for a more preventive, responsive, and analytically informed arrears management system.

Conclusion

The analysis demonstrates that digital tax administration instruments have become an essential institutional component of effective tax arrears management. Their significance derives not only from the automation of administrative procedures, but also from their capacity to improve the quality of compliance control, accelerate the identification of payment risks, and enable earlier intervention. In this respect, digital tools reshape the logic of tax administration by shifting it from a predominantly reactive enforcement model toward a more preventive, data-driven, and differentiated system of arrears management. This transformation is particularly important in modern fiscal systems, where administrative efficiency, taxpayer responsiveness, and timely revenue collection must be achieved simultaneously.

The statistical evidence confirms that digitalization strengthens tax administration through several interconnected channels. International data show high and increasing levels of e-filing, e-payment, automated processing, and digital identity use, while empirical research indicates that these developments are associated with improved revenue collection and reduced compliance gaps. In Uzbekistan, the expansion of digital tax infrastructure, broader inter-agency data exchange, and the integration of electronic reporting systems have been accompanied by substantial tax revenue growth and stronger identification of taxable activities. At the same time, the persistence of sizeable tax arrears, including their concentration among large debtors and their dispersion across numerous smaller liabilities, indicates that digitalization alone does not eliminate arrears, but significantly enhances the institutional conditions for managing them more effectively.

The findings also suggest that the effectiveness of digital tax administration instruments depends on their integration into a broader compliance management framework. Taxpayer portals, electronic payment channels, automated notifications, digital risk-scoring systems, and data-matching platforms are most effective when they are connected to taxpayer segmentation and targeted intervention strategies. In the case of large and persistent debtors, digital systems improve monitoring, accelerate response, and support more precise enforcement. In the case of mass small-scale arrears, they reduce compliance frictions, facilitate communication, and increase the likelihood of timely voluntary payment. Therefore, the management of tax arrears should not rely on a uniform enforcement approach, but on a differentiated model in which digital instruments support both preventive administration and targeted recovery procedures.

Overall, digital tax administration instruments should be regarded as a strategic mechanism for increasing the effectiveness of tax arrears management. Their institutional value lies in improving transparency, reducing

procedural delays, strengthening risk-based administration, and enhancing the interaction between tax authorities and taxpayers. Consequently, the further development of digital tax administration is not merely a technological priority, but an important direction for improving fiscal sustainability, tax discipline, and the overall quality of tax governance.

First, tax authorities should strengthen the integration of digital taxpayer services with risk-based arrears management systems. Taxpayer personal accounts, e-payment platforms, and automated reminders should be directly linked to compliance-risk classification so that intervention measures can be differentiated according to the scale, duration, and behavioral profile of tax debt.

Second, a greater emphasis should be placed on preventive digital instruments for small and medium-sized arrears. Automated notifications, simplified online payment options, and early warning mechanisms should be expanded in order to prevent temporary non-payment from developing into persistent tax debt. This would reduce administrative costs while strengthening voluntary compliance.

Third, digital tax administration should be deepened through broader data integration and analytical capacity. Expanding inter-agency data exchange, improving real-time transaction visibility, and using data analytics for early risk detection would increase the precision of arrears monitoring and improve the overall effectiveness of collection policy.

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