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Article

Modern Concepts of Excise Tax Administration and Their Adaptation in Uzbekistan: A Digital Traceability Framework

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Abstract: This study develops a conceptual and applied framework for modernizing excise tax administration in Uzbekistan through digital traceability, integrated transaction data, and risk-based compliance management. Excise taxes differ from broad-based consumption taxes because they are imposed on selected goods whose consumption may generate fiscal, health, or environmental externalities. Their effectiveness therefore depends not only on statutory rates, but also on the ability of the administration to identify taxable products, control production and import volumes, verify release for consumption, reconcile inventories, prevent illicit trade, and monitor retail realization. The analysis combines international guidance from the OECD, WHO, IMF and World Bank with official Uzbekistan budget and tax-administration data for 2021-2026. State budget receipts from excise tax increased from UZS 13.1 trillion in 2021 to UZS 21.9 trillion in 2025, equivalent to a compound annual nominal growth rate of about 13.7 percent. At the same time, the share of excise in total state budget revenue declined from 7.9 to 6.1 percent, indicating that nominal growth alone is not a sufficient measure of administrative performance. The paper proposes an Integrated Excise-Tax Data Platform connecting digital marking, electronic invoices, online cash-register receipts, customs declarations, production and warehouse data, payments and licenses. It also introduces an Excise Administration Risk Score and an Excise Tax Administration Modernization Index for operational monitoring. The proposed framework shifts control from periodic document-based inspection toward continuous reconciliation of product movement, tax liability and supply-chain risk, while preserving taxpayer service, data governance and legal safeguards.

Keywords: excise tax, tax administration, digital marking, track-and-trace, risk management, Uzbekistan.

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1. Introduction

Excise taxation is one of the oldest instruments of public finance, but its modern role is broader than revenue mobilization. Unlike value added tax, which applies to a wide base of consumption, excise is deliberately selective. It is normally imposed on tobacco, alcoholic beverages, fuels and other products for which governments seek either a stable revenue source or a change in consumer and producer behaviour. The OECD notes that contemporary excises increasingly combine fiscal and regulatory objectives, particularly in relation to health and environmental externalities [1]. From the perspective of public finance, this gives excise a dual character: it is simultaneously a tax on a narrow

consumption base and a corrective instrument designed to internalize social costs that are not fully reflected in market prices [2].

The special nature of the tax base makes administration decisive. A high statutory rate produces little policy value when taxable output is understated, excisable goods move through undocumented channels, classification is manipulated, warehouse losses are fictitious, imported products evade customs control, or retail sales cannot be reconciled with upstream transactions. Tobacco tax guidance from the World Health Organization (WHO) and the International Monetary Fund (IMF) therefore places licensing, production control, tax stamps or secure identifiers, inventory supervision, audit, customs coordination and anti-illicit-trade measures at the centre of effective excise administration [3]. Similar principles apply to alcohol and sugar-sweetened beverages, although the relevant tax base may be volume, alcohol strength, sugar content, product value, or a hybrid structure [4].

Digitalization changes the feasible administrative model. In a paper-based system, excise control is retrospective: the administration receives periodic declarations, compares them with accounting documents, and conducts field inspections when discrepancies are suspected. In a digitally integrated system, the taxable product can be identified at the unit or package level, its movement can be recorded through electronic invoices, its retail exit can be registered by an online cash register, and its tax status can be validated against production, import and payment data. This architecture does not eliminate audit. Rather, it changes audit from a broad search for violations into a targeted intervention based on prior data reconciliation and risk scoring.[6]

Uzbekistan provides a relevant setting for such a transition. Mandatory digital marking was introduced for tobacco and alcoholic products from 1 January 2021 and for beer from 1 April 2021. Water and soft drinks were added to the digital marking system from 1 March 2024 [6]. In 2026, additional mechanisms were introduced to validate marking codes through electronic invoices and online cash registers, strengthen specialized control, and support remote risk-based verification [7]. These measures create a technological foundation for a modern excise administration model in which tax liability, product traceability and market formalization can be analysed within a single data environment.

The fiscal importance of the issue is also substantial. Official Ministry of Economy and Finance data show that state budget excise receipts rose from UZS 13,086.5 billion in 2021 to UZS 21,862 billion in 2025 [8]. However, revenue growth by itself cannot identify the contribution of rate changes, inflation, changes in consumption, expansion or contraction of the excisable base, digital formalization, stronger enforcement or changes in the composition of excisable products. An administrative framework is therefore needed that separates these channels and measures the quality of the tax base rather than focusing only on collections.

The purpose of this article is to develop a systematic framework for adapting modern tax administration concepts to excise taxation in Uzbekistan. The study has five objectives: (1) to identify the theoretical and administrative features that distinguish excise from general consumption taxation; (2) to assess the recent fiscal trend using official budget data; (3) to evaluate the role of digital marking and transaction-level data in securing the excise base; (4) to design an integrated data and risk-management architecture; and (5) to propose measurable indicators and a phased implementation roadmap. The contribution of the paper lies in connecting excise policy design with the operating model of tax administration and in treating traceability, tax-gap estimation and taxpayer service as parts of one compliance system rather than separate projects.[9]

2. Materials and Methods

2.1. Conceptual and institutional approach

The study uses a mixed conceptual and descriptive methodology. First, international literature and administrative guidance are reviewed to identify the core principles of modern excise taxation and enforcement. The principal sources include OECD analysis of excise design and consumption taxation [10], WHO guidance on tobacco and sugar-sweetened beverage taxation IMF guidance on tobacco and alcohol excises the World Bank's tobacco tax reform framework and the WHO Framework Convention on Tobacco Control (FCTC) Protocol to Eliminate Illicit Trade in Tobacco Products [11]. The latter is particularly relevant because it emphasizes supply-chain control and tracking and tracing as a central response to illicit trade.

Second, the analysis draws on the broader concept of digital tax administration. The OECD Tax Administration 3.0 framework describes a transition from electronic replication of legacy forms toward systems in which compliance is increasingly embedded in taxpayers' natural business processes. The OECD Tax Administration 2024 report also highlights the growing use of data, analytics, digital services and tax-gap estimation in contemporary revenue bodies. For excise taxes, the natural systems are the physical and documentary flows of excisable goods: manufacture or import, warehousing, transfer, wholesale, retail sale, export, loss, destruction and payment of tax.

Third, the institutional assessment is anchored in the Tax Code of the Republic of Uzbekistan and official information published by the Ministry of Economy and Finance and the Tax Committee [12]. The study does not attempt to reproduce the full schedule of excise rates because the rate structure changes over time and by product category. Instead, it focuses on administration: the tax point, data sources, traceability, verification, risk management and performance measurement. This makes the proposed framework adaptable to future rate reforms without redesigning the core administrative architecture.

2.2. Data and descriptive indicators

The fiscal analysis uses annual state budget revenue data for 2021-2025 from the Ministry of Economy and Finance. The excise series is UZS 13,086.5 billion in 2021, UZS 13,455.0 billion in 2022, UZS 15,834.4 billion in 2023, UZS 19,060.0 billion in 2024 and UZS 21,862.0 billion in 2025 [13]. Total state budget revenue for the same years is used to calculate the relative fiscal share of excise. Nominal annual growth is calculated as $g_t = (E_t/E_{(t-1)} - 1) \times 100$, where E denotes excise revenue. The compound annual growth rate for 2021-2025 is calculated over four annual intervals.

Administrative evidence on digital marking is drawn from official Tax Committee materials. Mandatory marking covers tobacco, alcohol, beer and, from 2024, water and soft drinks [14]. Published information indicates a sharp expansion in the number of producers and importers participating in the marking system between 2021 and 2025 and improved visibility of product turnover and violations. More recent rules strengthen validation of marking codes in electronic invoices and online cash-register receipts and provide for risk-based or remote control mechanisms [15]. These data are used descriptively; the study does not claim a causal estimate of the effect of digital marking on tax revenue because no counterfactual series is available.

The research therefore follows a diagnostic rather than econometric design. It asks whether the existing information environment can support a more integrated administrative model, identifies the data relationships that should be tested, and proposes performance indicators suitable for future empirical calibration. This approach is appropriate at a stage when institutional and transaction-level microdata are not publicly available in a form that permits robust causal inference.

2.3. Analytical models proposed in the study

Two operational models are proposed. The first is an Excise Administration Risk Score (EARS) for a producer, importer, warehouse operator or trader. An illustrative form

is: EARS_i = 0.25Q_i + 0.20M_i + 0.20S_i + 0.15P_i + 0.10C_i + 0.10H_i, where Q is a production or quantity anomaly, M is a digital-marking mismatch, S is a supply-chain sales discrepancy, P is payment or arrears risk, C is a customs inconsistency, H is confirmed compliance history, and i denotes the economic operator. Each component is normalized to a common scale. The weights are illustrative and must be calibrated on confirmed audit outcomes before operational use.

The second model is an Excise Tax Administration Modernization Index (EAMI). For region r, EAMI_r = Sum(w_j x z_rj), where z is a standardized administrative indicator and w is the corresponding weight. The index is designed to measure traceability, data integration, real-time validation, risk analytics, inventory control and service/governance. It should not be used as a punitive regional ranking. Its purpose is to reveal bottlenecks and support targeted improvement plans.

3. Results

3.1. From document-based control to embedded excise compliance

The review suggests that excise administration has evolved through four broad stages. The traditional model relies on licensing, periodic declarations, tax stamps, physical inspection and post-transaction audit. The electronic model adds e-filing, electronic invoices and online cash registers, but the data may still remain in separate systems. Digital traceability adds unique product identification and movement history. The most advanced model integrates these data and uses automated validation, tax-gap analytics and risk-based intervention. Figure 1 summarizes this progression.

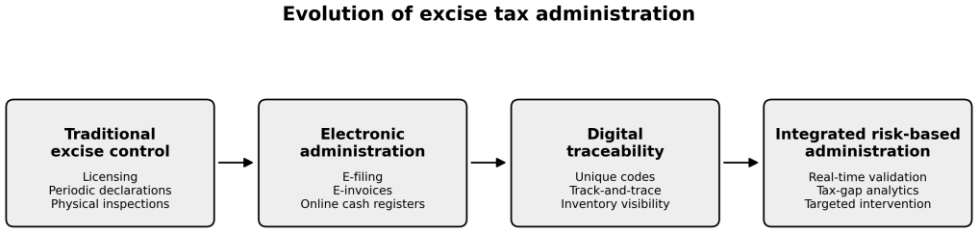


Figure 1. Evolution of excise tax administration

Source: Author's conceptualization based on OECD, WHO and IMF guidance [16].

The Table 1. key implication is that technology is not an end in itself. A Data Matrix code has fiscal value only when the code is linked to a legally defined product, taxpayer, quantity, tax status and transaction history. Similarly, an electronic invoice becomes an excise-control instrument only when product classification, quantity, counterparty, marking code and tax liability can be reconciled automatically. Modernization therefore requires a data model and governance rules in addition to software.

Table 1. Modern excise administration concepts and their adaptation to Uzbekistan

Modern concept	Core principle	Excise-tax adaptation	Illustrative indicator	Expected effect
Embedded compliance	Tax rules operate inside business processes	Validate excise status when marked goods are produced, invoiced, moved and sold	Share of excisable transactions validated automatically	Fewer manual declarations and earlier error prevention
Digital traceability	Each controlled unit or package has a verifiable identity	Link marking codes with product classification, taxpayer, invoice and receipt data	Share of excisable units with complete traceability chain	Lower opportunities for counterfeit and off-book circulation

Modern concept	Core principle	Excise-tax adaptation	Illustrative indicator	Expected effect
Risk-based compliance	Control resources focus on highest expected risk	Score producers, importers, warehouses and traders using data anomalies	Audit yield from risk-selected cases	Higher enforcement productivity
Tax-gap measurement	Performance is assessed against potential liability	Estimate production, import, warehouse and retail gaps by product group	Estimated excise gap as % of potential liability	Better distinction between policy and compliance effects
Tax-customs interoperability	Domestic and border data are reconciled	Match import declarations, marking codes, excise liability and domestic resale	Import-to-sale reconciliation rate	Reduced diversion and classification risk
Taxpayer-centred service	Correct compliance is made easier	Pre-filled data, validation messages, error correction and direct support	Average correction time and first-contact resolution	Lower compliance cost and fewer inadvertent errors
Governed analytics	Automated decisions are explainable and auditable	Document model variables, thresholds, access rights and appeal routes	Share of automated alerts with traceable explanation	Higher legitimacy and data accountability

Source: Author's development based on [17].

3.2. Fiscal trend of excise revenues in Uzbekistan

Excise receipts show a clear upward nominal trend. Revenue increased only modestly in 2022, but growth accelerated to 17.7 percent in 2023 and 20.4 percent in 2024. In 2025, receipts reached UZS 21.862 trillion, 14.7 percent above 2024. Across the full 2021-2025 period, the compound annual nominal growth rate was approximately 13.7 percent. This confirms that excise remains a significant and expanding revenue source in nominal terms.

The relative picture is more nuanced. Excise represented about 7.9 percent of state budget revenue in 2021, 6.7 percent in 2022, 6.8 percent in 2023, 6.9 percent in 2024 and 6.1 percent in 2025. The decline in relative share in 2025 occurred despite a substantial nominal increase in excise receipts because total state budget revenue grew faster. Figure 2 therefore illustrates why nominal collection growth should not be treated as a stand-alone measure of administrative effectiveness.

A useful performance framework should decompose the annual change in excise revenue into at least six components: changes in statutory rates; changes in legally taxed quantities or values; inflation or price effects where ad valorem components exist; changes in product composition; administrative formalization or improved compliance; and one-off collection effects such as arrears recovery. Without this decomposition, a higher collection figure may reflect policy changes rather than better administration, while a stable collection figure may conceal improved compliance in a shrinking consumption base.

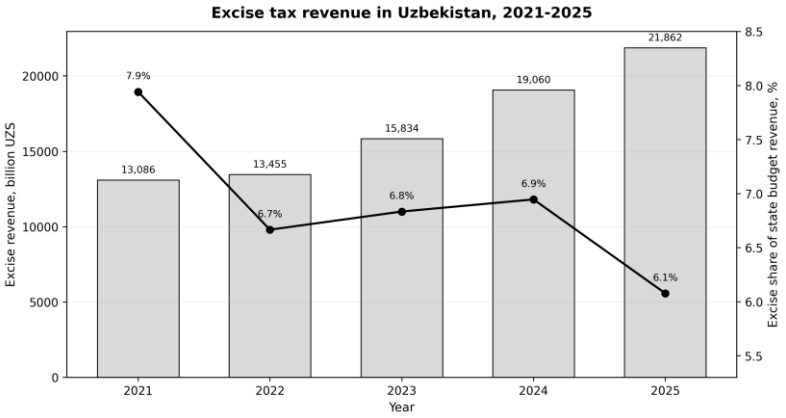


Figure 2. Excise tax revenue and fiscal share in Uzbekistan, 2021-2025

Source: Author's calculations based on official Ministry of Economy and Finance state budget revenue data

3.3. Digital marking as a fiscal-control infrastructure

Uzbekistan's digital marking system creates an important platform for modern excise administration. Tobacco and alcoholic products have been subject to mandatory marking since January 2021, beer since April 2021, and water and soft drinks since March 2024. The system assigns unique identification codes and supports the recording of product movement. When combined with electronic invoices and online cash-register data, this makes it possible to compare upstream supply with downstream realization at a level of detail that was not available under periodic reporting alone.

Official materials published in 2025 reported that the number of manufacturers and importers participating in the digital marking ecosystem increased from 931 at the start in 2021 to 3,595 by 2025. The same source reported stronger detection of illegal or irregular product circulation in several marked categories and higher recorded tax flows for marked goods [18]. These observations are consistent with a formalization mechanism, although they should not be interpreted as a causal estimate because enforcement intensity, tax rates, market conditions and reporting rules changed simultaneously.

The Table 2. 2026 reforms are particularly important for excise administration because they move the system from passive traceability toward transactional validation. The Tax Committee has described procedures under which electronic invoices check registration and marking information, while online cash registers validate the presence and consistency of marking codes for relevant products [19]. Specialized institutional control and remote verification based on information-system data further strengthen the potential for risk-based administration. The logical next step is to connect these controls directly with excise liability, inventory balance and tax-gap analytics.

Table 2. Product-specific excise risks and recommended digital controls

Product group	Typical administrative risk	High-value data link	Recommended control	Key indicator
Tobacco products	Illicit manufacture, counterfeit or smuggled product, substitution between categories	Marking code + production line + customs + invoice + retail scan	Unit-level traceability; production-input/output reconciliation; customs matching	Unreconciled marked units per 1,000 units

Product group	Typical administrative risk	High-value data link	Recommended control	Key indicator
Alcoholic beverages	Unrecorded production, incorrect strength/category, diversion from licensed channels	Marking + alcohol strength + warehouse + license + invoice + retail receipt	Strength/category validation; bonded inventory monitoring; license checks	Variance between expected and declared taxable volume
Beer and brewing products	Underreported volume, informal retail, keg/container movement gaps	Production meter + marking/aggregation + invoice + retail receipt	Volume reconciliation and outlet-level anomaly detection	Wholesale-to-retail volume gap
Sugar-sweetened and soft drinks	Classification errors and incomplete capture of newly taxed/controlled categories	Product catalogue + ingredients/technical attributes + invoice + marking	Automated classification rules and targeted product review	Share of sales with validated product category
Fuel and petroleum products	Diversion, quantity measurement errors, differentiated-use manipulation	Customs + refinery/depot data + e-invoice + payment + geospatial logistics	Depot balance reconciliation and risk alerts for abnormal movements	Stock variance and unexplained movement ratio

Source: Author's development. Product coverage should be aligned with the legally applicable excise schedule at the time of implementation.

3.4. Proposed integrated excise-tax data platform

The central institutional proposal of this study is an Integrated Excise-Tax Data Platform. The platform does not require that every source database be physically merged. Instead, it requires stable identifiers, legally authorized application programming interfaces, standardized data fields and clear responsibility for data quality. The objective is to make it possible to follow an excisable product from production or import to its final recorded sale and to compare that movement with the associated tax liability.

The left side of Figure 3 contains the principal source systems: digital marking, electronic invoices, online cash-register receipts, customs declarations, production and warehouse records, and payment, arrears and licensing data. The central layer performs matching, validation, inventory reconciliation and liability calculation. The right side converts the data into operational outputs: automatic liability checks, tax-gap dashboards, risk scoring, supply-chain alerts and taxpayer or policy analytics. A governance layer defines access rights, model documentation, privacy safeguards and data-quality responsibilities.

This design is particularly suitable for excise because the tax base is both fiscal and physical. A corporate income tax audit may focus primarily on monetary transactions and accounting recognition. Excise control often requires verification of units, litres, kilograms, alcohol strength, nicotine content, fuel type, packaging or other physical attributes. Integrating product data with tax transactions therefore reduces the space between physical reality and fiscal reporting.

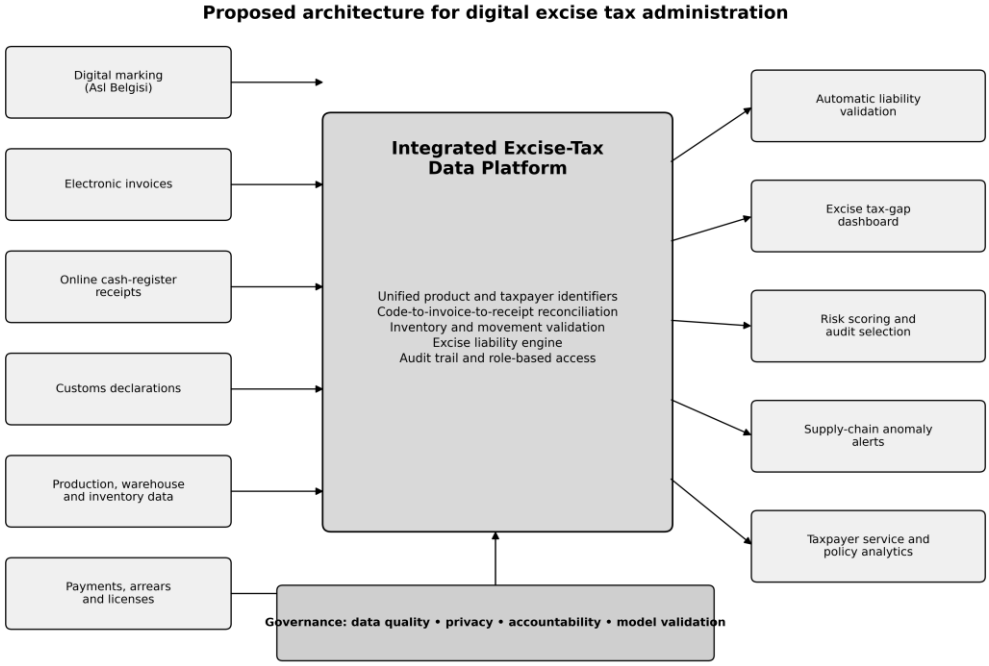


Figure 3. Proposed integrated excise-tax data architecture

Source: Author's development based on digital marking and modern tax-administration principles [20].

3.5. Risk scoring and the Excise Tax Administration Modernization Index

A modern system should avoid treating all excise taxpayers as equally risky. Large compliant producers with stable reconciled data should not face the same frequency of intrusive control as operators whose production, marking, invoicing, inventory and payment data repeatedly diverge. The EARS model proposed in the Methods section translates this principle into a measurable score. Each risk component should be generated from objective data and accompanied by an explanation code. For example, a marking mismatch may indicate codes appearing in retail receipts without a valid upstream invoice, while a quantity anomaly may reflect production volumes inconsistent with raw material use or historical capacity.

Risk models should be calibrated using confirmed outcomes rather than unverified alerts. If a control action determines that a mismatch was caused by a technical integration error, the case should not be labelled as non-compliance. This distinction is essential because otherwise the model can learn to target firms with complex information systems rather than firms with genuine tax risk. Model performance should be reviewed using precision, confirmed adjustment yield, false-positive rate, time to resolution and taxpayer correction cost.

The EAMI complements case-level risk analysis by measuring the institutional maturity of the system. A region or product group may collect substantial revenue while relying on manual interventions, or it may have strong digital coverage but weak data quality. A composite index makes these differences visible. Table 3 proposes six dimensions and indicative weights. The weights are normative and should be revised after pilot testing.

Table 3. Proposed Excise Tax Administration Modernization Index (EAMI)

Dimension	Weight	Illustrative indicators	Primary data source	Interpretation
Traceability and digital	0.25	Marked-unit coverage; complete chain rate;	Marking-system logs	Measures visibility of product movement

Dimension	Weight	Illustrative indicators	Primary data source	Interpretation
marking (TDM)		unresolved duplicate or invalid codes		
Tax-customs and transaction integration (TCI)	0.20	Import-to-domestic-sale match; invoice-code linkage; receipt linkage	Customs, e-invoice and cash-register systems	Measures interoperability across the supply chain
Real-time validation (RTV)	0.15	Transactions checked automatically; rejected invalid records; correction latency	Validation engine logs	Measures preventive rather than retrospective control
Risk analytics and tax-gap estimation (RGE)	0.15	Share of cases risk-selected; audit precision; estimated gap coverage	Risk and audit systems	Measures analytical targeting and understanding of potential revenue
Inventory and warehouse control (IWC)	0.10	Stock reconciliation; authorized loss/destruction controls; warehouse exception rate	Production and warehouse records	Measures physical-fiscal consistency
Service, governance and accountability (SGA)	0.15	Support response time; appeal resolution; data-quality score; model review compliance	Taxpayer service and governance logs	Measures fairness, usability and institutional control

EAMI_r = Sum(w_j x z_rj), where z_rj is a standardized indicator for region or product group r and w_j is the weight of dimension j. Source: Author's development.

3.6. Phased implementation roadmap

A staged approach is preferable to a single nationwide technology launch. The first phase should establish the legal and data architecture: a catalogue of excisable products, identifiers, tax points, data owners, update frequencies and reconciliation rules. The second phase should pilot the integrated data model in a small number of high-risk product groups, preferably tobacco and alcohol because digital marking coverage is already mature. The third phase should add automated liability validation, inventory controls and EARS-based case selection. The fourth phase should scale the model to other excisable categories and integrate tax-gap reporting into management dashboards. The final phase should emphasize continuous evaluation, model validation and policy feedback.

The Table 4. roadmap must distinguish between technology risk and legal risk. For example, an information system can technically identify an unexplained gap, but the legal framework must determine when the gap constitutes evidence, when the taxpayer should be asked to correct data, and when a formal audit is justified. Similarly, tax authorities require legal authority to exchange specific data with customs and other agencies, while taxpayers require clarity about access, retention and appeal.[21]

Table 4. Recommended implementation roadmap for modern excise tax administration

Phase	Main actions	Key output	Performance test	Main risk
1. Legal and data diagnostic (0-6 months)	Map excise products, tax points, identifiers, systems, licenses, warehouse rules and data owners	National excise data dictionary and process map	All critical fields and responsible owners documented	Technology precedes legal/process clarification
2. Reconciliation pilot (6-12 months)	Link marking, invoices, customs, production and payments for selected products	Pilot integrated excise ledger	High match rate with documented exception categories	False mismatches create taxpayer burden
3. Automated validation and risk scoring (12-24 months)	Deploy liability checks, inventory rules, EARS and digital clarification workflow	Preventive control and targeted audit model	Higher confirmed yield and lower false-positive rate	Opaque models or excessive automated blocking
4. National scaling and tax-gap analytics (24-36 months)	Extend to additional products and regions; estimate gaps by product and channel	National excise compliance dashboard	Gap estimates reconciled with collections and market indicators	Inconsistent regional data quality
5. Continuous improvement (36+ months)	Recalibrate models, review tax structure, publish performance indicators, strengthen service	Adaptive excise administration system	Stable compliance gains with lower intervention cost	Focus on revenue alone rather than balanced outcomes

Source: Author's development.

4. Discussion

The results suggest that Uzbekistan has already built several components required for a modern excise administration system, but the main policy challenge is to convert separate digital tools into a coherent compliance architecture. Digital marking is the most visible element, yet its fiscal potential depends on linkage with customs, invoices, online cash registers, production data and payment records. A marking system that proves product authenticity but is not reconciled with excise declarations leaves part of its tax-administration value unused. Conversely, a tax return that is digitally filed but cannot be linked to physical product movement remains vulnerable to quantity and classification manipulation.

The proposed framework is consistent with the international direction of tax administration. OECD work emphasizes data reuse, embedded compliance and analytics. WHO and IMF guidance on tobacco and alcohol taxation stresses that tax design and tax administration must be considered jointly because poorly controlled high excise rates can widen incentives for illicit supply. The implication is not that governments should avoid rate increases. Rather, rate policy should be accompanied by credible supply-chain

control, licensing, customs coordination and monitoring of affordability, substitution and illicit trade.

The fiscal trend in Uzbekistan illustrates the need for such a balanced view. Excise revenue increased by about 67 percent between 2021 and 2025 in nominal terms, but its share of total state budget revenue fell. This does not indicate administrative failure; the denominator expanded strongly and the excise base is deliberately narrower than that of VAT. It does show, however, that excise administration should not be assessed only by the absolute amount collected. A robust scorecard should include effective coverage of excisable producers and importers, traceability completeness, tax-gap estimates, arrears, audit precision, correction time, compliance cost and product-specific health or environmental indicators where relevant.[22]

Excise taxation also creates a policy tension between fiscal yield and corrective objectives. If a tobacco excise succeeds in reducing consumption, the long-run tax base may grow slowly or contract even when the policy is successful. The same logic applies to alcohol or sugar-sweetened beverages when the tax is designed to encourage reformulation or lower harmful consumption. Cnossen and international health-tax guidance therefore support a broader welfare perspective in which revenue is one outcome among several. For administration, this means that performance indicators should distinguish the quantity of legally taxed products, market formalization and compliance from simple revenue maximization.

Digital traceability can also support better policy design. Aggregated and anonymized data can reveal substitution between product categories, regional sales patterns, changes in package size, price responses and the emergence of new products. This is particularly important for tobacco and alcohol markets, where innovation may shift consumption toward products that are taxed differently. Policy makers can use these patterns to test whether the legal tax schedule remains aligned with relative harm and market behaviour. However, the analytical use of transaction data requires strict purpose limitation and governance so that information collected for taxation is not used arbitrarily.

The proposed risk score should therefore be seen as a decision-support mechanism, not an automated finding of guilt. High-risk cases should trigger differentiated responses. A low-value technical mismatch may be resolved through an electronic notification. A medium-risk case may require document clarification or an inventory reconciliation. A high-risk case with multiple independent signals may justify a formal tax audit or coordination with customs and licensing authorities. The objective is proportionality: use the least intrusive intervention capable of resolving the identified risk.

Tax-gap estimation is another important extension. For excise, the gap can be approached from several directions. A top-down model can compare estimated legal consumption or production with taxed quantities. A bottom-up model can aggregate identified discrepancies from taxpayers, warehouses or transactions. A marking-based model can compare codes issued, activated, moved, sold, returned, destroyed and remaining in stock. None of these measures is perfect, but triangulation can show whether revenue growth is consistent with market and administrative data. OECD Tax Administration 2024 notes the increasing institutional importance of tax-gap analysis across revenue bodies.

The architecture also has implications for legitimate business. Stronger traceability can reduce unfair competition from unregistered and counterfeit supply. At the same time, poorly designed validation can create costs when systems reject legitimate transactions because of data errors. Uzbekistan's recent emphasis on support channels and phased validation is therefore important. Each automated rule should be accompanied by a practical correction path, service standard and escalation procedure. The administration should measure not only how many transactions are blocked, but also how many were blocked incorrectly and how long correction took.

A further challenge is inter-agency governance. Excise administration often sits at the intersection of the tax authority, customs, licensing bodies, product regulators and law-enforcement institutions. The integrated platform should therefore operate as a governed exchange environment rather than a single-agency data monopoly. Each institution should remain responsible for the legal quality of the data it originates. The tax authority can then rely on verified events, while maintaining an audit trail showing when data were received, modified or used in a compliance decision.

The study has several limitations. First, the fiscal analysis is descriptive and uses nominal annual data. It does not separate inflation, rate changes, quantity changes or administrative effects. Second, public data do not provide a complete breakdown of excise receipts by product group for all years. Third, the proposed EARS and EAMI weights are illustrative and have not been calibrated against taxpayer microdata or audit outcomes. Future research should estimate product-level excise gaps, test the predictive power of marking and transaction anomalies, evaluate the compliance-cost effects of validation rules, and examine how changes in excise design affect substitution among taxable products.[23]

4.1 Policy Recommendations

1. Build a unified excisable-product master data catalogue. Each taxable product should have a stable link among legal excise category, product code, measurement unit, marking requirements, tax rate structure and customs classification. Changes should be version-controlled so that historical liabilities remain reproducible.
2. Create an integrated excise ledger rather than relying on disconnected reports. Production or import, marking, warehouse movement, electronic invoice, retail receipt and payment records should be reconcilable through common identifiers and event timestamps.
3. Make tax-customs reconciliation automatic for imported excisable goods. The system should compare customs quantity and classification with marking codes, subsequent domestic invoices and eventual retail or wholesale disposition. Material unexplained differences should generate a risk signal rather than an immediate sanction.
4. Introduce systematic excise tax-gap estimation. The Ministry of Economy and Finance and Tax Committee should publish an annual analytical decomposition showing the effects of rate changes, taxable quantity, formalization, arrears and major administrative measures. This would improve transparency and policy evaluation.
5. Pilot EARS on tobacco and alcohol before broad deployment. These sectors already have mature digital marking coverage and therefore provide the best environment for testing whether integrated anomalies predict confirmed under-declaration or illicit circulation.
6. Measure the accuracy of automated controls. Every validation rule should have statistics on alerts, taxpayer corrections, confirmed violations, false positives and average resolution time. A rule that creates many errors should be redesigned even if it produces some additional assessments.
7. Strengthen inventory and authorized-loss controls. Excise administration should reconcile opening stock, production or imports, transfers, sales, exports, documented destruction and closing stock. Product-specific tolerance rules should be transparent and evidence-based.
8. Use digital services to lower compliance cost for legitimate operators. Pre-filled excise reports, product-classification assistance, real-time code validation, reconciliation dashboards and direct support can reduce errors before filing and improve voluntary compliance.
9. Establish an EAMI-based management dashboard. The index should be reported with its underlying indicators and data-quality flags, allowing central and regional managers to distinguish weak traceability from weak collection, poor integration, or service bottlenecks.
10. Preserve legal safeguards and human review. Risk scores and automated blocks should be explainable, contestable and subject to documented authority. Data should

be used only for legally defined purposes, and access should be role-based and auditable.

5. Conclusion

Excise tax administration is entering a stage in which control over selected goods can be built around continuous digital evidence rather than periodic paper declarations. This transformation is especially relevant for Uzbekistan because digital marking, electronic invoices, online cash registers and customs information already provide much of the technological foundation required for integrated administration. The challenge is now institutional: common identifiers, standardized data, automatic reconciliation, tax-gap analysis, calibrated risk models and clear governance must connect these systems into a single compliance logic. Official data show that excise revenue increased from UZS 13.1 trillion in 2021 to UZS 21.9 trillion in 2025, with a nominal compound annual growth rate of approximately 13.7 percent. Yet the relative share of excise in total state budget revenue declined, confirming that collection growth alone cannot measure the success of excise policy or administration. A mature performance framework must also measure traceability completeness, legal-market coverage, inventory consistency, the excise tax gap, audit precision, arrears, taxpayer service and the corrective objectives attached to specific products. The Integrated Excise-Tax Data Platform, EARS and EAMI proposed in this article offer a practical structure for that next stage. Their central principle is simple: information on the physical movement of excisable goods should be linked with information on taxable transactions and payment, while compliance interventions should be proportional to verified risk. If implemented with strong data governance and taxpayer safeguards, this model can improve revenue security, reduce illicit circulation, protect compliant businesses and provide a more reliable analytical basis for future excise policy in Uzbekistan.

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