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RESEARCH ARTICLE

Diagnostics of Risk Zones and the Effectiveness of Interaction between Participants in Tax Relations in the Context of Platform-Based E-Commerce

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ABSTRACT

The article is devoted to the formation of a methodological approach to identifying risk areas that arise during the interaction of participants in tax relations in the context of electronic commerce. The relevance of the study is due to the fact that a modern online transaction is not limited to just one accounting action, but is formed by a number of separate stages (the order itself, payment, marketplace commission, possible request for a refund, entry in tax records, etc.). Consequently, even with a high degree of digitalization of individual parts of the tax administration, there remains the problem of end-to-end linking of these stages to identify discrepancies, at least due to the fact that participants in platform relationships can describe the same fact of a business transaction with different timestamps, identifiers, and analytical features. Hence, the purpose of the article is to substantiate the process-diagnostic model, which makes it possible to determine the risk zone not so much through the probability of a tax offense, but through the frictionality of interaction between the tax authority, the taxpayer, the digital platform and infrastructure intermediaries. To achieve this goal, an analysis of regulatory and analytical sources was carried out, the open data of the Federal Tax Service of Russia was systematized, and an expert-analytical ranking of the selected stages of e-commerce tax administration was carried out. The final result of the study is the identified indicators of frictionality, integral risk, and the efficiency index of interaction between participants in tax relations within individual stages, as well as a map of the bottlenecks of such interaction.

INTRODUCTION

The expansion of e-commerce is significantly reshaping the traditional configuration of tax relations. In the conventional retail model, a tax-relevant event is generally confined to a single organization and a single accounting system. In the platform-based model, however, it is distributed among several participants: the seller, buyer, marketplace, payment intermediary, bank, fiscal data operator, logistics service provider, and tax authority. This distributed structure increases the analytical richness of tax administration but simultaneously creates new areas of uncertainty: the same economic transaction may be recorded as an order, payment, commission deduction, refund, receipt, adjustment, and an item in a tax return.

For Russian practice, this problem is not merely theoretical but has clear practical implications. According to the Federal Tax Service of Russia, the number of sellers operating through marketplaces increased from 77,000 in 2020 to 832,000 in 2026 (Federal Tax Service, 2026, February 18), with approximately 77% of these sellers applying the simplified taxation system. Thus, this is not a small segment of digital commerce but a large-scale environment for tax compliance in which any data error can rapidly be replicated across numerous similar transactions. The Federal Tax Service additionally reports that the volume of online trade exceeded RUB 11 trillion in 2025 and accounted for approximately 19% of total retail turnover, while in

some constituent entities of the Russian Federation, the share of online sales approached 35% (Federal Tax Service, 2026, February 17).

In international discussions, the digitalization of tax administration is generally viewed more broadly than merely as a means of strengthening the state's control function. For example, documents issued by the Organisation for Economic Co-operation and Development (OECD) associate digitalization with reducing the costs of voluntary tax compliance and gradually integrating tax-control procedures into taxpayers' routine business processes. The Tax Administration 3.0 concept describes a transition toward embedded, more seamless, and predictive administration, in which tax rules and verification procedures become part of the digital business environment. In the context of platform-based e-commerce, this means that attention should be focused not only on individual documents or tax returns but also on the digital trail of each transaction, including the quality of data exchange between different systems.

However, in academic literature and policy documents, the effectiveness of interaction among participants in tax relations is often interpreted narrowly—as response time to inquiries, the level of service digitalization, or the amount of additional tax assessed (Semenova, 2024). Such an approach is insufficient for the platform economy because risks arise not only from intentional violations of tax legislation but also from data incompatibility, delays in information exchange, repetitive requests, the absence of a unified taxonomy of transaction events, and uncertainty regarding the role of digital intermediaries.

Against this background, the purpose of the study is to develop a process-based diagnostic approach to identifying risk areas and assessing the effectiveness of interaction among participants in tax relations within the contemporary architecture of e-commerce tax administration. The research hypothesis is that a key opportunity for improving the effectiveness of e-commerce tax administration lies not only in strengthening tax-control algorithms but also in reducing interactional friction, including delays, repeated actions, data uncertainty, and communication cycles. The greater the comparability of a transaction's digital trail and the earlier a taxpayer receives a structured risk alert, the lower the likelihood that a discrepancy will escalate into a contentious tax-control procedure.

LITERATURE REVIEW

Contemporary research on the effectiveness of e-commerce tax administration is developing primarily at the intersection of three main areas (Advokatova, 2018). The first area focuses on the digital transformation of the public sector, which is regarded as a key factor reshaping business-process analytics, as machine-learning and Big Data technologies make it possible to identify bottlenecks and optimize processes more effectively (Muzalev, 2024). In this context, S.V. Muzalev (2025) associates the use of artificial intelligence in the public sector with managerial and economic benefits, including improved decision-making quality and reduced data-processing costs.

The second area concerns compliance risks and tax-gap analysis. Guidelines developed by the International Monetary Fund (IMF) and the World Bank emphasize that risk-based tax administration requires the systematic collection of data, the classification of taxpayers, the analysis of behavioral patterns, and the calibration of administrative responses according to the probability and potential consequences of identified risks. This is particularly important for platform-based e-commerce because the source of risk may lie not in a single document but in discrepancies between several digital systems.

The third area concerns the role of digital platforms in taxation. The OECD notes that platforms may serve as sources of data, intermediaries in tax-control procedures, and participants in value-added tax (VAT) arrangements, particularly in cross-border online sales. European practice is increasingly based on a model of regulated information exchange between digital platforms and tax administrations. One example is the DAC7 Directive, which is intended to improve the transparency of income earned by sellers in the platform economy.

In Russian academic literature, digital tax control and e-commerce are examined through the analysis of marketplace tax risks, platform-based employment, the application of special tax regimes, and the development of digital services provided by the Federal Tax Service of Russia (Aleksakhina et al., 2024). However, insufficient attention has been paid to the question of how to measure the effectiveness of interaction among participants in tax relations when such interaction is understood not as an isolated request-and-response exchange but as the end-to-end movement of tax-relevant information throughout the digital transaction chain.

The scientific problem addressed in this article lies in the need to integrate two analytical dimensions. The first concerns the risk of tax non-compliance, including the incomplete reporting of revenue, the incorrect accounting of commissions and discounts, the artificial fragmentation of business activities, the improper application of the Patent Taxation System (PTS), the Tax on Professional Income (TPI), or the Simplified Taxation System (STS), and delays in recording adjustments. The second dimension concerns the risk of inefficient interaction arising from repeated requests for the same data, differing interpretations of the same event by various participants in tax relations, and other related factors.

MATERIALS AND METHODOLOGIES

The study is based primarily on publicly available materials of the Federal Tax Service of Russia describing current developments in e-commerce tax administration, as well as analytical and methodological documents issued by the OECD, the International Monetary Fund, and the World Bank on the digital transformation of tax administrations and the transition to risk-based tax-control models [10].

The research framework comprises the following interrelated analytical steps, each of which captures a particular aspect of interaction among the participants in the tax relations under consideration

Decomposition of e-commerce tax administration in which a digital transaction is viewed not merely as a single act of purchase and sale, as is typical of traditional commerce, but as a sequence of procedures through which information is generated, transmitted among participants, refined, and assigned a tax-related interpretation.

Assessment of interactional friction—in other words, the degree to which dialogue among the participants proceeds smoothly or becomes contentious. Friction refers to organizational, procedural, or informational difficulties that slow the transmission of tax-relevant data, necessitate repeated actions, or allow for ambiguity in their interpretation for tax-assessment purposes. A three-point scale is used to assess the level of friction at each previously identified stage, where a score of 1 indicates a low degree of manifestation and a score of 3 indicates a high degree. This format was selected deliberately because publicly available sources do not permit the duration and recurrence of procedures to be measured reliably using precise operational indicators.

Calculation of a composite risk score for each stage as a weighted average that incorporates, in addition to friction risk, the probability of a tax risk arising and the difficulty of detecting it. The weighting coefficients reflect the differing contributions of individual stages to the final result.

Interpretation of the results**,** enabling the stages of the process to be compared and the points at which interaction becomes most strained to be identified. A methodological limitation should be noted separately: in the absence of publicly available statistics on the duration of procedures, the number of repeated communications, and the proportion of cases requiring manual processing, it is methodologically more appropriate to apply a relative diagnostic approach.

RESULTS

In platform-based e-commerce, tax-relevant information is generated not within a single accounting register but throughout a distributed chain of digital actions:

The buyer places and pays for an order

The platform records the terms of the transaction, including the seller, commission, discount, refund, and other relevant details

The payment intermediary records the movement of funds

The fiscal data operator generates the transaction's tax-related digital trail

The seller transfers aggregated indicators into its tax accounting system

The Federal Tax Service of Russia reconciles and cross-checks the information received.

Accordingly, the effectiveness of interaction depends not only on the completeness of the data but also on their comparability in terms of timing, identifiers, economic substance, and tax interpretation.

A distinctive feature of the platform architecture is that a marketplace does not merely serve as a technical channel between the seller and the buyer. It accumulates information on the seller's profile, orders, prices, discounts, returns, commissions, product promotion, and buyer behavior. This transforms the platform into an important component of the tax information infrastructure. At the same time, the tax obligation remains with the taxpayer. Tax administration should therefore be structured so that platform data facilitate the correct fulfillment of tax obligations without replacing the seller's responsibility or accounting policies [12].

Since 2025, the Federal Tax Service of Russia has been implementing an experimental approach to cooperation with the largest digital platforms (Federal Tax Service, n.d.). In its public communications, the authority identifies such risks as the artificial fragmentation of business activities, non-payment of VAT by taxpayers applying the Simplified Taxation System (STS), incomplete reporting of revenue under agency agreements, and the improper application of the Patent Taxation System (PTS) and the Tax on Professional Income (TPI). Taxpayers receive information notices that enable them to clarify and adjust their tax obligations before conventional tax-control procedures are initiated. In essence, this practice confirms the transition toward a preventive model of tax administration.

Figure 1 presents the authors' basic architectural and process-based framework for interaction among participants in tax relations within platform-based e-commerce.

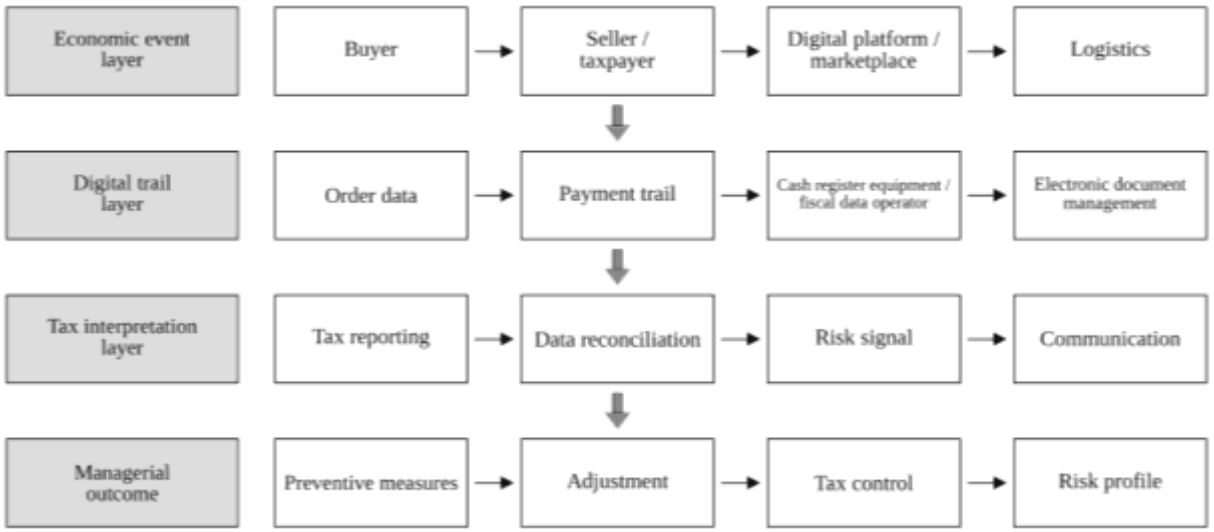

Figure 1: Architectural and process-based model of the flow of tax-relevant information in platform-based e-commerce

Source: Compiled by the authors.

From a methodological perspective, the identification of risk areas and the assessment of the effectiveness of interaction among participants in tax relations should be based on the authors' process model, which comprises eight consecutive stages of e-commerce tax administration (Table 1).

Table 1: Calculated assessment of interactional friction and composite risk by process stage

Stage	Weight	Sum of friction indicators	Process friction (F_i)	Risk score	Composite tax risk (IR_i)
Registration and identification	0.10	4	0.40	1.75	0.18
Transaction and payment	0.14	7	0.98	2.00	0.28
Fiscalization	0.12	6	0.72	1.75	0.21
Generation of tax-relevant data	0.18	6	1.08	3.00	0.54
Reporting / tax calculation	0.10	4	0.40	2.35	0.24
Desk-based reconciliation	0.18	6	1.08	3.00	0.54
Communication regarding discrepancies	0.12	5	0.60	2.00	0.24
Adjustment and compliance	0.06	3	0.18	1.75	0.11
Total / calculated index	1.00	–	5.44	–	2.34

Source: Compiled by the authors.

The calculations presented in Table 1 demonstrate that two stages make the greatest contribution to aggregate interactional friction: the generation of tax-relevant data and desk-based reconciliation. It is at these stages that digital events recorded in different systems must be transformed into the tax base, an indicator reported in the tax return, and an administrative signal. In the absence of a unified event model capable of linking a sale, payment, refund, commission deduction, and subsequent adjustment within a single analytical chain, the same business transaction may be subject to several different tax interpretations. This is of fundamental importance for e-commerce tax administration: ambiguity in reconciling digital trails not only increases the likelihood that a bona fide transaction will be classified as risky but also initiates an additional communication cycle involving repeated requests for explanations, clarification of information already submitted, and increased time-related and administrative costs for the taxpayer.

The diagnostic assessment made it possible to systematize the identified problems and distinguish four groups of risk areas (Table 2). The first group of problems, related to data architecture, arises because sales, payments, refunds, commission deductions, and adjustments are recorded by different participants in the digital environment and cannot always be unambiguously reconciled. As a result, discrepancies emerge between the data held by the platform, the payment infrastructure, the cash register equipment system, and the seller's tax accounting records. An additional source of risk is the insufficient linkage between the identifiers of the parties to the transaction and those of the transaction itself. This group of risks should be regarded as fundamental because, without a stable identifier and a uniform understanding of a digital event, it is impossible to ensure reproducible end-to-end traceability of a tax indicator from the original transaction to its inclusion in the tax return.

Table 2: Generalized map of bottlenecks in interaction among participants in tax relations

Problem group	Manifestation	Tax and organizational risk	Key solution
Data architecture	Different identifiers for the transaction, payment, fiscal receipt, and refund; inconsistent time lags	False discrepancies, incomplete revenue reporting, and incorrect allocation of marketplace commissions	Unified event model for a platform-based transaction
Procedural organization	Repeated requests, manual transfers between data formats, and different data-exchange formats	Increased administrative burden and a longer communication cycle	Once-only principle and regulated machine-to-machine data exchange
Identification of risk patterns	Artificial business fragmentation, improper application of the STS, TPI,	Late detection of risks and accumulation of tax arrears	Risk profiling of interconnected participants in platform-based commerce

	or PTS, and discrepancies arising from agency arrangements		
Communication	General notifications without traceability to the underlying event; different interpretations of the same transaction	Taxpayer distrust and repeated submission of data	Structured risk profile and preventive communication routing

Source: Compiled by the authors.

The second group of risk areas relates less to the substantive content of the data than to the procedural organization of their movement. It includes repeated requests for information that has already been submitted through another digital system, manual transfers between data formats, delays in transmitting clarifying information, and the absence of standardized processing statuses for identified risks.

The group of problems associated with identifying patterns of tax behavior among participants arises from the need to detect such risks as artificial business fragmentation and/or the improper application of special tax regimes, which is particularly relevant to the Russian platform environment. At the same time, these risks are difficult to identify by examining a single tax return or transaction because their detection requires the combined analysis of hidden links among participants, including logistics routes, bank accounts, product ranges, and other connections.

The fourth group concerns the quality of communication with taxpayers. Even a correctly identified risk may fail to produce the intended administrative outcome when the taxpayer receives an overly general alert, does not understand the source of the discrepancy, is required to resubmit data that are already available, or cannot identify the connection between the request and a specific digital event. The communication layer should therefore be treated not as an ancillary mechanism but as a full-fledged component of risk-based tax administration.

Reducing interactional friction requires a transition from fragmented explanations concerning discrepancies that have already arisen to the management of the digital life cycle of a tax-relevant event. In practical terms, this means that a platform-based transaction should be described using a stable, machine-readable set of attributes rather than an arbitrary collection of data. This set should include the seller and order identifiers, the date and time of the event, the transaction amount, the event type, the commission, discount, refund, payment status, fiscal details, and a link to a specific reporting indicator. With such a structure in place, the tax authority can not only identify a potential deviation but also explain to the taxpayer which event triggered the risk alert and why it requires clarification.

An important area of development is the creation of a cross-system reconciliation layer that would make it possible to match all the “traces” generated by an individual business transaction before an identified discrepancy becomes a source of conflict. Another important instrument is a digital interaction profile that would record both the discrepancy itself and the taxpayer’s subsequent response to it, while retaining historical data for the further identification of participants with a consistently compliant profile or, conversely, a recurring pattern of risky business conduct.

The fourth area is communication routing. A uniform approach to communicating with taxpayers about all types of discrepancies is methodologically inadequate because it fails to distinguish between different types of risk. A discrepancy involving a marketplace commission, indications of artificial business fragmentation, and improper application of the Tax on Professional Income each require different explanations, response deadlines, sets of supporting documents, and degrees of intervention by the tax authority. Consequently, the format of the risk alert should depend on the source of the risk, the magnitude of the potential deviation, the taxpayer’s previous interaction history, and the probability of a bona fide error caused by inconsistencies between digital systems.

DISCUSSION

The findings make it possible to clarify the meaning of the concept of the "effectiveness of interaction among participants in tax relations." In platform-based e-commerce, effectiveness cannot be reduced to the speed of the tax authority's response or the number of electronic services available. It is more appropriately understood as the ability of the system to ensure the once-only, internally consistent, timely, and reproducible flow of tax-relevant information from a digital transaction to an administrative decision. In this sense, the effectiveness of interaction is not a service-related indicator but a process-and-information metric.

The proposed model is consistent with the international approach to the digital transformation of tax administrations, in which control is gradually shifting from the ex post examination of tax returns toward embedded analytics and the prevention of non-compliance. At the same time, Russian practice has its own distinctive features: the widespread use of special tax regimes by marketplace sellers, the high concentration of platform-based sales, the availability of a developed online cash-register infrastructure, and the possibility of cross-system data reconciliation. These factors create the necessary conditions for a more advanced preventive model than in countries where digital data on online retail sales are less centralized.

The previously identified risk of artificial business fragmentation requires separate consideration because, in platform-based commerce, it has a more complex evidentiary basis. Under the conventional tax-control model, this risk is generally established by analyzing the legal, property-related, personnel, and managerial interdependence of business entities. In e-commerce, however, these indicators are no longer sufficient. Digital traces of market participants' behavior become particularly important, including the use of linked accounts, identical or overlapping product listings, similar or intersecting logistics routes, recurring bank details, shared contact information, and synchronized adjustments to prices, product ranges, and product-promotion terms.

Consequently, the identification of artificial business fragmentation in the platform environment should be based not only on formal indicators of interdependence but also on an analysis of participants' digital interconnectedness. At the same time, such analysis requires predefined and transparent rules of interpretation because an excessively broad interpretation of digital similarities may increase the number of false-positive risk alerts and, as a result, impose an additional administrative burden on compliant taxpayers.

As noted above, the verification of the proposed model is constrained by the non-public nature of detailed operational indicators relating to e-commerce tax administration. Accordingly, the quantitative component of the article constitutes an expert-based analytical model for relative diagnostics. It is intended not to replace the internal tools used by the Federal Tax Service of Russia but to identify the stages of the process at which interaction is comparatively more strained. Further validation of the model will be possible if access is obtained to anonymized operational data from tax authorities, digital platforms, and fiscal data operators.

CONCLUSION

The study demonstrates that platform-based e-commerce creates a distinct architecture of tax administration: a tax-relevant event is distributed across several digital systems and does not always have a single stable identifier. Under these conditions, the identification of risk areas should take into account not only the probability of violations of tax legislation but also the quality of interaction among the participants, including delays in the transmission of information, repeated actions, data uncertainty, and the potential burden of communication on compliant taxpayers.

The article proposes an eight-stage process-based diagnostic model covering participant registration and identification, transaction and payment, fiscalization, the generation of tax-relevant data, tax reporting, desk-based reconciliation, communication regarding discrepancies, and subsequent adjustment. Indicators of interactional friction and composite risk were calculated using expert-based analytical scoring. The generation of tax-relevant data and desk-based

reconciliation were identified as the most strained stages, confirming the need for cross-system reconciliation and a unified event model for platform-based transactions.

The scientific novelty of the article lies in the proposal to assess the effectiveness of interaction among participants in tax relations not only in terms of the speed of tax-control procedures, the volume of data collected, or the amount of the resulting tax assessment. The study interprets effectiveness as a process-and-information characteristic of tax administration that reflects the extent to which the system is capable of transmitting tax-relevant information from the initial digital event to an administrative decision by the tax authority. This approach shifts the focus from an isolated risk signal to the entire sequence of its generation, explanation to the taxpayer, and subsequent resolution.

The practical significance of the proposed approach lies in its potential application to the design of more flexible instruments for interaction among tax authorities, digital platforms, and taxpayers.

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A STATEMENT OF ORIGINALITY

The authors warrant that the above-mentioned material has not previously been published in Russian and is not currently under consideration by another journal.

GENERATIVE ARTIFICIAL INTELLIGENCE

The authors warrant that no part of the manuscript submitted to the editorial office was created using automated text- or image-generation systems or other artificial intelligence tools, including ChatGPT and similar technologies, except for the use of neural networks in processing research data.

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