



RESEARCH ARTICLE

Target Model of E-Commerce Tax Administration Processes with Integration of Artificial Intelligence-Based Services

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ABSTRACT

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This study examines the issue of improving the process efficiency of e-commerce tax administration, driven by the rapid growth of online transactions and the spread of digital business models, through the implementation of advanced artificial intelligence-based technologies. A target model of tax administration processes is proposed and built as a project configuration aimed at eliminating process gaps in e-commerce administration. The target model differs from the current organization of existing processes: it changes the internal logic of support, verification, distribution, and accumulation of results within the digital tax administration. The central idea of the target model is to reconfigure transitions between stages by selectively incorporating intelligent models in areas where typical errors, duplicate requests, excessive navigation load or an excess of similar messages accumulate. The effects of integrating the target model are practical and include: reducing the number of actions, ensuring data completeness, accelerating primary processing, and increasing the targeting of feedback.

INTRODUCTION

The transition to a target model for e-commerce tax administration processes should be based not on the expansion of digital services in the abstract, but on identifying process gaps and assessing channel-specific constraints and opportunities. Accordingly, the target model is viewed as a design configuration that addresses the identified shortcomings of the current process and ensures more reliable progression through the stages of tax administration in a digital environment.

In this context, the target model represents a legally robust arrangement of existing process stages, in which intelligent modules are used to address specific process gaps: input errors, incomplete information, excessive manual routing, repetitive actions, and insufficiently targeted feedback.

From a methodological perspective, the target model should be developed according to a set of design principles: preserving the legal nature of the procedure; integrating modules at specific process stages; prioritizing the reduction of gaps between stages; maintaining a cumulative record of results; ensuring targeted and explainable feedback; and implementing changes in phases according to the readiness of each channel and process segment. These principles define not only the technological but also the organizational and legal boundaries of the target model.

RESEARCH METHODS

The study's methodological framework comprised a combination of general scientific and specialized research methods. The research methodology draws on the principles of a systems approach (viewing the process as a unified system), appropriateness (of implementing artificial intelligence [AI] technologies), sequencing (introducing changes in stages), and effectiveness (focusing on measurable performance indicators).

Systems analysis was applied to examine e-commerce tax administration processes as an integrated system, identifying its subsystems and the relationships between them. The study uses

modeling and visualization to develop a target process model through diagrams, tables, and matrices.

Criteria-based analysis and classification made it possible to categorize the functions and key characteristics of the process stages and, on this basis, assess the feasibility of integrating AI-based services. The process-based approach facilitated the analysis of tax administration as a set of interrelated procedures.

RESULTS

A clear governance framework is essential to the practical implementation of the target model. The tax authority should retain ownership of the administrative process and legal responsibility for the outcome of each action; the digital system should perform auxiliary service and analytical support functions; specialists should be responsible for confirming, adjusting, and interpreting atypical cases; and internal regulations should define the limits of the intelligent module's use, the grounds for its activation, and the procedure for reviewing its output. Without this allocation of roles, the target model will be perceived as a technical scheme rather than a legally and organizationally robust configuration of tax administration.

The target model should align process stages, digital interaction channels, and the permissible extent of intelligent support at each stage. To translate the identified problems into design solutions, a consolidated matrix should be used in which each shortcoming is linked to a specific direction for process redesign (Table 1).

Table 1: Design solutions for improving e-commerce tax administration processes

Identified shortcoming	Design solution	Process stage	Intelligent module	Who confirms the result	Expected outcome
Incomplete initial profile	Enhancing the taxpayer's registration and information profile and requiring its subsequent use throughout the tax control cycle	Participant identification and inclusion in the tax administration framework	Guidance on procedural steps, checks on the completeness of initial information, and assistance in selecting the appropriate entry pathway	A tax authority official during registration and entry into the tax register	More targeted subsequent control and fewer input errors
Disconnected data flows	Establishing a stable logical link between information on the entity, settlement, document, transaction execution, and tax liability	Generation and receipt of tax-relevant information; initial verification and data matching	Preliminary matching of messages and checks on the completeness and logical coherence of the digital footprint	A tax authority specialist when confirming identified discrepancies and atypical cases	A more coherent digital footprint and fewer unmatched messages
Weak linkage between reporting and the digital footprint	Establishing a preliminary logical link between reported data and previously received information on the business transaction before proceeding to an in-depth review	Submission of reporting and tax calculation documents	Checks on required details, completeness, and evident discrepancies between the reporting form and information already available	A tax inspector when deciding how the audit should proceed	Fewer discrepancies detected at later stages and less need for repeated clarification
Excessive manual rework	Distinguishing between standard processing of routine cases and in-depth analytical assessment of atypical situations	Initial verification and data matching; analytical support	Case classification, preliminary ranking of signals, and identification of high-priority deviations	A tax authority analyst	Less labor-intensive analytical work and a faster transition to a substantiated response
Repetition of actions	Maintaining a cumulative record	Recording of the outcome;	Support for reusing	A tax authority official when	Reduced administrative

	of the results of completed procedures and requiring the use of previously established findings in each new control cycle	subsequent control cycle	previously accumulated information and reminders of prior actions and results	initiating a new audit or interaction cycle	burden and fewer duplicate requests
Insufficiently targeted feedback	Transitioning to clear, context-specific communication of procedural outcomes, taking account of the type of case and the previously established digital profile	Compliance response	Targeted explanations, service guidance, and preparation of a clear draft response or notification	The tax authority when preparing the final legally significant communication	More predictable interactions and fewer repeat inquiries

Source: compiled by the authors

It is important to emphasize that the target model differs from the current model in how progression through the existing stages is organized. In other words, the internal logic governing support, verification, allocation, and the accumulation of results within digital tax administration changes. A comparative diagram can be used to illustrate the differences between the current and target process configurations (Figure 1).

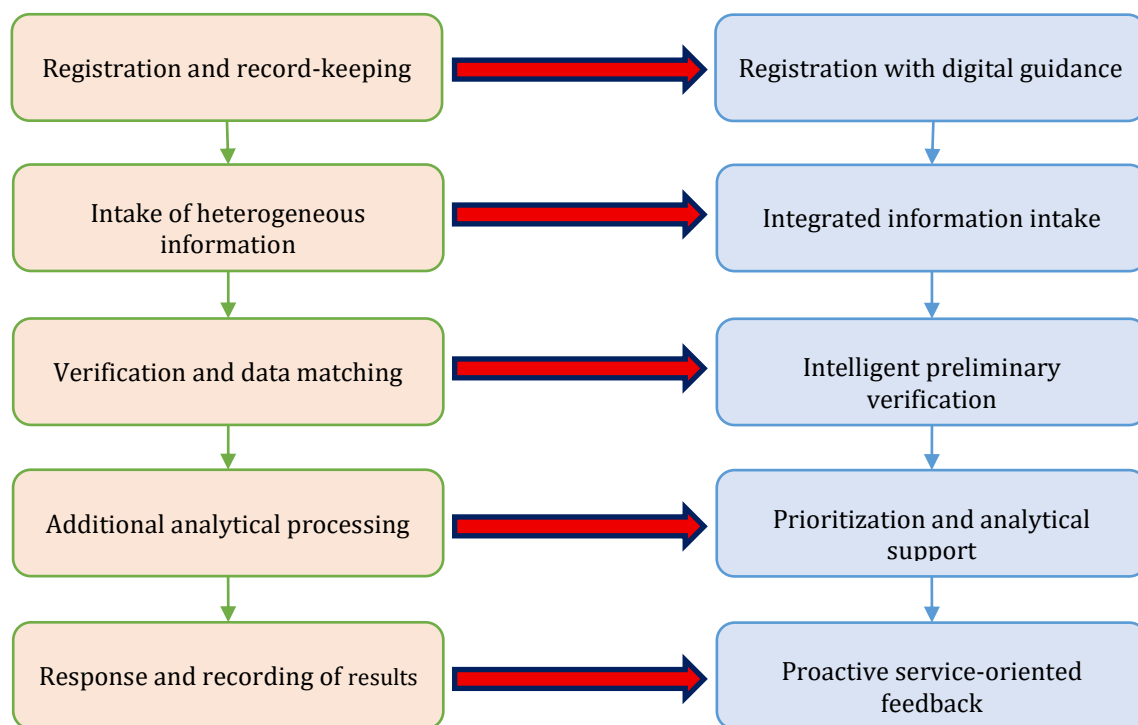


Figure 1: Comparative overview of the current and target models of e-commerce tax administration processes

Source: Compiled by the authors.

The figure demonstrates that the target model differs from the current model not in the introduction of a new set of legal actions, but in the internal organization of the existing stages. It is based on a shift from documenting process gaps to their targeted elimination through embedded service and analytical modules.

The next step in the design process involves allocating permissible functions to individual process stages. To directly address the question of how intelligent modules should be distributed across these stages, a dedicated stage-by-stage map was used (Table 2).

Table 2: Stages of e-commerce tax administration and the suitability of using artificial intelligence

Process stage	Suitability of AI use	Permissible AI function	Responsibilities retained by humans	Rationale
Participant identification	High	Procedural guidance, checks on the completeness of initial data, and suggestions for the next action	Legal assessment of status and administrative decision-making	High repetition of routine actions
Generation and receipt of information	Moderate to high	Preliminary data matching and checks on message completeness	Confirmation of atypical discrepancies	Large volume of structured data
Submission of reporting documents	High	Checks on required details, completeness, and evident inconsistencies	Confirmation of the content of legally significant documents	Substantial benefits from reducing input errors
Initial verification and data matching	High	Identification of discrepancies, routing, and grouping of routine cases	Decisions on the form of further verification	A substantial proportion of operations can be formalized
Analytical support	Moderate	Ranking of signals, support for case selection, and preliminary interpretation	Substantive assessment and conclusions regarding atypical cases	High cost of error and the need for expert judgment
Compliance response	Limited	Preparation of explanatory templates and targeted service support	Taking legally significant action	AI must not substitute for administrative decision-making
Recording of the outcome	Moderate to high	Support for cumulative record-keeping and subsequent reuse of results	Verification of the accuracy of the final record	Importance of continuity between cycles

Source: Compiled by the authors.

The target process diagram, identifying the embedded intelligent modules, is presented in Figure 2. This diagram illustrates the proposed process configuration as an integrated design, rather than merely a set of individual functions or areas for automation.

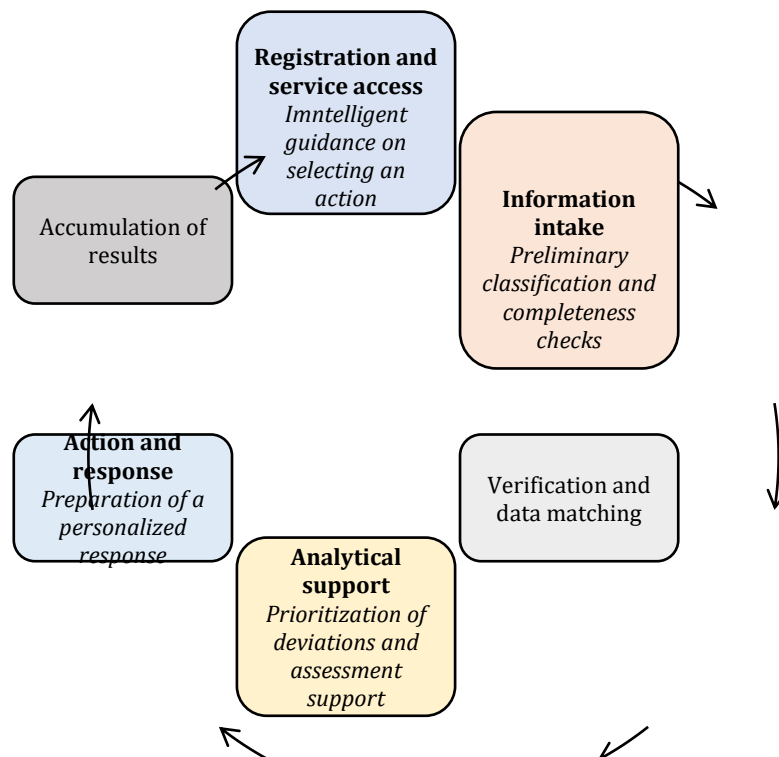


Figure 2: Target process diagram for e-commerce tax administration with embedded intelligent modules

Source: Compiled by the authors.

The integration of intelligent services should vary across process stages. At entry, priority should be given to guidance and explanations; in the intermediate stages, to classification, completeness checks, and preliminary validation; at the analytical stage, to ranking and support for case selection; and at the output stage, to targeted and clear feedback. The target model does not represent the comprehensive automation of the entire process, but rather the allocation of intelligent modules according to their suitability for specific process stages.

To provide a systematic overview of the expected outcomes of the transition to the target model, it is useful to identify the main categories of effects and link them to the process stages at which they arise (Table 3).

Table 3: Key expected effects of the transition to the target model of e-commerce tax administration processes

Effect category	Description of the effect	Beneficiaries	Process stage at which the effect arises
Time-related	Reduced duration of routine procedures and shorter routing times	Tax authority; taxpayer	Process entry, verification, and initial allocation
Service-related	Fewer user errors and repeat inquiries	Taxpayer	Form completion, information submission, and feedback
Control-related	Improved quality of preliminary verification, data matching, and analytical prioritization	Tax authority	Verification and analytical support
Workload-related	Reduced excessive administrative burden and repetition of actions	Both parties to the interaction	Repeated requests, clarifications, and repeated cycles

Source: Compiled by the authors.

The expected effects of the transition to the target model should be assessed using a set of observable process and service parameters. These include the duration of routine procedures, the number of user errors and repeat inquiries, the quality of preliminary verification and routing, the degree to which feedback is targeted, and the extent to which results from the previous control cycle are used.

An equally important condition for the transition to the target model is the allocation of responsibilities among process participants. The tax authority retains its legal powers and responsibility for the outcome of administrative actions; the digital service provides guidance, preliminary verification, classification, and support for routine scenarios; specialists confirm and interpret atypical cases; and users are responsible for the accuracy of their initial data and their choice of actions. A systematic stage-by-stage overview of the target model is presented in Table 4.

Table 4: Comparison of the current and target models of e-commerce tax administration processes

Process stage	Current state	Target model	Intelligent process support tool
Registration and process entry	Users independently select the tax regime, form, and submission pathway	Users receive guidance on selecting the tax regime, channel, and next action	Intelligent navigation and explanatory guidance
Information intake	Messages arrive through different channels and require additional classification	Information is automatically classified by type and undergoes preliminary completeness checks	Message classification and completeness checks
Initial verification	A substantial proportion of technical and logical inconsistencies are resolved after submission for processing	Routine errors and omissions are identified before an in-depth review begins	Module for preliminary verification of structure and required details
Analytical assessment	Much of the prioritization is performed by specialists	The system helps identify routine and high-priority cases	Intelligent support for ranking deviations
Action and response	Feedback is frequently generic or excessively formal	Responses become more targeted, clearer, and tailored to the type of case	Support for preparing personalized responses
Recording of the outcome	The results of a procedure are not always fully used in subsequent cycles	Results are integrated into an updated digital profile and provide the basis for further interaction	Cumulative record-keeping of results and proactive notifications

Source: Compiled by the authors.

The transition to the target model should also be phased. At the first stage, intelligent modules should be introduced in areas characterized by highly repetitive routine actions and low legal sensitivity of outcomes, primarily guidance, completeness checks, and message routing. At the second stage, preliminary data matching and analytical prioritization of routine signals can be strengthened. At the third stage, the use of accumulated results and targeted feedback can be integrated into an end-to-end tax administration framework. This phased approach is necessary to ensure that adaptation of the target model is accompanied by quality checks, revisions to internal regulations, and continued control over the administrative process.

The central idea of the target model is to reconfigure transitions between stages according to the sequence “current problem–design solution–expected effect.” Each stage retains its legal meaning but is supplemented with a support module that reduces a specific type of process inefficiency.

For e-commerce tax administration, the appropriate approach is not to embed intelligent models throughout the entire process, but to integrate them selectively at points where routine errors, repeated requests, excessive navigational demands, or excessive volumes of similar messages accumulate. This framework is illustrated in Figure 3, which identifies the operational points at which auxiliary intelligent functions are integrated into the established process structure.

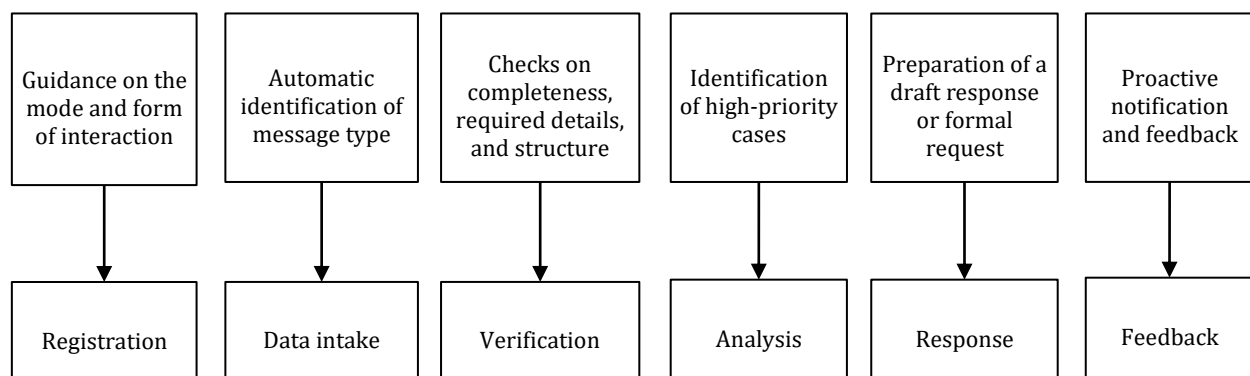


Figure 3: Integration of intelligent modules into the stages of e-commerce tax administration

Source: Compiled by the authors.

The integration of intelligent services should take place “above” the process stages rather than replace them. The user pathway is not replaced but becomes more manageable; verification is not eliminated but is supplemented by a preliminary filter; analytics does not lose its human component but gains a tool for prioritization; and feedback is not separated from its legal form but becomes more precise and understandable. This approach ensures a balance between technological enhancement of the process and preservation of the legal and regulatory stability of tax administration.

The expected effects of the transition to the target model are practical in nature and can be assessed through clear process parameters: reduction of repetitive actions, improved data completeness, faster initial processing, more targeted feedback, and cumulative recording of results.

The practical feasibility of the target model is confirmed by the possibility of observing the impact of intelligent modules on the course of the procedure. Therefore, the expected effects should be linked to indicators that can subsequently be monitored, compared, and adjusted through management decisions (Table 5).

Table 5: Expected effects of the transition to the target model of e-commerce tax administration processes

Effect category	Description of the effect	Assessment indicator	Expected direction of change
Time-related	Reduced duration of routine procedures	Average time required to complete a routine scenario	Decrease
Service-related	Reduced number of user errors	Share of repeated requests on the same	Decrease

	and repeat inquiries	issue; number of cases returned for revision	
Control-related	Improved quality of preliminary verification and prioritization	Share of correctly classified messages; share of deviations assigned to high-priority cases	Increase
Workload-related	Reduced excessive administrative burden	Number of additional actions per completed scenario	Decrease
Communication-related	Improved clarity and targeting of feedback	Share of inquiries resolved without additional clarification	Increase
Cumulative	More complete use of the results of completed procedures	Share of cases in which a previous result is taken into account in a new cycle	Increase

Source: Compiled by the authors.

The target model should be assessed not only through the internal metrics of the digital system, but also through the quality of the user experience and the ability of the legal mechanism to operate with lower costs. This is particularly important in e-commerce, where administrative interaction takes place against the background of high-speed business transactions. If a digital procedure remains formally compliant but is excessively lengthy, unclear, or repeatedly duplicated, such a model cannot be regarded as a fully developed target model. Therefore, the criterion for a successful transition is the ability to combine legal accuracy, service clarity, and manageable analytical support within a single process.

CONCLUSIONS

The analysis shows that the target model of e-commerce tax administration processes should be designed as a project configuration aimed at eliminating previously identified process gaps rather than simply expanding the range of digital functions.

The main solutions for improving the process have been substantiated: strengthening the taxpayer's initial profile, improving data connectivity, establishing a preliminary logical link between reporting and the digital footprint of transactions, distinguishing between standard and in-depth analytical processing, and maintaining cumulative records of the results of completed procedures.

It was established that the use of AI is most appropriate at the stages of navigation and completeness checking, preliminary data matching, classification and ranking of signals, and service-oriented feedback, whereas legally significant decisions should remain the responsibility of the tax authority and its specialists.

The key expected effects of the transition to the target model include shorter processing times for routine procedures, fewer user errors and repeat inquiries, improved quality of preliminary verification and analytical prioritization, and more complete cumulative use of the results of completed procedures in subsequent tax administration cycles.

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