

Enhancing Tax Co-Governance in the Digital Age: Pathways and Strategies for Platform Optimization

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Abstract:

In the context of a rapidly expanding digital economy, traditional tax administration systems encounter significant hurdles, including fragmented data and inefficient collaboration. Enhancing the tax co-governance platform emerges as a critical strategy for improving governance efficacy. This research underscores the necessity of integrating advanced technologies—such as big data analytics, blockchain, and artificial intelligence—into the platform to facilitate cross-departmental data sharing, intelligent risk management, and precise decision-making. This study identifies key issues plaguing the current tax co-governance platform, including data circulation barriers, inadequate collaborative mechanisms, and security management vulnerabilities. We propose optimization pathways focusing on technological integration, process refinement, and institutional innovation. Our findings suggest that the future evolution of the tax co-governance platform will be characterized by intelligence, internationalization, and service orientation, providing theoretical underpinnings and practical guidance for the modernization of tax governance in the digital age.

Keywords:

Tax co-governance platform; Big data; Blockchain; Collaborative governance; Tax administration

1. Introduction

In the digital era, taxation serves as a cornerstone of national fiscal revenue, intricately linked to the stable economic growth and harmonious societal functioning, contingent upon the efficiency and quality of tax administration. The traditional tax administration model relies primarily on the sole management of the tax authority and faces many limitations in information acquisition and collaborative efficiency. With the rapid development of information technology, the application of big data, cloud computing, and artificial intelligence in the field of taxation has gradually deepened, giving rise to the tax co-governance platform as a key measure to enhance the modernization of tax administration. Building a tax co-governance platform—through technology empowerment and institutional innovation to achieve cross-departmental data sharing and multi-stakeholder collaborative governance—has become a critical breakthrough for resolving governance difficulties and advancing the modernization of national governance.



Although domestic and foreign research has focused on the application of big data, blockchain, and other technologies in the tax field, no systematic solutions have yet been formed for the deep logic of 'technology embedded in institutions' or the incentive and constraint mechanisms for multiple actors. This paper explores the pathways for the platform to fulfill its functions in data sharing, risk prevention, and decision support, and reveals pain points such as data barriers, low collaboration efficiency, and limited technology application. The research aims to put forward a construction strategy of 'data standardization—process intelligence—governance collaboration' driven by the dual engines of technological innovation and institutional adaptation, providing theoretical references and practical guidance for upgrading the tax governance system in the digital era, and helping to achieve the leap from 'governing taxes through data' to 'intelligent co-governance'.^[1]

2. Overview of the Tax Co-Governance Platform

2.1. Definition of the Tax Co-Governance Platform

The tax co-governance platform represents an innovative framework designed to modernize tax governance in the digital age. Leveraging advanced information technology, it breaks down the information barriers between departments in traditional tax management, integrates the forces and resources of multiple actors such as government departments, enterprises, and social organizations, and jointly participates in the tax governance process through data sharing, business collaboration, and process optimization.^[2] Its core connotation lies in emphasizing collaborative cooperation—not only collaboration among the different levels and business segments within the tax authority, but also broad coordination between the tax authority and other external government departments (such as industry and commerce, finance, and customs) as well as social forces including enterprises, industry associations, and third-party institutions. This collaborative cooperation aims to form an all-round, multi-level tax governance pattern, improve the efficiency of tax collection and administration, optimize the quality of taxpayer services, promote tax fairness, and enhance the foundational, pillaring, and protective role of taxation in national governance.

2.2. Construction Objectives of the Platform

The construction of the tax co-governance platform has multi-dimensional and multi-level objectives, aiming to comprehensively improve the level of tax governance and better serve economic and social development. Its main construction objectives include the following aspects:

(1) Improving Operational Efficiency in Tax Administration: By integrating tax-related data resources from various departments, breaking down information silos, and achieving real-time data sharing and interaction, the tax authority can obtain more comprehensive and accurate taxpayer information, reduce information asymmetry, and thus more precisely conduct tax source monitoring, tax assessment, and tax inspection.

(2) Optimizing taxpayer service experience: Providing taxpayers with more convenient, efficient, and personalized services is one of the important objectives of the tax co-governance platform. Through the platform, taxpayers can handle tax matters at a single window without running between multiple departments, greatly saving time and cost.

(3) Promoting tax fairness and justice: With the help of big data analytics, conducting horizontal and ver-

tical comparative analyses of the tax payment situations of enterprises in different industries and of different scales enables the timely detection of abnormal tax payment, preventing enterprises from evading tax obligations through improper means.

(4) Enhancing scientific tax decision-making: The tax co-governance platform aggregates massive amounts of data from all sides, including economic operation data, industry development data, and enterprise operation data. Through comprehensive analysis of these data, it can accurately grasp the economic development situation and tax revenue trends, providing a scientific basis for the formulation and adjustment of tax policies.

(5) Advancing social collaborative governance: Encouraging social forces such as enterprises, industry associations, and third-party institutions to participate in tax governance, forming a positive atmosphere for the whole society to pay attention to and support tax work. Enterprises can provide feedback through the platform on problems and suggestions encountered during the implementation of tax policies; industry associations can play the role of industry self-discipline to guide enterprises to pay taxes according to law; and third-party institutions—such as tax agencies and accounting firms—can provide professional tax consulting and agency services to taxpayers, assisting the tax authority in conducting tax assessment and inspection.

2.3. Key Technologies for Platform Construction

Big data technology is the core support of the tax co-governance platform. Tax co-governance involves massive amounts of tax-related data, including corporate financial statements, transaction records, tax declaration data, and various administrative data provided by government departments. Big data technology enables the efficient storage, management, and analysis of vast datasets, facilitating real-time monitoring and predictive analytics for tax administration. Through data mining, machine learning, and other technical means, it extracts valuable information from the data, identifies potential tax risk points, and provides data support for the decisions of the tax authority. Using big data analysis to model the tax behavior of enterprises can predict tax trends, detect abnormal tax behavior in a timely manner, and improve the precision of tax administration.[3]

Cloud computing technology provides the tax co-governance platform with powerful computing resources and storage capacity. Cloud computing is characterized by elastic scalability, enabling dynamic adjustment of computing resources and storage capacity according to the platform's business volume, avoiding waste and shortage of resources. During peak periods of tax administration—such as the tax declaration period—the cloud computing platform can automatically increase computing resources to ensure fast platform response; during periods of low business volume, resources can be reduced to lower costs. Cloud computing also achieves distributed deployment of the platform, improving platform reliability and availability, and ensuring the continuous operation of tax co-governance work.

Blockchain technology, with its characteristics of decentralization, immutability, and traceability, plays an important role in the tax co-governance platform. In terms of tax-related data sharing, blockchain technology can ensure the authenticity and integrity of data; once data is uploaded to the blockchain, it cannot be tampered with, guaranteeing data credibility. In the tax administration process, blockchain technology can realize the automation and intelligence of business processes, improve administration efficiency, reduce human



intervention, lower tax administration costs, and enhance the collaborative efficiency and transparency of tax co-governance.[4]

3. Current Problems of the Tax Co-Governance Platform

At present, the construction of China's tax co-governance platform has played a positive role in advancing the modernization of tax governance, but it still faces systemic challenges in institutional design, management collaboration, and technical support, which constrain the full realization of its effectiveness.

3.1. Institutional Challenges: Inadequate Establishment of Collaborative Governance Mechanisms

First, regarding laws, regulations, and policy basis, cross-departmental and cross-level data sharing still lacks clear and unified legal authorization and institutional safeguards. Departments face ambiguous divisions of responsibilities, rights, and interests in providing data, usage permissions, and accountability, leading to the dilemma of 'unwillingness to share, fear of sharing, and inability to share' in data sharing practice. Second, the incentive and assessment mechanisms for collaborative governance have not yet been systematically established. The current assessment system is mostly unit-based, lacking effective evaluation and positive incentives for cross-departmental collaboration effectiveness, which affects the enthusiasm and sustainability of participation by all parties. In addition, the role positioning, rights and obligations, and cooperation rules of multiple actors such as the government, enterprises, and social organizations in tax co-governance still need to be further clarified to form a stable and sustainable collaborative governance structure.

3.2. Management Level: Shortcomings in Organizational Collaboration and Execution Capacity

In terms of management collaboration, the primary problem is the inconsistency in cross-departmental business process standards and poor linkage. Due to historical evolution and functional differences, relevant departments such as taxation, market regulation, social security, and banking differ in business specifications, data calibers, and processing timeliness, leading to impaired platform collaboration efficiency and bottlenecks in business transfer. Second, organizational barriers and cultural conflicts still exist to a certain extent. Some departments still have a 'data territory' mindset, are accustomed to vertical management thinking, and need to strengthen horizontal collaboration awareness and capacity. Finally, there is a severe shortage of compound talents who are both versed in tax business and proficient in digital technology. The construction, operation, and optimization of the platform requires a large number of professionals with cross-domain knowledge; the current talent reserves are insufficient to meet the needs of the platform's in-depth development and innovative applications, constraining intelligent upgrades and sustainable operation.

3.3. Technical Level: Challenges in System Architecture and Data Governance

Technical problems are mainly concentrated in three aspects: system integration, data quality, and security and privacy. First, the problem of system heterogeneity and inconsistent interfaces is prominent. Systems independently built by various levels and departments differ greatly in technical architecture, data format, and

interaction protocols, leading to high platform integration difficulty, large interface development costs, and limited overall scalability, flexibility, and response capacity of the system. Second, data quality standards and governance systems are lacking. The data accessed by the platform varies in completeness, accuracy, timeliness, and consistency, lacking authoritative data quality assessment standards and continuous governance mechanisms, affecting the reliability of data-based risk prevention and decision support. Third, security and privacy protection face severe challenges. The platform aggregates massive amounts of sensitive tax-related and enterprise information, facing multiple risks such as network attacks, data breaches, and permission abuse throughout the entire lifecycle of data collection, transmission, storage, use, and destruction. The platform still needs to be strengthened in terms of security protection systems, privacy computing technology applications, and security management systems to build a trusted and controllable data sharing environment.

4. Improvement Proposals for the Current Tax Co-Governance Platform

Targeting the problems at the institutional, management, and technical levels of the current tax co-governance platform, the following systematic improvement proposals are put forward to promote the platform to develop in a more collaborative, intelligent, and secure direction.

4.1. Institutional Level: Improving Collaborative Governance Mechanisms

1. Strengthening Legal and Policy Frameworks for Data Sharing and Collaborative Governance: Formulate the Measures for the Management of Tax Data Sharing and the Regulations on Promoting Tax Collaborative Governance, clarifying the legal basis, responsibility boundaries, and usage norms for cross-departmental data sharing. Establish a data classification and graded authorization mechanism, implementing differentiated sharing strategies for data of different sensitivity levels. Meanwhile, improve the definition of the rights and obligations of all participating actors in tax co-governance, forming a collaborative governance pattern of government-led, multi-party participation, and clear responsibilities.

2. Establishing collaborative incentive and assessment mechanisms: Build a cross-departmental performance assessment system oriented toward co-governance effectiveness, incorporating data sharing quality, business collaboration efficiency, and risk joint prevention results into assessment indicators. Establish a special incentive fund for tax co-governance, rewarding departments and individuals with significant collaborative achievements. Implement a working mechanism of 'first inquiry responsibility, time-limited completion, and collaborative accountability' to break departmental barriers and improve overall execution efficiency.

4.2. Management Level: Improving Organizational Collaboration and Execution Capacity

1. Promoting business process standardization and integration: Take the lead in formulating the Tax Co-Governance Business Process Specifications, unifying data calibers, processing timeliness, and exchange standards. Establish cross-departmental business collaboration working groups to regularly sort out and optimize key collaborative processes, such as the 'one-window' enterprise registration and the joint law enforcement for tax inspection. Through process reengineering and system connection, realize the transformation of business from 'serial' to 'parallel', improving efficiency.



2. Strengthening compound talent cultivation and organizational culture building: Implement a special training program for 'taxation + digital' compound talents, conducting targeted training and practical exercises jointly with universities and enterprises. Establish dedicated positions for digital governance within the tax system and establish a cross-departmental talent exchange mechanism. At the same time, foster an organizational culture of openness, sharing, and collaborative win-win through co-governance case sharing and collaborative work recognition activities.

4.3. Technical Level: Optimizing System Architecture and Data Governance

1. Building an open, elastic, and secure platform technical architecture: Following the overall 'microservices + middle platform' architectural concept, promote the evolution of systems from centralized to distributed. Adopt containerization and cloud-native technologies to achieve elastic scaling and rapid deployment of resources. Build a unified technical standard and open API system to support the gradual access and integration of existing heterogeneous systems. [5] The specific technical architecture is shown in Figure 1.

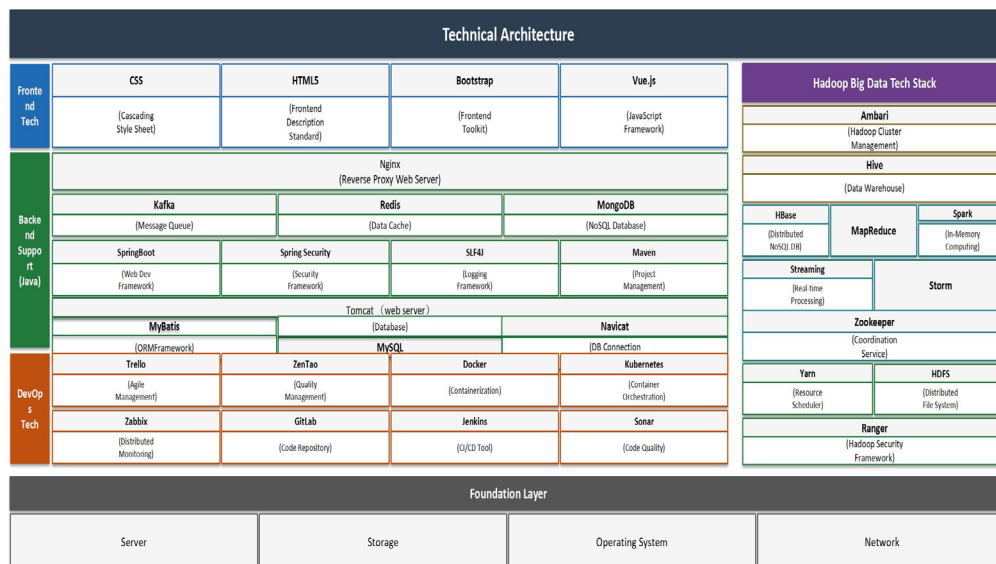


Figure 1. Technical Architecture Diagram

2. Establishing a full-lifecycle data governance system: Formulate the Tax Co-Governance Data Quality Standards and Management Specifications, establishing a full-lifecycle data governance process covering collection, cleaning, storage, application, and destruction. Build a data quality monitoring and assessment platform, using rule engines and machine learning to realize automatic monitoring and repair of data anomalies. In the data sharing phase, actively apply privacy computing and federated learning technologies to achieve 'data available but not visible', balancing data utilization and security protection.

3. Strengthening platform security and privacy protection capabilities: Strictly adhere to the network security classified protection system, building a multi-layer security protection system from network, host, application, and data perspectives. Establish a dynamic access control mechanism based on the zero-trust architecture, achieving minimum permission and traceable behavior. In key business processes, use blockchain technology for evidence storage to ensure operations are immutable and fully traceable. Regularly conduct

security penetration tests and emergency exercises to improve overall security defense and response capabilities.

4. Functional architecture upgrade: Building a 'six-in-one' collaborative platform: Based on the above improvements, the tax co-governance platform should be upgraded into an organic whole collaboratively supported by the following six core modules (see Figure 2 for the specific functional architecture).

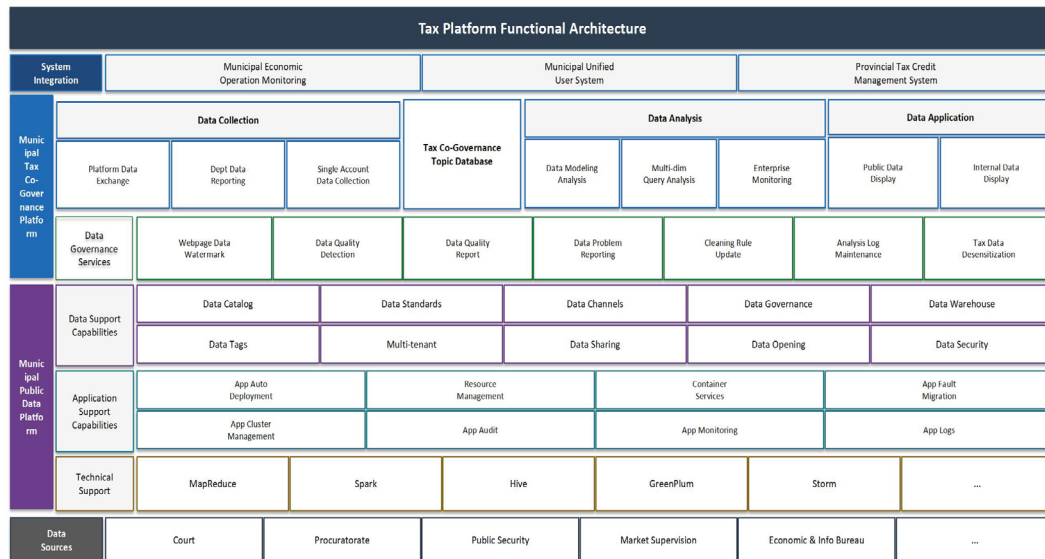


Figure 2. Functional Architecture Diagram

The tax co-governance platform, as an important tool for realizing the modernization of tax governance, is composed of multiple interrelated and synergistic functional modules covering key areas such as data collection and exchange, data governance, data analysis and application, and business collaboration, jointly supporting the efficient operation of the platform and the realization of tax co-governance objectives.

Data Collection and Exchange Module: This is the foundation of the tax co-governance platform, responsible for broadly collecting all types of tax-related data and realizing the safe and efficient exchange of data between different departments and systems. It obtains data through various means, including system connection with government departments—such as sharing enterprise registration information with the market supervision department, sharing enterprise capital transaction information with financial institutions, and sharing import and export goods information with customs—while also supporting data collection through enterprise self-declaration and third-party data provision. In terms of data exchange, standardized data interfaces and transmission protocols are adopted to ensure data accuracy and timeliness. [6] For example, ETL (Extract, Transform, Load) technology is used to extract, transform, and load the collected data, integrating data of different formats and from different sources into a unified data warehouse, providing a solid data foundation for subsequent data processing and analysis.

Data Governance Module: This module is mainly responsible for cleaning, integrating, storing, and managing the collected tax-related data to ensure data quality and security. By establishing a data quality monitoring mechanism, it conducts real-time monitoring and assessment of data completeness, accuracy, and consistency.

cy, timely discovering and correcting errors and anomalies in the data. For example, data cleaning algorithms are used to remove duplicate data, correct erroneous data formats, and fill in missing data to improve data usability. In terms of data storage, distributed storage technology such as the Hadoop Distributed File System (HDFS) is adopted to ensure data security and reliability. At the same time, a strict data access permission management system is established, assigning different data access permissions based on user roles and responsibilities to ensure the secure use of data and prevent data leakage and abuse.[7]

Data Analysis and Application Module: This is one of the core modules of the tax co-governance platform, utilizing big data analytics, artificial intelligence, and other technologies to conduct in-depth mining and analysis of tax-related data, providing powerful decision support for tax administration, taxpayer services, and policy formulation. In tax administration, risk assessment models are established to evaluate the tax payment behavior of taxpayers, identify potential tax risk points, and provide precise clues for tax inspections. For example, machine learning algorithms are used to analyze corporate financial statement data and invoice data to predict the probability of enterprise tax risk and conduct key monitoring and inspection of high-risk enterprises. In taxpayer services, personalized service recommendations and policy pushes are provided based on taxpayer behavioral data and preferences. [8]For instance, by analyzing taxpayers' historical tax handling records, commonly used tax businesses and tax policies of concern are identified, and relevant service guides and policy interpretations are pushed to improve the pertinence and satisfaction of taxpayer services. In addition, this module can also evaluate the implementation effects of tax policies and provide data basis for policy adjustment and optimization.

Business Collaboration Module: This realizes business process collaboration and work linkage between the tax authority and other government departments, enterprises, and social organizations. By establishing a unified business collaboration platform and breaking down departmental business barriers, seamless information sharing and business process connection are achieved. [9] For example, in the enterprise registration process, the tax authority collaborates with departments such as market supervision, public security, and social security, realizing data sharing and business transfer through the platform; enterprises only need to submit materials once at a single window to complete the registration procedures of multiple departments, greatly reducing the time for enterprise registration. In terms of tax enforcement, the tax authority and judicial, audit, and other organs establish a collaborative enforcement mechanism, sharing case clues and enforcement information through the platform and jointly conducting tax inspections and case investigations to enhance the deterrent effect of tax enforcement. In addition, the business collaboration module also supports the cooperation between the tax authority and industry associations, third-party institutions, and other social organizations to jointly advance tax co-governance work.

Taxpayer Service Module: This is an important window of the tax co-governance platform facing taxpayers, aiming to provide taxpayers with convenient, efficient, and high-quality services. It covers a variety of service functions, such as online tax handling services, through which taxpayers can handle various tax-related businesses including tax declaration, tax payment, invoice issuance, and tax registration changes, realizing full electronic processing of tax businesses and reducing taxpayers' time and cost. At the same time, intelligent consultation services are provided using AI customer service robots to answer taxpayers' questions in real time, providing timely policy consultation and tax handling guidance. [10]In addition, there are taxpayer

feedback channels through which taxpayers can reflect problems and suggestions encountered during the tax handling process; the tax authority improves services in a timely manner based on the feedback, continuously improving the quality of taxpayer services.

Supervision and Management Module: This module is mainly responsible for supervising and managing the operation of the tax co-governance platform, data usage, and the work of all participating actors to ensure compliant platform operation and the smooth progress of tax co-governance work. A platform operation monitoring mechanism is established to monitor in real time the platform's performance indicators, data traffic, and user access conditions, timely detecting and resolving problems that arise in platform operation. At the same time, data usage is audited to track data flow and usage methods, ensuring legal and compliant use of data. In supervising all participating actors, work assessment indicators and evaluation standards are formulated to evaluate and assess the performance of the tax authority, other government departments, and social organizations in tax co-governance work, incentivizing all participants to actively fulfill their responsibilities and improve work efficiency and quality.

Risk Warning and Prevention Module: This module establishes a tax risk early warning indicator system to conduct real-time monitoring and early warning of tax risks. When risk indicators exceed set thresholds, early warning information is promptly issued, and corresponding risk response strategies are provided. Through early identification and intervention of risks, the probability and loss of tax risk occurrence are effectively reduced. [11]For example, for abnormal invoice issuance behavior of enterprises, the platform can issue timely early warnings, and the tax authority can investigate and verify accordingly to prevent the occurrence of falsely issued invoices. In addition, a risk case database should be established to analyze and summarize occurred tax risk cases, providing experience for risk prevention and control.

5. Social Benefit Analysis

The planning, construction, and implementation of the tax co-governance platform are of critical importance to improving the level of tax administration and realizing the goals of tax co-governance. The platform aggregates massive data from all sides; the quality, security, and compliance of data directly affects the operational effectiveness of the platform and the accuracy of tax administration. By cleaning, transforming, and integrating raw tax-related data into valuable information, it provides powerful data support for tax risk assessment, taxpayer credit evaluation, and tax policy formulation. Using data mining technology to analyze enterprise tax payment data can uncover potential tax risk points and achieve precise supervision; through analysis of taxpayer credit data, a scientific taxpayer credit evaluation system is built to classify and manage taxpayers, improving the efficiency and fairness of tax administration. After testing and going online, various tax data management indicators have improved significantly (see Table 1).



Table 1. Improvement Indicators for Tax Data Management

Data Type	Data Indicator	Initial Value	Final Value	Improvement Rate (%)
Information Collection	Departmental data reporting	100	175	75%
Data Governance	Data issue reporting	80	150	88%
Data Analysis	Enterprise monitoring analysis	500	800	60%
Data Application	Public data display	70	130	86%
Industry Reference	—	120	120	—

Note: The data units used are the Tax Bureau and the Big Data Development Center of a certain city; the industry reference values are from comparable city-level units.

6. Conclusions

This research systematically examines the primary challenges confronting the tax co-governance platform in the digital era across three dimensions: institutional collaboration, management execution, and technical support. It proposes a comprehensive improvement pathway of 'legal system—business process—data governance—security protection' from the dimensions of institutional improvement, management optimization, and technology empowerment. The study emphasizes that the deepened development of the tax co-governance platform must adhere to the overall logic of 'institutional guidance, technology empowerment, and governance collaboration'. On the basis of clarifying data ownership and sharing rules, and supported by an open, elastic, and secure microservices architecture, it promotes cross-departmental business process reengineering and deep data integration, gradually building a new tax co-governance ecosystem characterized by government leadership, multi-stakeholder participation, intelligent drive, and security control.

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