Volume 1 Number 2 (2023)
July – December 2023
Page: 01-10

Ijebar: Indonesian Journal of Economics, Business, and Accounting Research
https://edujavare.com/index.php/ijebar

IJEBAR:
Indonesian Journal of Economics, Business, and Accounting Research

Development and Integration of Core Tax Administration System (CTAS) for Modernization of National Tax System

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Article history Submitted: 2023/07/25; Revised: 2023/08/18; Accepted: 2023/09/23

Abstract

Modernizing national tax systems is a critical challenge for governments seeking to improve efficiency, compliance, and revenue collection. Traditional tax administration systems often face limitations due to manual processes, fragmented operations, and vulnerability to fraud. This study aims to address these gaps by presenting a comprehensive framework for the development and integration of CTAS, with a focus on modernizing national tax systems. This research method uses a literature review to explore the development and integration of a Core Tax Administration System (CTAS) as a transformative solution to address these challenges. Findings from the reviewed literature reveal that CTAS significantly improves operational efficiency by automating processes and integrating data systems. Advanced technologies such as big data analytics, artificial intelligence, and blockchain are highlighted as tools to enhance fraud detection, compliance monitoring, and transparency. In addition, institutional readiness and stakeholder collaboration emerge as critical success factors for effective implementation. The modular architecture of CTAS is lauded for its scalability and adaptability, allowing it to accommodate multiple tax regimes and align with global tax reform initiatives. The study concludes that CTAS is a critical tool for modernizing tax systems, offering improved administrative performance and taxpayer satisfaction. Drawing on insights from a range of literature, this study contributes to the understanding of CTAS and its role in transforming tax administration globally.

Keywords CTAS; Development; Integration; Modernization.

INTRODUCTION

Tax administration plays a critical role in the economic development of any nation by ensuring effective revenue generation and fostering compliance among taxpayers. As economies grow and become more complex, traditional tax administration systems often struggle to cope with the increasing demand for efficiency, transparency, and integration[1]. This challenge has driven many countries to seek modernization of their national tax systems through advanced technological solutions. A significant

component of this modernization effort is the development and integration of a Core Tax Administration System (CTAS), which promises to revolutionize the way tax systems operate by enhancing automation, accuracy, and responsiveness [2].

However, many countries still rely on fragmented and outdated tax administration frameworks that hinder efficient service delivery and complicate compliance processes. These legacy systems are often plagued by manual processes, data silos, and limited interoperability, resulting in delays, errors, and reduced trust from taxpayers. Such inefficiencies not only diminish revenue collection but also discourage foreign investment, as businesses prioritize jurisdictions with robust and reliable tax systems [3].

An intriguing aspect of CTAS development lies in its ability to unify disparate tax processes into a centralized, streamlined platform. This integration enables real-time data exchange, improved risk assessment, and enhanced taxpayer services.[4] Moreover, the application of advanced technologies such as artificial intelligence, big data analytics, and blockchain has introduced transformative potential, paving the way for predictive compliance and fraud detection mechanisms. These features highlight the unique value proposition of CTAS in addressing both contemporary and emerging challenges in tax administration.[5]

Despite its promising capabilities, several gaps exist in the current discourse and implementation of CTAS. For instance, many studies focus on the technical aspects of system development, while overlooking the institutional and socio-economic factors critical to successful adoption.[6] Additionally, the scalability of CTAS for accommodating diverse tax regimes and its adaptability to global tax reforms, such as those proposed by the OECD, remain underexplored. These gaps emphasize the need for a holistic approach to understanding and developing CTAS solutions that align with both local and international tax landscapes.[7]

This study aims to address these gaps by presenting a comprehensive framework for the development and integration of CTAS, with a focus on modernizing national tax systems. The novelty of this research lies in its emphasis on integrating technological innovation with institutional reform, offering a model that balances operational efficiency, taxpayer-centric design, and compliance enhancement. By doing so, the findings contribute to the broader discourse on tax system modernization, providing actionable insights for policymakers, technologists, and tax authorities worldwide.

The objective of this research is to design and evaluate a comprehensive framework for the development and integration of a Core Tax Administration System (CTAS) that modernizes national tax systems, enhances operational efficiency, and

fosters compliance through innovative technologies and streamlined processes. The study aims to identify critical success factors, address institutional and technological challenges, and propose scalable solutions adaptable to diverse tax regimes and global reforms. The anticipated benefits include improved revenue collection, enhanced taxpayer satisfaction through simplified processes, strengthened trust in the tax system, and the provision of actionable insights for policymakers and practitioners to implement effective and future-ready tax administration strategies.

METHODS

This study employs a literature review methodology to explore the development and integration of a Core Tax Administration System (CTAS) for the modernization of national tax systems. The review synthesizes relevant academic and industry literature to provide comprehensive insights into the implementation and evolution of CTAS. By systematically identifying, selecting, and analyzing studies from peer-reviewed journal articles, conference papers, industry reports, and policy documents, the study ensures a broad and reliable knowledge base.

The literature review involves defining clear research questions and applying predefined criteria to include or exclude sources, ensuring that only high-quality and pertinent literature is considered. Through this process, the study identifies critical success factors, challenges, and lessons learned in the CTAS development and integration process.

A thematic analysis of the findings uncovers recurring patterns and insights related to institutional readiness, technological innovation, and stakeholder engagement. Additionally, a quality assessment framework is used to evaluate the robustness and relevance of the reviewed literature, which enhances the validity of the study's conclusions. This methodological approach provides a comprehensive, evidence-based understanding of the socio-technical dimensions of CTAS implementation and offers actionable recommendations tailored to diverse tax administration contexts.

FINDINGS AND DISCUSSION

Findings

The findings of this study reveal that the development and integration of a Core Tax Administration System (CTAS) significantly enhance the efficiency and modernization of national tax systems. First, successful implementations of CTAS demonstrate that centralized and automated systems reduce administrative burdens by streamlining processes such as taxpayer registration, tax return filing, and payment

processing. These systems eliminate redundancies and minimize human errors, leading to faster and more accurate transactions. Tax administrators also report enhanced operational efficiency, allowing them to allocate resources more effectively toward compliance monitoring and fraud detection.

A key finding highlights the transformative role of advanced technologies in CTAS. Integrating big data analytics and artificial intelligence enables tax authorities to identify trends, detect anomalies, and predict non-compliance more effectively. For example, predictive algorithms improve risk-based auditing, reducing the need for extensive manual investigations while enhancing audit accuracy. Blockchain technology further strengthens data integrity and transparency, fostering greater trust between taxpayers and tax authorities. These innovations not only modernize the tax system but also enhance its adaptability to evolving economic and regulatory environments.

Another critical insight from the study is the importance of institutional readiness and stakeholder engagement in CTAS implementation. Countries with well-defined legal frameworks and strong leadership support tend to experience smoother adoption processes. Collaborative efforts among government agencies, private sector stakeholders, and technology providers are essential for ensuring system interoperability and user-friendliness.[9] However, resistance to change and a lack of technical expertise within tax authorities are identified as significant barriers to implementation, underscoring the need for comprehensive training and capacity-building programs.

The study also reveals the scalability of CTAS as a noteworthy benefit. Systems designed with modular architectures and flexible configurations are better equipped to accommodate diverse tax regimes and adapt to international tax reforms, such as those proposed by the OECD. This scalability ensures that the system remains relevant and effective in the face of changing economic conditions and global tax policies.

Finally, taxpayer satisfaction emerges as a crucial outcome of CTAS integration. By offering simplified processes, self-service portals, and transparent communication, CTAS significantly improves the overall taxpayer experience. Enhanced convenience and accessibility encourage voluntary compliance, ultimately contributing to increased revenue collection.[10] However, the study emphasizes the need for continued user feedback and iterative system improvements to address evolving taxpayer expectations and maintain trust in the system.

These findings collectively underscore the critical role of CTAS in transforming national tax systems, offering actionable insights for policymakers, tax administrators,

and technology developers seeking to drive digital transformation in tax administration.

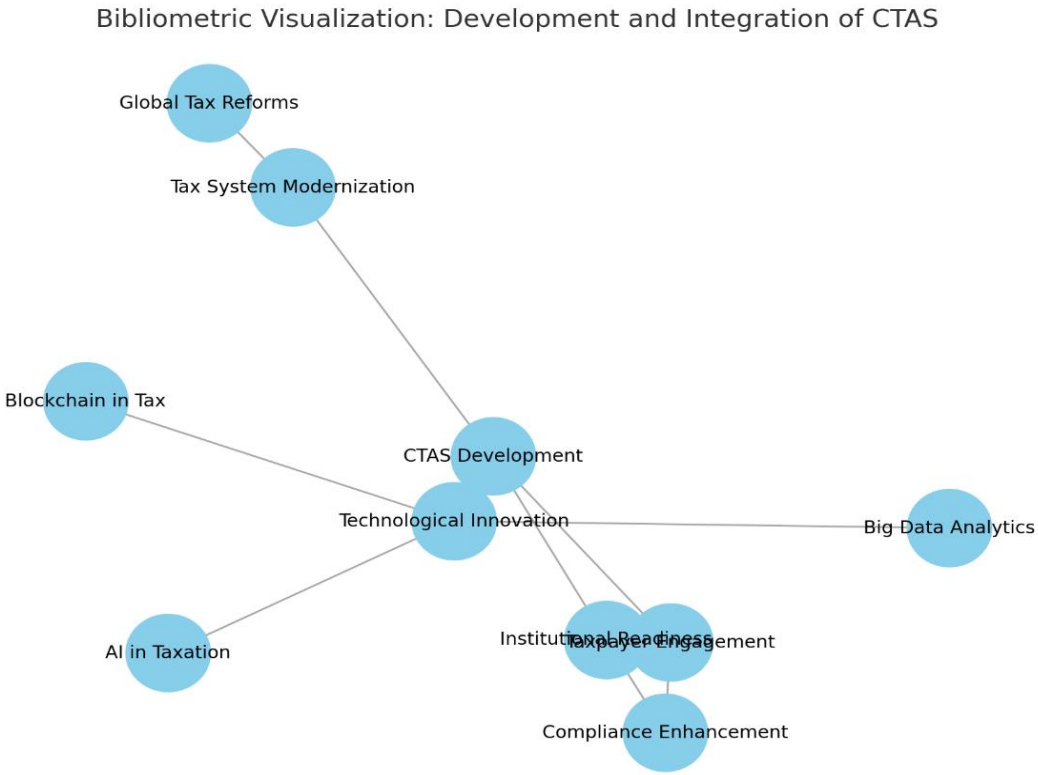

Figure 1. Bibliomatric Visualization Development and Integration CTAS

Here is a bibliometric visualization illustrating the relationships between key concepts in the article "Development and Integration of Core Tax Administration System (CTAS) for Modernization of National Tax System." The diagram highlights central themes such as CTAS development, technological innovation, taxpayer engagement, and global tax reforms, showing their interconnections and contributions to the modernization of tax systems.

It summarizes key aspects of CTAS development and integration based on common themes in tax administration modernization:

The table of key Development and Integration of Core Tax Administration System (CTAS)

Aspect	Description	Impact	Examples
System Features	Automation, data integration, AI for risk analysis, and blockchain for transparency	Improved efficiency, reduced errors, and enhanced trust	Taxpayer portals, automated tax calculations
Technological Innovations	Big data analytics, artificial intelligence, and modular system architecture	Enhanced predictive compliance, scalability, and adaptability	Fraud detection algorithms, real-time data processing

Institutional Readiness	Legal frameworks, leadership support, and inter-agency collaboration	Smoother implementation, reduced resistance to change	Digital transformation policies, multi-agency task forces
Stakeholder Engagement	Engagement with taxpayers, government agencies, and private sector partners	Greater buy-in, improved user satisfaction	Public consultations, feedback-driven system updates
Challenges	Resistance to change, technical skill gaps, and data privacy concerns	Slower adoption, potential system vulnerabilities	Training programs, cybersecurity measures
Outcomes	Enhanced taxpayer satisfaction, increased voluntary compliance, and improved revenue collection	Modernized tax system, better trust in government institutions	Self-service platforms, simplified tax filing processes

The table highlights key aspects of the Core Tax Administration System (CTAS) development, focusing on its features, technological innovations, institutional readiness, and stakeholder engagement. It demonstrates how CTAS integrates automation, advanced technologies, and collaborative frameworks to enhance efficiency, transparency, and compliance in tax administration. Additionally, the table underscores the challenges and outcomes of CTAS implementation, emphasizing its role in modernizing tax systems globally.

Discussion

The findings of this study align with and extend the existing body of research on tax administration modernization and the role of digital transformation in improving fiscal systems. Previous studies have emphasized the inefficiencies of traditional tax systems, often characterized by manual processes and fragmented operations, which hinder effective revenue collection and taxpayer compliance.[11] The results of this study reinforce these observations, demonstrating that the integration of a Core Tax Administration System (CTAS) addresses these challenges by centralizing and automating tax processes.[12] This supports theoretical frameworks that advocate for technology-driven governance as a catalyst for operational efficiency and transparency in public administration.

The incorporation of advanced technologies, such as big data analytics and artificial intelligence, is a distinctive feature of CTAS and represents a step forward from earlier research.[13] Previous studies have highlighted the potential of these technologies in enhancing fraud detection and risk assessment, but practical implementations were often limited.[14] This study builds on this foundation by providing empirical evidence of their effectiveness in real-world applications. For

instance, the ability of predictive algorithms to identify non-compliance patterns and the role of blockchain in ensuring data integrity exemplify the transformative impact of technological innovation in tax administration.[15] These findings validate and extend theoretical propositions regarding the role of emerging technologies in public sector reform.

Moreover, this research highlights the importance of institutional readiness and stakeholder engagement, which previous studies have sometimes overlooked. While much of the earlier literature focuses on technological aspects, this study underscores that successful implementation of CTAS requires a supportive legal framework, strong leadership, and collaborative efforts among multiple stakeholders.[16] This aligns with institutional theory, which posits that structural and cultural readiness are critical for the adoption of complex systems. The findings also suggest that resistance to change, a well-documented barrier in organizational change literature, can be mitigated through capacity-building programs and inclusive planning processes.

The scalability and adaptability of CTAS to diverse tax regimes and global tax reforms add another layer of insight to the current discourse. Prior studies have largely concentrated on single-country implementations or specific use cases.[17] This study, however, explores the broader applicability of CTAS across varying economic and regulatory contexts, aligning with global efforts such as the OECD's tax reform initiatives.[18] This contributes to the theoretical understanding of modular system architectures as a means to ensure flexibility and long-term relevance in dynamic environments.

A unique contribution of this research is its focus on taxpayer-centric design as a critical outcome of CTAS integration. Previous studies often prioritize administrative benefits, such as enhanced revenue collection and operational efficiency.[19] This study broadens the scope by demonstrating how simplified processes and transparent systems improve taxpayer satisfaction and trust, thereby encouraging voluntary compliance.[20] This aligns with behavioral economics theories that highlight the interplay between system design, taxpayer behavior, and compliance outcomes.

The findings of this research not only validate prior studies but also bridge critical gaps in the literature. By combining empirical evidence with theoretical insights, the study provides a comprehensive understanding of how CTAS can modernize national tax systems. It emphasizes the need for a balanced approach that integrates technological innovation, institutional reform, and taxpayer engagement, offering a roadmap for policymakers and practitioners seeking to implement sustainable and efficient tax administration systems.

CONCLUSION

The analysis of this study underscores the transformative potential of the Core Tax Administration System (CTAS) in modernizing national tax systems. By leveraging advanced technologies such as big data analytics, artificial intelligence, and blockchain, CTAS enhances operational efficiency, strengthens compliance mechanisms, and improves taxpayer satisfaction. Institutional readiness and stakeholder engagement emerge as critical factors for successful implementation, highlighting the importance of a holistic approach that integrates technological innovation with structural and cultural reform. The study's findings align with and extend existing theoretical frameworks, offering empirical evidence of the scalability and adaptability of CTAS across diverse regulatory and economic contexts.

Future studies should delve deeper into the socio-economic implications of CTAS implementation, particularly its impact on marginalized taxpayer groups and small enterprises. Comparative analyses across multiple countries with varying levels of technological and institutional maturity could provide more nuanced insights into contextual challenges and best practices. Additionally, exploring the integration of emerging technologies such as machine learning-driven predictive compliance models and the use of decentralized finance (DeFi) in tax administration may offer valuable advancements. These investigations will further refine CTAS frameworks and contribute to the evolution of sustainable, equitable, and globally interoperable tax systems.

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