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APPLYING BLOCKCHAIN TECHNOLOGY FOR VALUE-ADDED TAX MANAGEMENT IN VIETNAM

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ABSTRACT Value-added tax (VAT) is a key source of government revenue in Vietnam. However, issues like tax evasion, fraud, and revenue leakage present major challenges. This paper explores the potential of blockchain technology to modernize and optimize VAT management in Vietnam. Blockchain's decentralized, immutable ledgers can enhance transparency, reduce fraud, and streamline tax processes. The paper reviews global blockchain case studies in Estonia, China, and the EU. It then analyzes Vietnam's VAT system and proposes a blockchain framework incorporating digital invoices, smart contracts, and inter-agency data sharing. A phased implementation plan is recommended focusing first on e-invoicing, followed by payment automation and advanced data analytics. Blockchain can significantly improve VAT collection efficiency and transparency in Vietnam. However, success requires strong institutional support, public-private collaboration, updated regulations, and major investments in digital infrastructure and human capital.

KEYWORDS : Blockchain, value-added tax, VAT, tax management, tax administration, Vietnam

INTRODUCTION

Value-added tax (VAT) is a consumption tax levied on goods and services at each stage of production and distribution (Wijaya et al., 2017). It is an important source of government revenue in many countries. In Vietnam, VAT contributes nearly 30% of total state budget revenue, highlighting its vital role in national development (General Department of Taxation, 2021).

However, VAT systems face major challenges like tax evasion, fraud, revenue leakage, and gaps between projected and actual revenue. These result from complex supply chains, paper invoicing, weak oversight, and limited real-time monitoring (Joshi et al., 2018). Advanced digital technologies like blockchain can help modernize and optimize VAT collection and management.

This paper examines the potential of blockchain to enhance VAT administration in Vietnam. It first reviews global case studies of blockchain for taxation. The current Vietnamese VAT framework is then analyzed, and a blockchain-based model proposed focusing on e-invoicing, payment automation, and data analytics. The paper concludes with policy recommendations for phased implementation. Adopting blockchain can significantly improve the efficiency, transparency and revenue outcomes of Vietnam's VAT system.

BLOCKCHAIN FOR TAXATION: GLOBAL CASE STUDIES:

Blockchain is a distributed digital ledger using cryptographic techniques to record transactions immutably across a decentralized network (Treiblmaier, 2019). Its transparency, security and automation make it promising for modernizing tax administration. Some noteworthy global case studies are:

Table – 1 Blockchain VAT Projects In Select Countries

Country	Blockchain VAT Project	Key Features
Estonia	Implemented blockchain for all government services including tax filing and payments. Almost 100% of VAT processes are now digital.	Enabled real-time monitoring of transactions. Reduced tax fraud. Saved 2% of GDP in cost and time.
China	Proposed blockchain-based state cryptocurrency for VAT transactions, under 2020 Cryptography Law. Aims to exert greater control.	Seeks to replace decentralized cryptocurrencies like Bitcoin with centralized legal digital currency.
EU	Proposed blockchain platform for pan-EU VAT payments and invoicing under anti-fraud initiative. Pilots planned from 2021.	Real-time VAT transaction verification across borders. Specialized cryptotoken limits fraud. Interoperability and standards are challenges.

Estonia is a pioneer in government blockchain adoption. Its e-Residency program uses blockchain for document verification, taxation, voting and other public services (Hamm, 2017). Over 99% of VAT declarations now occur digitally, enabling real-time monitoring and significant time and cost savings.

China's new Cryptography Law indicates interest in a centralized state digital currency for blockchain-based VAT payments, rather than decentralized cryptocurrency like Bitcoin (CipherTrace, 2020). This allows greater control and oversight of transactions.

The EU aims to combat the €60 billion annual VAT gap by testing cross-border blockchain solutions. Proposed ideas include an EU VAT cryptocurrency to instantaneously record and validate transactions between tax authorities (Ainsworth & Alwohaibi, 2017).

These cases showcase blockchain's expanding use for taxation, especially in VAT due to its complex cross-border flows. Benefits like transparency, fraud reduction and cost-savings are driving adoption. However, variations in technical standards and legal frameworks pose interoperability challenges.

VAT In Vietnam: Issues And Blockchain Potential

VAT was introduced in Vietnam in 1999 and is levied on all goods and services (except exempted categories) at a standard 10% rate (General Department of Taxation, 2021). VAT contributed 29% of total state budget revenue in 2020, highlighting its importance (General Statistics Office, 2021). However, Vietnam's VAT system faces several issues.

Firstly, VAT evasion and fraud remains problematic. Fake invoices, false claims and compliance gaps cause major revenue losses. Nearly 12% of VAT declarations contained errors in 2019 (General Department of Taxation, 2020). Secondly, paper invoicing makes real-time monitoring difficult. Only 30% of VAT receipts were e-invoices in 2019, while most firms still use paper receipts (General Department of Taxation, 2020). Thirdly, the complex supply chain across manufacturing, distribution and retail sectors creates opacity. Lastly, lengthy physical inspections and manual verification lead to poor use of tax authority resources.

To address these challenges, Vietnam is modernizing tax administration by digitalizing procedures through e-filing, e-payment and e-customs. However, paper documentation persists in many processes. The General Department of Taxation stratgeic plan 2020-2025 emphasizes IT system upgrades, e-invoicing and data exchange with other agencies to enhance compliance and reduce errors (General Department of Taxation, 2020).

- Blockchain's attributes can significantly optimize VAT processes to realize these objectives:
- Decentralized ledger enables real-time, transparent record of VAT transactions and invoices across the supply chain.
- Cryptographic proofs and digital signatures prevent invoice manipulation or duplication.

- Smart contracts automate tax computations and payments, reducing errors.
- Data immutability deters fraud by timestamping transactions accurately.
- Shared ledger between tax authority, companies and banks improves monitoring and reconciliation.
- Reduced document verification via e-invoicing improves efficiency.
- Data analytics on transaction history identifies discrepancy patterns for risk-based enforcement.

PROPOSED BLOCKCHAIN VAT MODEL FOR VIETNAM

To leverage blockchain for Vietnamese VAT, this paper proposes a phased model spanning:

Phase 1 (2023 - 2025) - VAT e-Invoicing
Phase 2 (2025 - 2027) - Smart contract automation
Phase 3 (2028 - 2030) - Advanced analytics

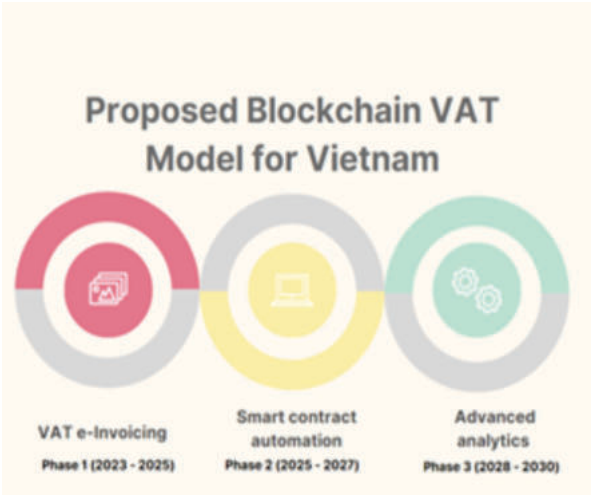

Figure 1: Proposed Blockchain VAT Model for Vietnam

Phase 1 focuses on transitioning to mandated blockchain-based e-invoicing between companies. The invoice data will be verifiable, immutable and transparent to authorized parties.

Phase 2 incorporates smart contracts to automate VAT computations and payments by extracting invoice data. Once invoices are issued, VAT transfers can occur instantly based on predefined logic coded into smart contracts.

Phase 3 applies big data analytics like machine learning on the rich VAT transaction data history. Advanced modeling can identify discrepancies, anomalies and risk factors for enhanced enforcement.
Table 2 summarizes the proposed model:

The key stakeholders in the proposed VAT blockchain ecosystem:
General Department of Taxation - Sets standards and regulations for blockchain VAT system.

- Develops smart contracts and analytics models.
- Manages and monitors blockchain platform.
- Audits system functionality and data quality. Tax departments - Onboards companies to blockchain ecosystem.
- Provides support for adoption.
- Maintains ledger and wallet infrastructure. Companies - Adopt e-invoicing and smart contract capabilities.
- Integration with enterprise systems.
- Ensure invoice quality and data accuracy. Banks - Payment gateways and currency conversion.
- Manages tax authority wallet accounts. IT vendors - Assists in platform development and testing.
- Provides maintenance and support.

Blockchain VAT systems involve complex technical build-out. Vietnam's existing e-filing infrastructure provides a foundation to progress to e-invoicing. However, integrating smart contracts requires specialized programming. Tax authority developers must collaborate closely with companies and IT vendors throughout the process. Change management for thousands of affected firms also poses organizational challenges.

Table – 2 Proposed Blockchain Model For Vietnam VAT

Phase	Key Features	Benefits
VAT e-Invoicing (2023-2025)	VAT e-invoices contain encrypted unique identifiers and digital signatures for authentication.	Invoice data is recorded immutably on distributed blockchain ledger. Tax authority can view real-time transactions between companies. - Reduced invoice processing time and cost. Improved verification and transparency. Lowered fraud risk.
Smart Contract Automation (2025-2027)	Smart contracts automatically compute VAT amount payable based on e-invoice data.	Payments are automatically executed from company to tax authority wallets. Both tax authority and companies maintain real-time visibility of VAT transactions and payments. - Faster, cheaper VAT payment process. Reduced errors in computation. Mitigated tax evasion risks.
Advanced Analytics (2028-2030)	Tax authority analytics team develops machine learning models using the rich VAT transaction data history.	Identify patterns, correlations and anomalies to detect potential fraud and non-compliance. - Data-driven VAT enforcement. Proactive fraud detection. Improved risk scoring of companies.

Nevertheless, the multi-phase approach allows gradual capability development. Meanwhile each phase generates distinct efficiency and anti-fraud advantages. Moreover, blockchain standardization efforts by multilateral institutions can aid interoperability (Radocchia, 2018). The overall impact of enhancing VAT performance will provide major economic benefits that justify the investment and effort.

CONCLUSIONS

In conclusion, blockchain technology can significantly optimize Vietnam's VAT administration to reduce revenue leakage, improve transparency, lower compliance costs and drive digitization. This requires a phased, systematic approach focusing first on e-invoicing, then smart contract automation before advancing to big data analytics.

- To turn potential into reality, the paper offers several policy recommendations:
- Develop blockchain standards and protocols for tax administration.
- Introduce enabling regulations recognizing e-transactions and digital invoices.
- Commit resources for R&D and staff training on blockchain systems.
- Foster public-private partnerships between government, industry and academia.
- Start with small-scale pilots before expanding to minimize risks.
- Make major infrastructure investments for digital systems and data security.

With strong leadership and coherent strategy, blockchain will enable Vietnam to harness the power of digital innovation for more effective and transparent VAT management. This will in turn provide vital revenue to propel Vietnam's socio-economic advancement in the

digital age.

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