



LEVERAGING DIGITAL GOVERNANCE FOR INCLUSIVE ECONOMIC GROWTH: GST REFORMS AND FISCAL FEDERALISM IN TAMIL NADU

Editors

Dr. A. Anandhiprabha

Dr. M. Jeeva

Ms. A. Gomathi

Dr. S. Mahalakshmi

Volume - I



A One Day National Seminar on

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Volume I

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BLOCKCHAIN-BASED TAX ADMINISTRATION: ENHANCING TRANSPARENCY IN GST SYSTEMS



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Abstract

The rapid digitalization of public finance has transformed tax administration worldwide. In India, the implementation of the Goods and Services Tax (GST) marked a significant milestone in tax reform through a unified and technology-driven framework. However, challenges such as tax evasion, invoice fraud, data manipulation, and cybersecurity risks persist. This paper explores the potential of blockchain technology in strengthening GST systems by enhancing transparency, traceability, and accountability. By examining the integration of blockchain into tax administration architecture, the study highlights its benefits for fraud reduction, real-time verification, and intergovernmental coordination. The paper concludes with policy recommendations for implementing blockchain-enabled tax governance in a federal system.

Keywords: Blockchain, GST, Digital Governance, Tax Transparency, E-Governance, Public Finance.

1. Introduction

Digital governance has become central to modern public administration. Tax systems increasingly rely on online platforms, data analytics, and automation to improve efficiency and compliance. In India, the Goods and Services Tax (GST), introduced in 2017, unified indirect taxes under a single national framework supported by the GST Network (GSTN) digital platform.

Despite digital integration, GST systems still face issues such as fake invoicing, input tax credit fraud, data tampering, and reconciliation mismatches. Traditional centralized databases may be vulnerable to manipulation or cyberattacks. Blockchain technology, with its decentralized and immutable ledger system, offers a promising solution to these challenges.

This paper examines how blockchain-based tax administration can enhance transparency, reduce fraud, and strengthen fiscal coordination in GST systems.

2. Overview of GST Digital Infrastructure

The GST system operates through a centralized IT platform that enables:

- Online registration of taxpayers
- E-filing of returns
- E-invoicing
- E-way bill generation
- Automated tax credit reconciliation

While these digital features have increased efficiency, the system still relies on centralized data management. Fraudulent claims of Input Tax Credit (ITC), invoice duplication, and delayed cross-verification remain key challenges. Therefore, enhancing the technological backbone of GST becomes essential.

3. Blockchain Technology

Blockchain is a distributed ledger technology (DLT) that records transactions in a secure, transparent, and tamper-proof manner. Its key characteristics include:

- **Decentralization:** Data is stored across multiple nodes instead of a single server.
- **Immutability:** Once recorded, data cannot be altered without consensus.
- **Transparency:** All authorized participants can view transaction records.
- **Smart Contracts:** Self-executing contracts automate verification and compliance processes.

In tax administration, these features can significantly improve audit trails and reduce opportunities for manipulation.

4. Application of Blockchain in GST Systems

4.1 Invoice Verification and Fraud Prevention

GST fraud often involves fake invoices to claim wrongful ITC. A blockchain-based invoice registry would:

- Record invoices in real time.
- Prevent duplication through cryptographic hashing.
- Enable instant cross-verification between buyers and sellers.
- Reduce manual audits.

This ensures that every transaction is authenticated and traceable.

4.2 Input Tax Credit Reconciliation

Input Tax Credit is a core component of GST. Blockchain can automate reconciliation by:

- Linking supplier and purchaser transactions instantly.
- Eliminating mismatches.
- Providing a shared ledger accessible to tax authorities.

Smart contracts can automatically validate eligibility conditions before granting credit.

4.3 Intergovernmental Fiscal Coordination

GST is a federal tax shared between the central and state governments. Blockchain can:

- Provide real-time revenue-sharing data.
- Ensure transparent distribution of funds.
- Improve trust between federal and state authorities.
- Enable data-driven decision-making in GST Council deliberations.

4.4 Audit and Compliance Monitoring

Blockchain's immutable records simplify audit processes. Authorities can track transaction histories without relying on manual verification. This reduces administrative burden and enhances compliance efficiency.

5. Benefits of Blockchain-Based GST Administration

5.1 Enhanced Transparency

Every transaction recorded on blockchain is visible to authorized stakeholders, reducing corruption and discretionary manipulation.

5.2 Reduction in Tax Evasion

Immutable records discourage fraudulent activities such as invoice manipulation, under-reporting, and circular trading schemes.

5.3 Improved Data Security

Blockchain's cryptographic mechanisms protect sensitive taxpayer data from unauthorized access and cyber threats.

5.4 Cost Efficiency

Automation through smart contracts reduces administrative costs, paperwork, and manual audits.

5.5 Faster Refund Processing

Real-time verification of transactions enables quicker processing of GST refunds, benefiting businesses.

6. Challenges in Implementation

Despite its advantages, blockchain integration in GST faces several challenges:

6.1 Technical Complexity

Developing a nationwide blockchain infrastructure requires high computational capacity and skilled professionals.

6.2 Scalability Issues

GST processes millions of transactions daily. Ensuring blockchain scalability without compromising speed is critical.

6.3 Regulatory and Legal Framework

Existing tax laws may require amendments to recognize blockchain-based records as legally valid.

6.4 Initial Investment Costs

Infrastructure development, training, and system migration involve substantial financial investment.

6.5 Data Privacy Concerns

Although transparent, blockchain systems must balance transparency with taxpayer confidentiality.

7. Policy Recommendations

1. **Pilot Projects:** Implement blockchain pilots in selected sectors before nationwide deployment.
2. **Hybrid Architecture:** Use a permissioned blockchain integrated with existing GSTN infrastructure.
3. **Capacity Building:** Train tax officials and IT professionals in blockchain management.
4. **Legal Reforms:** Amend tax regulations to legally recognize blockchain-based documentation.
5. **Cybersecurity Framework:** Establish strong encryption and access-control protocols.

8. Conclusion

Blockchain technology offers transformative potential for GST administration by enhancing transparency, reducing fraud, and strengthening fiscal coordination. Its decentralized and immutable features align well with the objectives of digital governance in tax systems. While implementation challenges exist, strategic adoption through pilot testing and regulatory support can significantly modernize tax administration. Integrating blockchain with GST infrastructure can create a more secure, transparent, and efficient tax ecosystem, ultimately contributing to economic stability and inclusive growth.

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