



Transforming GST Compliance: The Role of Technology, Real-Time Reporting and Global Best Practices

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Abstract:

The evolution of Goods and Services Tax (GST) compliance in India is increasingly driven by rapid technological advancements and regulatory transformations. This study provides a comprehensive analysis of emerging trends in GST compliance, focusing on the integration of artificial intelligence (AI), blockchain technology, real-time reporting mechanisms and digital automation. It critically evaluates the impact of government initiatives such as e-invoicing, the Invoice Matching System (IMS), geocoding and biometric authentication in strengthening tax compliance frameworks. By drawing comparisons with global tax models, the research highlights India's alignment with OECD tax compliance standards, emphasizing enhanced transparency, efficiency and anti-evasion measures. Furthermore, the study explores the implications of AI-driven tax enforcement, predictive analytics, and automated reconciliation mechanisms in reducing compliance complexities. The findings underscore the need for businesses to embrace digital transformation proactively, ensuring seamless adaptation to evolving tax regulations. As India transitions towards a technology-centric GST compliance ecosystem, this research offers policy-relevant insights for optimizing regulatory efficiency and fostering a more robust, transparent and automated tax administration system.

Keywords: *GST compliance, Global Tax Trends, e-invoicing, AI in Tax Compliance, global trend, OECD Tax Compliance Standards, Tax Fraud Prevention, Multi-Factor Authentication (MFA) in Taxation.*

Introduction:

The global tax compliance landscape is undergoing a paradigm shift, driven by rapid advancements in digitalization, automation, and AI-powered analytics. In the Indian context, the introduction of the Goods and Services Tax (GST) in 2017 represented a transformative overhaul of indirect taxation, consolidating a previously fragmented fiscal structure into a unified, technology-driven framework. As regulatory mechanisms evolve, the imperative for seamless, automated and data-centric tax administration has intensified, necessitating

continuous policy recalibrations and technological innovations.

The integration of emerging technologies—such as artificial intelligence, blockchain, big data analytics and cloud-based tax infrastructures—has profoundly reshaped GST compliance, enhancing operational efficiency, accuracy and fraud detection capabilities. Government-driven initiatives, including mandatory e-invoicing, multi-factor authentication (MFA), real-time invoice reconciliation, and biometric authentication, have bolstered enforcement mechanisms and fostered a more transparent tax ecosystem. Concurrently, India's

progressive alignment with OECD tax compliance frameworks reflects its commitment to strengthening international cooperation, mitigating base erosion and profit shifting (BEPS) and establishing a robust, globally integrated tax administration system.

Nevertheless, significant challenges remain, particularly concerning the complexities of digital compliance for small and medium enterprises (SMEs), the dynamic nature of regulatory mandates, and the imperative for resilient cybersecurity infrastructure. This research endeavours to critically examine the trajectory of GST compliance in India, juxtaposing it against global best practices and evaluating the role of emerging technologies in optimizing tax enforcement. By interrogating the implications of AI-driven compliance mechanisms and forecasting future regulatory trajectories, this study aims to furnish policymakers, businesses and tax professionals with a rigorous scholarly foundation to navigate the evolving GST landscape with strategic acumen.

Research Objectives:

This research aims to:

1. Assess the impact of digital transformation on GST compliance.
2. Evaluate government initiatives like e-invoicing, IMS and MFA in streamlining compliance.
3. Analyse technology-driven enforcement using AI, blockchain and geocoding.
4. Compare India's GST compliance trends with global tax frameworks.
5. Identify future challenges and advancements in GST compliance.

Research Methodology:

This study employs a rigorous mixed-methods research design, integrating qualitative and quantitative analytical frameworks to ensure a comprehensive

examination of emerging trends in GST compliance. The methodological approach comprises the following key components:

- **Data Collection:** This study systematically compiles secondary data from authoritative sources, including governmental reports, GST Council directives, industry white papers and peer-reviewed academic publications, ensuring a robust empirical foundation.
- **Survey-Based Empirical Analysis:** Structured surveys are administered to a diverse cohort of business operators, tax practitioners and regulatory authorities. The objective is to empirically assess compliance challenges, the adoption of digital solutions and the evolving regulatory landscape.
- **Comparative Policy Analysis:** India's GST compliance framework is benchmarked against global taxation models, utilizing a comparative analytical approach to identify best practices, assess scalability and derive policy insights that may enhance regulatory effectiveness.
- **Stakeholder-Centric Qualitative Inquiry:** Semi-structured interviews are conducted with key stakeholders, including GST officers, advocates, chartered accountants and tax practitioners. This inquiry facilitates an in-depth understanding of the practical implications of digital tax enforcement, regulatory burden and industry adaptation.
- **Case Study Methodology:** A selection of real-world business case studies is critically examined to evaluate the tangible impact of GST policy reforms on operational efficiency, compliance behaviour and the broader economic ecosystem.

By employing this multi-faceted research design, the study ensures a robust, policy-relevant, and academically rigorous

assessment of GST compliance dynamics within the evolving business environment.

Key Trends In GST Compliance:

1. Digital Transformation and Automation in GST Return Filing:

The accelerated digitalization of tax compliance has propelled businesses toward the adoption of advanced automated GST solutions, fundamentally reshaping operational paradigms to enhance efficiency and minimize human errors. The incorporation of artificial intelligence (AI)-enabled reconciliation frameworks and cloud-based tax administration ecosystems has revolutionized compliance mechanisms by ensuring real-time data integrity and seamless integration with enterprise resource planning (ERP) systems. Concurrently, progressive enhancements in the Goods and Services Tax Network (GSTN) infrastructure have enabled instantaneous transaction monitoring and the deployment of AI-driven validation protocols, thereby fortifying regulatory oversight. Moreover, the introduction of pre-filled GST returns has significantly streamlined tax compliance processes, proactively mitigating discrepancies and reinforcing adherence to statutory obligations.

2. Integration of Invoice Matching System:

The Invoice Matching System (IMS) represents a cornerstone mechanism in GST compliance, strategically designed to fortify the accuracy of Input Tax Credit (ITC) claims and curtail fraudulent tax practices. This framework mandates real-time reconciliation between supplier-issued invoices and buyer-reported transactions, enabling tax authorities to detect anomalies and mitigate revenue leakages. The IMS necessitates that businesses systematically verify their purchase invoices against the corresponding sales invoices submitted by suppliers to ensure ITC eligibility. By automating this validation process, IMS

significantly enhances transparency, mitigates tax evasion risks and fosters regulatory accountability. Although the IMS platform was officially introduced on October 14, 2024, its application in GSTR-2B reconciliation remains discretionary at this stage.

3. E-Invoicing and Real-Time Reporting:

The introduction of e-invoicing has necessitated real-time transaction reporting, thereby enhancing transparency and mitigating fraudulent claims. The government continues to broaden the scope of e-invoicing by integrating it with GST return filing, further automating the compliance landscape. Following the successful implementation of e-invoicing for Business-to-Business (B2B) transactions, India is now evaluating its extension to Business-to-Consumer (B2C) sales. In its 54th meeting, the GST Council recommended a phased approach for incorporating high-value B2C transactions within the e-invoicing framework. This expansion aims to enhance revenue reporting, curb the underreporting of sales and further strengthen tax compliance mechanisms.

4. Revised Time Limit for E-Invoice Reporting on the IRP:

Effective April 1, 2025, businesses with an annual turnover of Rs 10 crore and above will be required to report their e-invoices on the Invoice Registration Portal (IRP) within 30 days of issuance. This marks a significant shift from the previous threshold of Rs 100 crore. The revised mandate applies to invoices, credit notes and debit notes. Failure to report an invoice within the stipulated timeframe will result in automatic rejection by the IRP system. This regulatory update underscores the imperative for businesses to align their compliance operations with e-invoicing timelines to ensure seamless adherence to GST regulations.

5. Technology Integration in the E-Way Bill System:

The e-way bill system has undergone significant technological advancements to enhance logistics compliance and curtail tax evasion. Historically, businesses encountered challenges in tracking goods movement while adhering to GST regulations. The introduction of digital e-way bill generation, real-time vehicle tracking and integration with the GSTN platform has streamlined the process. Under the prevailing framework, an e-way bill must be generated prior to transporting goods valued above Rs 50,000, applicable to both inter-state and intra-state transactions, with specific exemptions outlined under GST laws. As of February 28, 2025, a cumulative total of 582.74 crore e-way bills have been generated, demonstrating increased compliance and adoption.

The incorporation of RFID technology and GPS-enabled monitoring systems has enabled tax authorities to track consignments in transit, thereby minimizing tax leakage and unauthorized diversions. Additionally, AI-powered route analysis and risk-based compliance monitoring mechanisms have been deployed to detect potential tax fraud. These AI-driven tools assess route deviations, frequent cancellations and invoice modifications to identify suspicious activities, proactively alerting enforcement agencies. Furthermore, the system has evolved to incorporate automated alerts for non-compliance, reducing manual interventions and expediting enforcement measures. This integration of technology within the e-way bill system has significantly enhanced regulatory oversight and operational efficiency in GST compliance.

6. Implementation of Multi-Factor Authentication:

To enhance security measures in GST compliance, Multi-Factor Authentication (MFA) has been

implemented, requiring users to authenticate their identity through multiple verification steps. This process involves a combination of a username, password and a one-time password (OTP) for secure access to the GST portal. Since August 2023, MFA has been mandatory for businesses with an annual turnover exceeding Rs 100 crore. The implementation is being progressively expanded, with the requirement extending to businesses with a turnover above Rs 20 crore from January 2025, those exceeding Rs 5 crore from February 2025, and ultimately, all taxpayers from April 2025. To ensure uninterrupted access to the GST portal, businesses are advised to activate MFA and maintain updated contact details for authentication purposes.

7. Biometric Authentication and Aadhaar-Based Verification:

To strengthen identity verification, biometric authentication—incorporating fingerprint and facial recognition—has been integrated into the GST registration process. This measure reduces tax evasion risks by preventing fraudulent registrations through impersonation or fake identities. Additionally, Aadhaar-based verification has become a mandatory requirement, linking business registrations to an individual's digital identity. From March 2025, the GSTN has streamlined biometric authentication, allowing promoters and directors of public limited companies, private limited companies, unlimited companies and foreign companies to complete verification at any GST Suvidha Kendra (GSK) within their home state. This initiative enhances accessibility while maintaining stringent fraud prevention measures.

8. Geocoding for Address Verification:

Geocoding has been introduced to strengthen GST compliance by linking business locations to precise geographic coordinates. This system mandates businesses to validate their addresses using

GPS-based mapping, allowing tax authorities to remotely verify physical existence. The integration of geotagging technology reduces the risks associated with shell companies and fraudulent registrations while enhancing tax audit accuracy. Moreover, the seamless integration of geocoding with e-invoicing and the e-way bill system enhances compliance tracking.

9. Digital Transformation in Refund Processing and Payment Systems:

Advancements in digital tax infrastructure have accelerated refund processing while enhancing compliance oversight. The implementation of automated refund processing, complemented by AI-driven risk assessment tools, has facilitated the early detection and prevention of fraudulent refund claims, thereby safeguarding government revenues. Furthermore, the government has reinforced verification protocols through AI-powered anomaly detection mechanisms, enabling more rigorous scrutiny of refund applications. Notably, unregistered taxpayers can now claim refunds for excess tax payments and contractual cancellations via Form RFD-01 on the GST portal, a provision that has been in effect since October 1, 2023. This development underscores the government's commitment to fostering a streamlined, transparent and technology-driven tax ecosystem.

Global Trends In Tax Compliance:

Globally, tax compliance is undergoing a significant transformation, with governments adopting digital-first approaches to improve efficiency and transparency. Countries such as the United Kingdom, Australia and those in the European Union are at the forefront of real-time tax reporting and automated compliance frameworks. Key trends include:

- **Real-Time Reporting and Digital Tax Administration:** The implementation of continuous transaction control (CTC)

models, requiring real-time reporting of transactions, similar to India's e-invoicing framework.

- **Blockchain Integration:** Several jurisdictions are exploring blockchain technology to establish tamper-proof digital tax records, reducing fraud and enhancing verification mechanisms.
- **AI and Big Data Analytics in Tax Enforcement:** Tax authorities worldwide are leveraging AI-driven risk assessments and big data analytics to detect tax evasion and non-compliance patterns.
- **Cross-Border Tax Compliance Automation:** As global trade expands, multinational corporations are investing in automated compliance solutions to streamline tax filings across multiple jurisdictions.

Future Outlook:

The trajectory of GST compliance in India is poised to be profoundly influenced by rapid technological advancements and evolving policy frameworks. Foremost among these anticipated developments is the expanded deployment of artificial intelligence (AI) and machine learning (ML) in compliance solutions, facilitating predictive analytics, automated reconciliation and anomaly detection. The integration of blockchain-based GST networks is expected to enhance data security, transactional transparency and real-time auditability.

Additionally, ongoing efforts to simplify GST return filing processes aim to reduce administrative burdens and foster greater taxpayer convenience. Concurrently, regulatory authorities are expected to intensify enforcement and anti-evasion strategies through the sophisticated application of AI-driven analytics and big data methodologies, thereby strengthening tax compliance oversight.

A significant dimension of this transformation is India's progressive alignment with OECD tax compliance standards, reinforcing global tax cooperation, curbing base erosion and profit shifting (BEPS) and fostering a more transparent fiscal environment. Collectively, these developments signal a paradigm shift toward a digitally integrated, technology-centric GST compliance framework, necessitating proactive adaptation by businesses to ensure seamless regulatory adherence.

Conclusion:

The landscape of GST compliance in India is undergoing a significant transformation, driven by rapid technological advancements, regulatory reforms and global best practices. The adoption of AI, blockchain and automation is reshaping tax management, improving efficiency and cost-effectiveness while posing challenges, especially for SMEs. To stay ahead, businesses must invest in digital infrastructure, embrace emerging technologies and remain updated on regulatory developments. As India's tax administration evolves, aligning with these changes is crucial for maintaining compliance and competitiveness.

In the coming years, AI-driven compliance solutions will enhance predictive analytics and automate GST reconciliation, while blockchain may improve transparency and security in tax transactions. Efforts to simplify GST return filing will ease compliance for SMEs, while authorities will use AI and data analytics to strengthen enforcement against tax evasion. Globally, tax compliance is shifting towards digital-first frameworks, with real-time reporting, blockchain integration and AI-driven risk assessment becoming standard. As international tax systems become more

automated, Indian businesses must prepare for increased digitalization to ensure compliance and long-term sustainability in an evolving regulatory environment.

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