

Future of GST Compliance: Convergence of IoT, AI & Big Data in GST 2.0

DR. V. MOHAN NAYAK

Associate Professor,
Department of Commerce,
GVR Government Degree College,
Dhone, Nandyal (Dist), Andhra Pradesh, India.

ABSTRACT:

The future of GST compliance in India is set to transform significantly with the integration of advanced digital technologies under the proposed GST 2.0 framework. The convergence of Artificial Intelligence (AI), Internet of Things (IoT), and Big Data analytics promises to enhance transparency, accuracy, and efficiency in tax administration. AI enables automated return filing, predictive analytics, and real-time fraud detection, while IoT facilitates continuous tracking of goods, production monitoring, and seamless data flow across supply chains. Big Data analytics supports risk-based assessments, policy formulation, and audit precision through large-scale data integration from e-invoices, e-way bills, and IoT-generated information. This technological synergy not only reduces compliance burden on taxpayers but also strengthens governance, minimizes tax evasion, and improves revenue collection. Despite challenges related to cybersecurity, data privacy, implementation cost, and skill readiness, the convergence of AI, IoT, and Big Data positions GST 2.0 as a foundation for intelligent, automated, and future-ready tax compliance in India.

KEYWORDS: GST 2.0, Artificial Intelligence, Internet of Things, Big Data Analytics, Tax Compliance, E-Governance, Digital Taxation, Automation, Predictive Analytics, Supply Chain Transparency.

INTRODUCTION:

The Goods and Services Tax (GST) is one of India's biggest tax reforms, introduced to create a single and transparent tax system for the country. Over the years, GST has become more digital, with

online return filing, e-invoices, and e-way bills. As technology continues to grow, the idea of GST 2.0 is gaining importance. GST 2.0 refers to a smarter and more advanced GST system that uses modern technologies to make tax compliance easier and more efficient. Technologies like Artificial Intelligence (AI), the Internet of Things (IoT), and Big Data can help automate many GST processes. AI can reduce errors and detect fraud, IoT can track goods and production in real time, and Big Data can help the government analyse large amounts of information for better decision-making. The use of these technologies will make GST faster, more accurate, transparent, and secure. This study explains how the convergence of AI, IoT, and Big Data will support the future of GST compliance and help both taxpayers and the government.

SCOPE OF THE STUDY:

The scope of this study includes understanding how Artificial Intelligence, the Internet of Things, and Big Data can support the development of GST 2.0 in India. It covers the ways in which these technologies can improve GST compliance, such as automating return filing, tracking goods movement, and analysing large data sets. The study focuses mainly on the Indian GST system and explains how digital tools can benefit both taxpayers and the government. It also highlights the role of technology in detecting fraud, increasing transparency, and making the tax

system more efficient. Since the study is based on secondary data, it includes information from books, journals, research papers, and official GST documents.

NEED FOR THE STUDY:

There is a strong need for this study because GST in India is moving towards greater digitalisation, and understanding GST 2.0 is important for both taxpayers and administrators. With increasing use of technology, it is necessary to know how AI, IoT, and Big Data can make GST filing easier, faster, and more accurate. These technologies help reduce human errors, prevent tax fraud, and improve monitoring of goods and production. The study is needed to show how modern tools can strengthen the tax system, increase transparency, and support better governance. It also guides policymakers and businesses in preparing for a future where GST will be more automated and technology-driven.

OBJECTIVES OF THE STUDY:

- ❖ To understand the concept of GST 2.0.
- ❖ To study the role of AI, IoT, and Big Data in GST compliance.
- ❖ To analyse how technology can improve tax filing and monitoring.
- ❖ To identify the benefits of using advanced technologies in GST.
- ❖ To find the challenges in adopting GST 2.0.
- ❖ To give suggestions for better implementation of GST 2.0.

METHODOLOGY:

This study is based on **secondary data**. Information was collected from books, journals, research articles, government reports, and online sources.

Data related to GST, AI, IoT, and Big Data was taken from published studies and official GST documents. The review of literature was done to

understand how technology is used in tax systems. The collected data was compared, analysed, and summarized to identify the benefits and challenges of GST 2.0. Simple descriptive analysis was used to explain the role of AI, IoT, and Big Data in GST compliance. The findings and suggestions were prepared based on the analysis of secondary information.

REVIEW OF LITERATURE:

Kumar and Singh (2019) explained that Artificial Intelligence helps in reducing errors in tax filing and detecting fraud in GST.

Patel (2020) stated that AI-based chatbots improve taxpayer support by giving quick answers to GST-related questions.

Sharma and Gupta (2021) found that machine learning tools can identify fake invoices and unusual tax activities.

Reddy and Rao (2020) discussed that IoT devices like GPS and RFID help track the movement of goods and improve supply chain transparency.

Mehta (2021) said that IoT sensors in factories help record real-time production data, which supports accurate GST reporting.

OECD (2020) reported that Big Data analytics helps governments detect tax gaps and understand taxpayer behaviour.

LIMITATIONS OF THE STUDY:

The study is based only on secondary data. No primary data or field survey was conducted. Technology in GST is still developing, so some information may change. The study does not cover state-level variations in GST compliance. Limited availability of detailed data on GST 2.0. The study mainly focuses on general concepts, not technical details

UNDERSTANDING GST 2.0:

GST 2.0 is an advanced, technology-enabled version of the existing GST framework with greater emphasis on:

- ❖ Real-time invoice matching
- ❖ Automated return filing
- ❖ Predictive tax analytics
- ❖ AI-driven compliance tools
- ❖ Enhanced taxpayer services
- ❖ Fraud prevention using machine learning
- ❖ Integration with e-invoicing, IoT-based systems, and digital ledgers

It envisions a seamless, taxpayer-friendly, and transparent system that enhances revenue efficiency and reduces compliance burdens.

CONVERGENCE OF AI, IOT & BIG DATA IN GST 2.0:

1. Role of Artificial Intelligence in GST 2.0:

a. Automated Return Filing: Auto-filing GST returns based on invoices, purchases, and past patterns. Reducing human error and speeding up compliance.

b. Fraud Detection: Identifying fake invoices, shell companies, and circular trading. Machine learning models detect anomalies in tax transactions.

c. AI Chat bots for Taxpayer Assistance: 24/7 support for queries related to GST rates, procedures, and compliance.

d. Predictive Analytics: Forecasting tax revenue
Detecting non-compliant businesses and
Evaluating risk levels of taxpayers.

ROLE OF IOT IN GST 2.0:

Real-Time Tracking of Goods: IoT devices like GPS and RFID help track goods during transport. This ensures that e-way bills are accurate and goods are not diverted.

Accurate Production Monitoring: Smart sensors and meters in factories record production data automatically. This helps businesses report correct GST on goods manufactured.

Automatic Data Reporting: IoT devices can send production and movement data directly to GST systems, reducing manual entry and errors.

Supply Chain Transparency: IoT provides a clear view of goods from manufacturer to customer. This reduces fraud and increases compliance.

Improved Inventory Management: Sensors in warehouses can monitor stock levels in real time. This helps businesses maintain accurate GST records for goods stored or sold.

Reduction of Tax Evasion: Real-time monitoring ensures that every transaction is recorded, preventing underreporting or fake invoicing.

Integration with AI and Big Data: IoT data can be used by AI systems to detect irregularities and by Big Data tools for analytics, improving GST compliance.

Support for E-Way Bills: IoT devices can automatically update movement of goods in the e-way bill system, reducing manual checks and delays.

Efficiency in Logistics and Transport: Fleet tracking using IoT ensures timely deliveries and compliance with GST rules for goods movement.

Future Scope: In the future, IoT may help connect small businesses, transporters, and warehouses in a single GST 2.0 digital network.

ROLE OF BIG DATA IN GST 2.0:

Handling Large Amounts of Data: GST 2.0 generates huge data from e-invoices, e-way bills, and return filings. Big Data helps process and manage all this information easily.

Risk-Based Assessment: Big Data can identify taxpayers who may underreport or commit fraud. This helps the government focus on high-risk cases.

Error Detection: By analysing multiple records, Big Data helps detect mismatches in invoices, returns, and payments.

Revenue Forecasting: Big Data analytics helps predict future tax collections and monitor trends in different sectors.

Policy Planning: Government can use insights from Big Data to make better policies and improve GST rules.

Automated Reporting: Big Data can generate reports on compliance, refunds, and tax collection automatically.

Integration with AI and IoT: Big Data works with AI for fraud detection and IoT for real-time goods tracking, making GST 2.0 more efficient.

Transparency in Tax Administration: Analysing large datasets helps reduce corruption and increase trust in the GST system.

Improving Taxpayer Services: Big Data identifies common issues faced by taxpayers, helping the government provide better support and guidance.

Future Potential: In the future, Big Data can help create a fully automated, predictive, and intelligent GST system.

BENEFITS OF TECHNOLOGY CONVERGENCE IN GST 2.0:

For Government: Enhanced tax compliance, Real-time monitoring, Reduction in tax evasion, Faster processing of returns & refunds and Transparency in supply chain movement.

For Businesses: Lower compliance cost, Reduced paperwork, Auto-generated invoices and returns, Faster refund processes, Improved accuracy and reduced penalties.

For Economy: Stable revenue flow, Increased investor confidence and Digitally empowered taxation ecosystem.

CHALLENGES IN IMPLEMENTING GST 2.0 WITH AI, IoT & BIG DATA:

High Cost of Technology-Many businesses, especially small ones, cannot afford AI tools, IoT devices, and data systems. Lack of Digital Skills-Taxpayers and officials may not have the required training to use advanced technologies. Cyber security Risks-GST data is sensitive. AI and IoT systems can be targeted by hackers, causing data leaks. Data Privacy Issues-Collecting large amounts of data from IoT devices may create privacy concerns for businesses.

Poor Internet Connectivity-Rural and remote areas may not have strong internet networks, making real-time data transfer difficult. Integration Problems-Connecting GST systems with Income Tax, Customs, banking, IoT devices, and AI tools can be complex. Resistance to Change-Some users prefer manual methods and may not accept digital tools easily. Maintenance and Up gradation Cost-AI models, IoT devices, and Big Data systems

require regular updates, which is expensive. Legal and Ethical Issues-Clear rules are needed on how AI decisions will be used in tax assessments and audits. Data Quality Problems-Incorrect or incomplete data reduces the accuracy of AI and Big Data systems. Security of IoT Devices-IoT sensors and trackers can be easily tampered with, affecting the reliability of GST data. Lack of Standardisation-Different industries use different IoT and data systems, making uniform implementation difficult. Infrastructure Gap-Many small businesses and government offices lack modern digital infrastructure.

FUTURE PROSPECTS:

GST 2.0 will become more automated with the use of AI, IoT, and Big Data. AI will help in predicting tax fraud before it happens, making GST safer and more reliable. IoT devices will allow real-time monitoring of goods and production, improving transparency in the supply chain. Big Data will help the government make better decisions by analysing large amounts of information. GST return filing may become fully automatic, reducing the burden on taxpayers. E-invoicing and e-way bills will be linked with AI tools to avoid mismatches and errors.

Tax audits will become faster and more accurate through data analytics and smart tools. Digital integration between GST, Income Tax, Customs, and Banks may become common for better compliance. Chat bots and AI assistants will improve taxpayer services by giving instant support. GST 2.0 will help reduce corruption and manual intervention in tax administration. The use of block chain along with AI may improve security and trust in GST records. Small businesses will have access to simple digital tools to help them comply easily. Overall, GST will become smarter,

more transparent, and more efficient in the coming years.

CONCLUSION AND SUGGESTIONS:

GST 2.0 will be stronger and smarter with the use of AI, IoT, and Big Data. These technologies will make GST work faster, more accurate, and more transparent. They will also help reduce tax fraud and make compliance easier for businesses. Although there are some challenges, proper training, security, and support can solve them. Overall, technology will help create a better and modern GST system for the future.

AI helps in filing GST returns automatically and reduces mistakes. IoT devices help track goods and production in real time. Big Data helps the government analyse large amounts of GST information. GST 2.0 makes the compliance process faster and easier for taxpayers. Technology helps detect fake invoices and tax fraud quickly. Some challenges like high cost, cyber security, and lack of skills still exist. Using AI, IoT, and Big Data together will improve the GST system in the future.

The government should improve data security to protect taxpayer information. More training should be given to taxpayers and officials on digital GST tools. Industries should use IoT devices to track goods and production accurately. All tax-related databases should be connected for better transparency. AI tools should be used to warn taxpayers about mistakes before filing returns. Small businesses should get support or incentives to adopt digital tools. Clear rules must be made on how AI and data will be used in GST 2.0.

REFERENCES:

1. Bansal, R. (2021). Big Data applications in tax fraud detection: An analytical approach. *Journal of Digital Governance*, 8(2), 45–53.
2. Chattopadhyay, S. (2021). Strengthening GST compliance through AI and data analytics. *Indian Journal of Public Finance*, 15(1), 72–85.
3. Das, P., & Mishra, R. (2022). Big Data analytics for GST: A study on compliance and risk profiling. *International Journal of Accounting Research*, 10(3), 55–66.
4. Jain, M., & Verma, A. (2022). Integrated AI and IoT systems for smart taxation: A future model for GST 2.0. *Journal of Emerging Technologies in Finance*, 9(1), 101–115.
5. Kumar, A., & Singh, P. (2019). Artificial Intelligence in tax administration: Challenges and opportunities. *Journal of E-Governance Studies*, 6(4), 22–33.
6. Mehta, R. (2021). IoT-enabled production monitoring and its impact on indirect tax compliance. *International Journal of Industrial Technology*, 13(2), 88–97.
7. Narayan, S. (2022). GST 2.0: Evolution, challenges and technology-driven solutions. *Indian Tax Review*, 9(3), 34–49.
8. OECD. (2020). Technology tools to tackle tax evasion and compliance gaps. Organisation for Economic Co-operation and Development.
9. Patel, V. (2020). AI-based tools and chatbots in GST compliance management. *International Review of Digital Finance*, 5(1), 56–67.
10. Reddy, K., & Rao, M. (2020). IoT-based tracking systems for supply chain transparency under GST. *International Journal of Logistics & Digital Innovation*, 7(4), 41–54.
11. Sharma, N., & Gupta, S. (2021). Machine learning applications in GST for detecting fraud and circular trading. *Journal of Artificial Intelligence Applications*, 12(3), 67–80.
12. Saxena, D. (2022). Cybersecurity and ethical considerations in AI-driven GST systems. *Journal of Information Security & Law*, 11(2), 90–104.
13. World Bank. (2021). Digital tax administration: Global experiences and best practices. World Bank Publications.