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Artificial Intelligence in GST Administration for Sustainable and Transparent Tax Systems in India

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Abstract

The Goods and Services Tax (GST) represents one of the most significant tax reforms in India, aiming to simplify indirect taxation and improve transparency and compliance. However, small businesses continue to face challenges related to compliance complexity, return filing, and system efficiency. At the same time, rapid digital transformation, and the emergence of Artificial Intelligence (AI) are reshaping public finance and governance systems worldwide. This study examines the role of Artificial Intelligence in strengthening GST administration while promoting transparency, efficiency, and sustainability. The research is based on primary data collected through a structured survey of 40 GST-registered small businesses, supported by secondary sources and practical internship experience in GST compliance. The findings reveal moderate awareness of GST processes, strong dependence on Chartered Accountants, increasing adoption of digital tools, and persistent compliance challenges. The study highlights that AI-driven automation, intelligent reconciliation, and digital tax systems can reduce compliance burden, improve accuracy, minimize fraud, and promote environmentally sustainable, paperless tax administration. The paper concludes that integrating Artificial Intelligence into GST systems can enhance transparency, efficiency, and sustainability, contributing to smarter and more responsible economic governance.

Keywords: Artificial Intelligence, GST, Tax Compliance, Digital India, Sustainability, Fiscal Transparency.

Introduction

Taxation plays a critical role in economic development, governance, and resource mobilization. In India, the implementation of the Goods and Services Tax (GST) marked a major transformation in the indirect taxation system by replacing multiple taxes with a unified, transparent structure. GST aims to simplify tax compliance, reduce cascading effects, and improve tax collection efficiency. Despite its advantages, GST compliance remains challenging, particularly for small and medium-sized enterprises (SMEs), which often face resource constraints, technical difficulties, and complex

regulatory requirements GST Council. (2023).. With increasing digitalization, governments are adopting advanced technologies such as Artificial Intelligence (AI) to improve administrative efficiency, detect fraud, and enhance compliance monitoring. Simultaneously, sustainability has become a key focus in public policy. Digital and paperless tax systems reduce resource consumption, improve operational efficiency, and support environmentally responsible governance. The integration of AI into GST administration therefore represents a convergence of technology, taxation, and sustainability, forming the foundation of smart and transparent tax systems (OECD. (2021).

Research Problem

Although GST introduced digital compliance mechanisms, small businesses still face difficulties related to return filing, system usability, and regulatory complexity. The study investigates whether Artificial Intelligence can enhance GST administration, reduce compliance challenges, and contribute to sustainable and efficient tax governance.

Objectives of the Study

- To assess awareness of GST compliance among small businesses.
- To examine challenges faced in GST compliance.
- To analyze digital adoption and software usage in GST management.
- To evaluate the role of Chartered Accountants in GST compliance.
- To study delays and inefficiencies in GST processes.
- To explore how Artificial Intelligence can improve GST transparency and efficiency.
- To examine the contribution of digital taxation to sustainable governance.

Significance of the Study

- This study is important for:
- Small businesses facing compliance burden
- Policymakers aiming to improve tax efficiency
- Understanding AI's role in digital taxation
- Promoting sustainable and paperless governance

Literature Review

The integration of Artificial Intelligence (AI) into taxation systems has significantly transformed tax administration, compliance monitoring, and financial transparency. With the introduction of Goods and Services Tax (GST), governments have increasingly adopted digital technologies to improve efficiency and reduce tax evasion. Recent academic and policy literature highlights the growing role of AI in strengthening GST compliance, automating return filing, detecting fraud, and supporting sustainable economic governance. This section reviews key studies related to AI in taxation, GST compliance, and sustainability.

- **AI in Tax Administration**

Several researchers have emphasized that AI improves the efficiency and accuracy of tax systems. According to recent studies, machine learning algorithms can analyze large volumes of transaction data, identify inconsistencies, and detect suspicious patterns that may indicate tax evasion or fraud. AI-powered systems reduce manual errors and enable faster tax processing. Scholars argue that automation in tax administration not only reduces operational costs but also increases transparency and accountability. Intelligent systems can automatically match invoices, verify input tax credits, and flag mismatches, thereby strengthening tax governance.



Image 1: AI in GST Administration;

Source Gen AI 3.03.2026

- **AI and GST Compliance**

Literature on GST compliance suggests that digital technologies play a crucial role in improving taxpayer behavior. AI-based GST platforms assist businesses in accurate tax calculation, timely filing, and error detection. Researchers have found that automated reminders, predictive analytics, and smart dashboards help taxpayers avoid penalties and maintain compliance. Studies also show that AI reduces compliance burden, especially for small and medium enterprises, by simplifying complex tax procedures. By minimizing human intervention, AI improves filing accuracy and reduces the chances of incorrect returns.

- **AI in Fraud Detection and Risk Management**

One of the most discussed areas in recent literature is the use of AI for detecting GST fraud. Researchers highlight that AI systems can identify fake invoicing, circular trading, and tax credit manipulation by analyzing abnormal transaction patterns. Predictive models help tax authorities classify high-risk taxpayers and conduct targeted audits. The literature suggests that AI-based fraud detection not only protects government revenue but also enhances fairness in the taxation system. By preventing revenue leakage, AI contributes to economic stability and efficient resource allocation.

- **Sustainability and Digital Tax Systems**

Recent academic discussions link digital taxation with sustainability. Sustainable governance requires transparent financial systems, efficient tax collection, and reduced administrative waste. AI contributes to sustainability by reducing paper usage, minimizing manual processing, and enabling data-driven decision-making. Researchers argue that improved tax compliance increases government revenue, which can be redirected toward sustainable development initiatives such as green infrastructure, social welfare, and digital transformation. Thus, AI-enabled GST systems indirectly support economic and institutional sustainability.

- **Research Gap**

Although existing literature recognizes the benefits of AI in taxation, limited studies specifically examine the combined relationship between AI, GST compliance, and sustainability outcomes. Most research focuses either on digital taxation efficiency or fraud detection, without linking these advancements to long-term sustainable governance. This study attempts to bridge this gap by analyzing how AI-driven GST systems improve compliance, transparency, and sustainable economic management.

- **Conclusion of Literature Review**

The reviewed literature indicates that AI has the potential to revolutionize GST systems by improving compliance, reducing fraud, and enhancing administrative efficiency. Furthermore, digital tax systems contribute to sustainable governance through transparency, reduced resource wastage, and improved revenue management. However, more empirical research is required to fully understand the long-term sustainability impact of AI-driven GST frameworks.

Research Methodology

- **Methodology:** The research interprets respondent perceptions regarding digital tax tools, comparing these findings with existing literature to identify systemic shifts and remaining hurdles.

Research Design

This study uses a descriptive research design to examine the role of Artificial Intelligence (AI) in improving GST compliance and supporting transparent and sustainable tax systems.

Data Collection

The research is based mainly on primary data collected through a structured questionnaire. The survey included questions on GST filing frequency, use of AI-based tools, error reduction, and the impact of digital GST systems on compliance and transparency. Some secondary data from articles and reports was also referred to for theoretical support.

Sampling and Sample Size

A convenience sampling method was used. The respondents included business owners, students, and individuals familiar with GST. A total of 40 responses were collected for analysis.

Data Analysis

The collected data was analyzed using percentage analysis and graphs to identify trends related to AI usage, GST compliance, and sustainability.

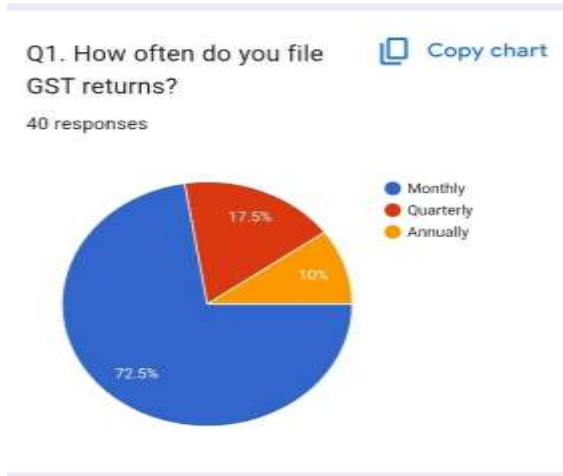
Limitations

The study is limited by a small sample size and is based on respondents' perceptions, which may include some bias.

Results and Data Analysis

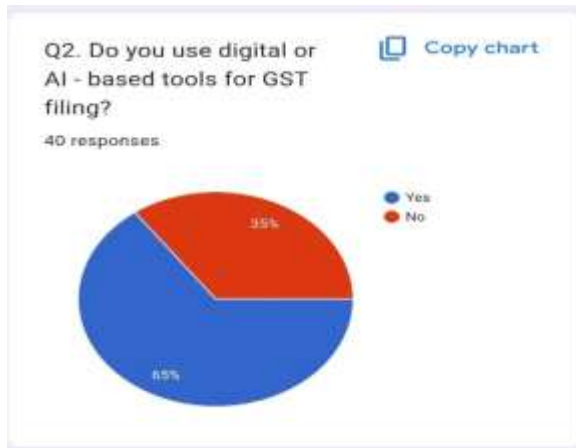
This section presents the findings of the survey conducted to examine the role of Artificial Intelligence (AI) in improving GST compliance and supporting a transparent and sustainable tax system. The analysis is based on percentage interpretation and graphical representation of responses.

- **GST Return Filing Frequency**



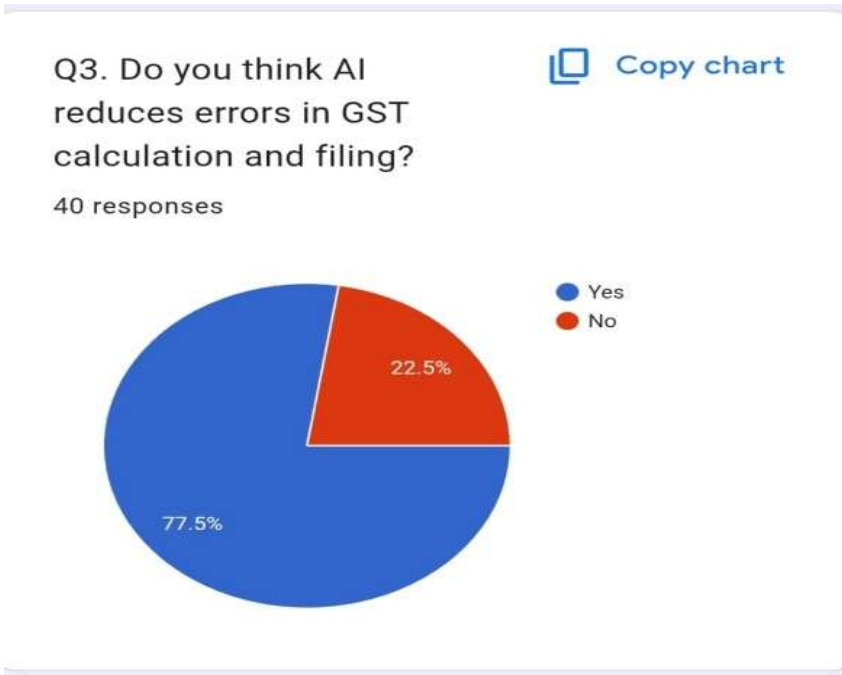
Graph 1: GST Return Filing Frequency

- **Use of AI/Digital tools in GST filing**



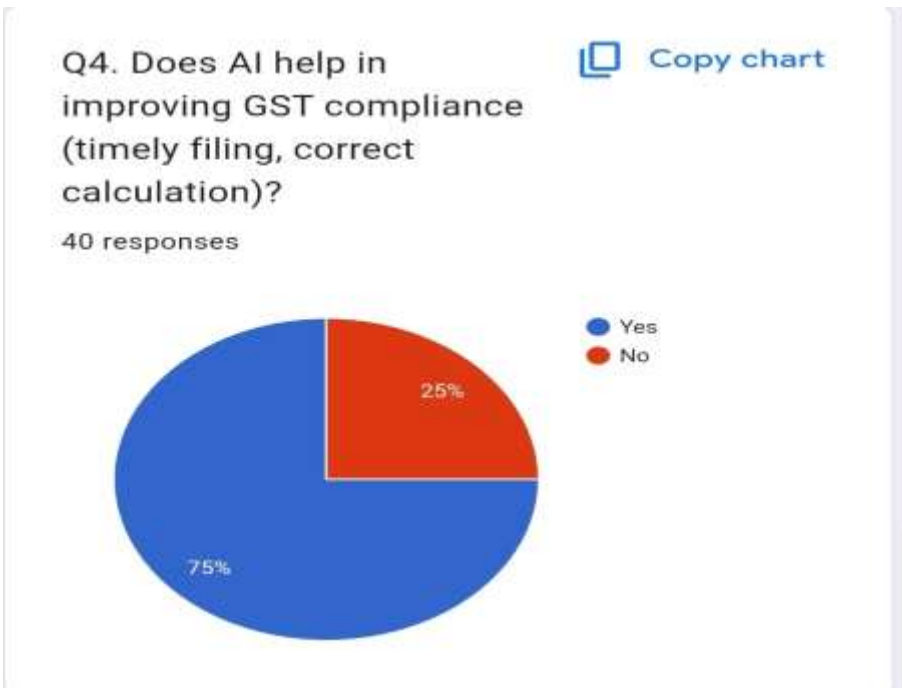
Graph 2: Use of AI/Digital tools in GST filing

- **Impact of AI on Error Reduction**



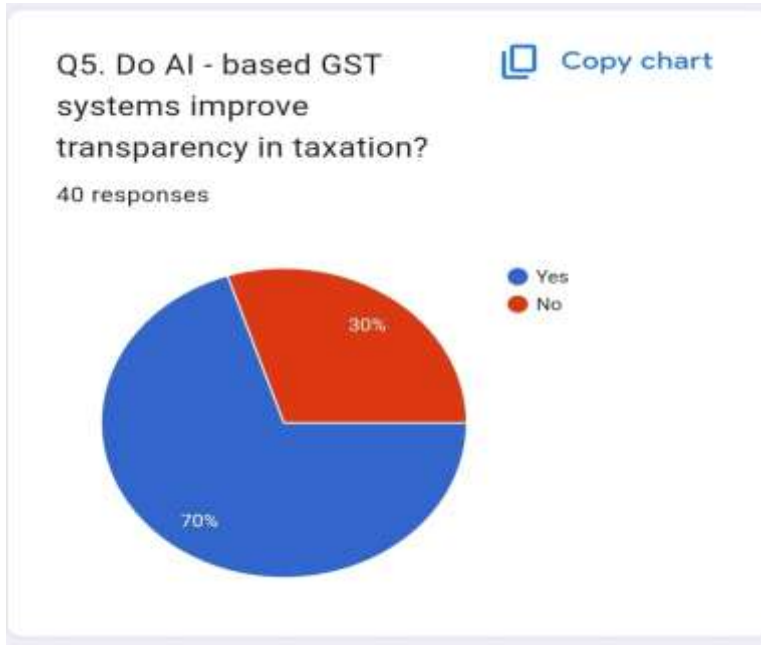
Graph 3: Impact of AI on Error Reduction

- **Role of AI in Improving GST Compliance**



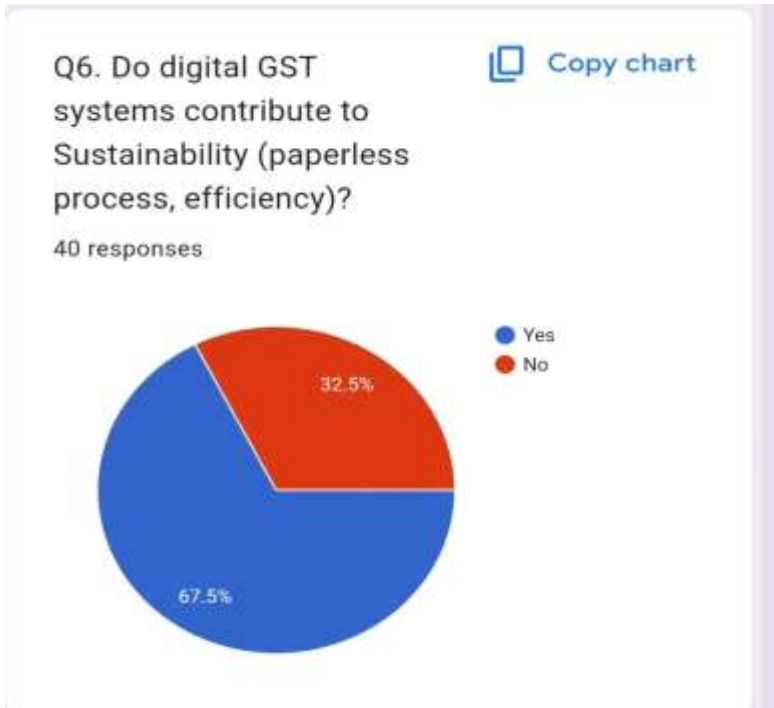
Graph 4: Role of AI in Improving GST Compliance

- **AI and Transparency in Taxation**



Graph 5: AI and Transparency in Taxation

- **AI and Sustainability in GST System**



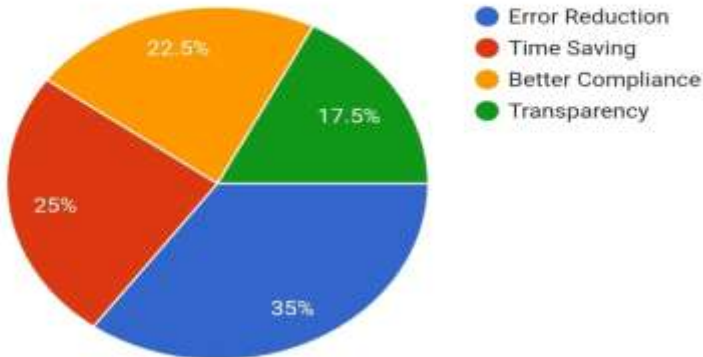
Graph 6: AI and Sustainability in GST System

- Major Benefits of AI in GST

Q7. What is the biggest benefit of AI in GST ?

 Copy chart

40 responses



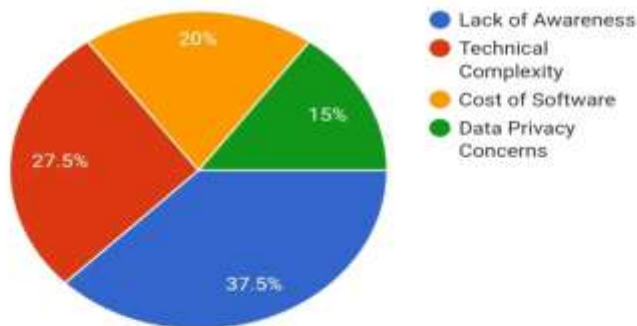
Graph 4.7 Major Benefits of AI in GST

- Challenges in Using AI for GST Compliance

Q8. What is the biggest challenge in using AI for GST?

 Copy chart

40 responses



Graph 8: Challenges in Using AI for GST Compliance

Interpretation & Result

Overall, the results indicate a positive perception of AI in GST systems. Respondents recognize that AI improves accuracy, compliance, transparency, and efficiency, which ultimately contributes to a more sustainable and effective taxation framework (Gupta, A., & Sharma, R. (2021).

Interpretation of Results

- Most respondents regularly file GST returns, showing improved compliance and awareness.
- Use of AI and digital tools indicates a shift toward automated tax systems.
- AI reduces calculation errors and improves accuracy in GST filing.
- AI helps in timely filing, better documentation, and smoother compliance.
- Digital GST systems improve transparency and support sustainability by reducing paper usage.
- Some challenges remain, such as lack of technical knowledge and system complexity.

Comparison with Existing Literature

- The findings align with earlier studies showing that digital taxation improves compliance and reduces errors.
- Previous research supports the role of AI in improving transparency and monitoring.
- Earlier GST studies also identified compliance complexity as a major challenge, similar to this study.
- The link between digital systems and sustainability is consistent with existing literature.

Implications of the Study

- AI can significantly improve GST compliance and efficiency.
- Businesses can reduce errors and penalties through AI-based tools.
- Policymakers can promote digital GST systems to improve transparency and reduce tax evasion.
- Training and awareness are needed to help small businesses adopt AI tools effectively.

Findings

The results indicate a strong positive correlation between AI adoption and improved tax transparency. AI significantly reduces calculation errors and documentation delays. However, technical complexity remains a barrier for certain demographics, highlighting a need for better user support.

Recommendations

To bridge the gap between AI potential and current implementation challenges, the following actions are recommended:

- **User-Centric Interface Design:** Tax authorities should prioritize the development of intuitive, AI-powered dashboards that simplify complex filing processes for non-technical users.
- **Capacity Building Programs:** Government and educational institutions should collaborate to provide subsidized training and certification programs for SMEs to improve digital literacy in tax technology.
- **Real-time Error Detection:** Implementation of proactive AI "nudges" that alert taxpayers to potential discrepancies *before* submission, thereby reducing the burden of legal notices and penalties.
- **Incentivizing Green Compliance:** Policymakers should consider fast-tracking refunds or providing "Gold Status" certifications for businesses that consistently maintain high compliance scores via digital, paperless AI tools.

Conclusion

The integration of Artificial Intelligence (AI) within the GST administration in India marks a transformative shift toward a more robust, transparent, and sustainable fiscal ecosystem. This study underscores that while the transition to digital taxation is well underway, the implementation of AI serves as a critical catalyst in overcoming traditional bureaucratic hurdles. **Operational Excellence:** The findings confirm that AI significantly mitigates human error and enhances the accuracy of GST filings, fostering a culture of voluntary compliance among taxpayers. **Sustainability & Transparency:** By digitizing the tax trail and reducing reliance on paper-based documentation, AI-driven systems contribute directly to environmental sustainability and minimize the scope for tax evasion. **Addressing the Digital Divide:** Despite the clear advantages, the "complexity of systems" and "lack of technical knowledge" remain significant barriers. This suggests that the technological evolution of GST must be accompanied by comprehensive stakeholder education (Gupta, A., & Sharma, R. (2021)). This study explores the impact of Artificial Intelligence (AI) on the Goods and Services Tax (GST) framework in India, focusing on its role in enhancing compliance, accuracy, and environmental sustainability. In conclusion, AI is not merely a tool for automation but a strategic asset for sustainable tax governance. For India to fully realize the potential of an AI-enabled GST framework, future efforts must focus on simplifying user interfaces and providing targeted training for small and medium enterprises (SMEs). Moving forward, the synergy between advanced technology and inclusive policy design will be the cornerstone of a transparent and future-ready Indian economy.

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