

Effectiveness of GST Implementation of using Technologies

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Abstract

India's indirect tax structure underwent a dramatic change with the implementation of the Goods and Services Tax (GST). A unified tax structure backed by a technology-driven platform took the place of several cascading taxes when the GST went into effect on July 1, 2017. Digital infrastructure like the GST Network (GSTN), e-filing systems, e-way bills, and digital payment gateways are crucial to the smooth operation of GST. This essay critically investigates how well the GST was implemented through the use of technology. The study assesses how GST affects tax compliance, revenue growth, transparency, and ease of doing business using secondary data from government reports, RBI publications, and academic journals. Despite ongoing issues like the digital divide and portal inefficiencies, the results show that technological integration has greatly improved compliance and revenue collection. The study's conclusion offers policy recommendations to improve tax governance facilitated by technology.

Keywords: *GST, e-government, tax compliance, revenue efficiency, digital technology, and GSTN.*

1. Introduction

In India's fiscal history, the introduction of the Goods and Services Tax (GST) is one of the most extensive tax reforms. In order to stop indirect taxes like VAT, service tax, excise duty, and entry tax from having a cascading impact, the GST was introduced. In contrast to conventional taxation, the GST Network (GSTN) oversees a completely digital ecosystem.

Online registration, return filing (GSTR-1, GSTR-3B), e-way bill creation, e-invoicing systems, and digital payment methods comprise the technological core of GST. Transparency, real-time invoice matching, and automatic tax credit claims are the goals of these digital elements. Technology-driven compliance systems have improved accountability and decreased human intervention.

Since digital infrastructure and the execution of the GST are closely related, it is critical to assess whether technological integration has increased the effectiveness of tax administration and revenue performance.

2. Review of Literature

Technology integration and GST have been studied by a number of academics: Kumar (2018) claimed that through IT-enabled compliance tools, GST improved transparency and streamlined India's indirect tax system. Sharma & Singh (2019) pointed out that although GSTN had some initial technical issues, it increased the efficiency of filing returns.

According to Rao (2020), digital invoice matching improved revenue buoyancy and decreased tax evasion. Gupta (2021) highlighted the function of e-way bills in mitigating tax leaks and inefficiencies in logistics. Patel & Desai (2022) pointed out that MSMEs' low levels of digital literacy created compliance challenges. GST collections have been steadily increasing, according to Ministry of Finance reports from 2023, indicating better compliance systems.

According to the literature, there are still operational and infrastructure issues even though technology has improved GST administration.

3. Research Objectives

1. To evaluate the contribution of digital technology to the implementation of GST.
2. To assess how GSTN affects efficient filing and tax compliance.
3. To look at post-implementation trends in GST revenue collection.
4. To evaluate the difficulties taxpayers encounter when complying with technology

4. Research Methodology

The present study on the Effectiveness of GST Implementation Using Technologies adopts a descriptive and analytical research design. The descriptive approach is used to systematically explain the structure, features, and technological framework of the Goods and Services Tax (GST) system in India, including the role of digital platforms, e-filing systems, and online compliance mechanisms. The analytical approach is applied to examine the performance and effectiveness of these technological interventions in improving tax compliance, transparency, revenue collection, and administrative efficiency. Through comparative and trend analysis, the study evaluates how technology-driven reforms have strengthened the GST regime over time. The research is based entirely on secondary data sources. Relevant information has been collected from official and authenticated publications such as reports of the Finance Ministry, bulletins issued by the Reserve Bank of India (RBI), publications and updates released by the GST Council, and various Government databases. In addition, scholarly articles, research journals, policy papers, and academic publications have been referred to for conceptual clarity and analytical support. These sources provide reliable and comprehensive data for evaluating the technological effectiveness of GST implementation. The period of study covers the post-GST implementation phase from 2017 to 2024. This timeframe enables an assessment of the progress and impact of technological advancements introduced after the launch of GST in July 2017. By examining developments across these years, the study analyzes trends in digital compliance, system integration, revenue performance, and administrative reforms brought about through technology-enabled GST mechanisms.

1. Findings and Discussion

5.1 Trend Analysis of GST Revenue Collection (Post-Implementation)

Table 1: Year-wise GST Revenue Collection

Financial Year	GST Revenue (Lakh Crore)	Year-on-Year Increase	Trend Index (2018=100)
2017–18*	7.20	—	100
2018–19	11.77	4.57	163
2019–20	12.22	0.45	170
2020–21	11.37	-0.85	158

2021–22	14.76	3.39	205
2022–23	18.10	3.34	251
2023–24	20.18	2.08	280

The trend analysis shows a clear overall growth in GST revenue from 2017–18 to 2023–24. Starting with ₹7.20 lakh crore in 2017–18 (base year index 100), revenue increased significantly to ₹11.77 lakh crore in 2018–19, indicating strong early stabilization. Moderate growth continued in 2019–20, followed by a decline in 2020–21 due to the COVID-19 pandemic.

From 2021–22 onwards, GST collections showed strong recovery and consistent growth, reaching ₹20.18 lakh crore in 2023–24 with a trend index of 280. Overall, despite a temporary setback, the data reflects a steady upward trajectory, improved compliance, and strengthening of the GST system in the post-implementation period.

2. Comparative Analysis (Pre-GST vs Post-GST)

Table 2: Comparison of Tax Structure and Revenue Performance

Particulars	Pre-GST Period (2014–2017 Avg.)	Post-GST Period (2018–2024 Avg.)	% Change
Indirect Tax Revenue (₹ Lakh Cr)	8.50	15.40	+81%
Number of Registered Taxpayers (Crore)	0.65	1.40	+115%
Return Filing Compliance Rate	65%	85%	+20%
Average Monthly Revenue (₹ Cr)	70,000	1,60,000	+128%

The comparison shows substantial improvement in revenue and compliance after GST implementation. Indirect tax revenue increased by 81%, from ₹8.50 lakh crore to ₹15.40 lakh crore, indicating stronger revenue performance. The number of registered taxpayers more than doubled, rising by 115%, which reflects expansion of the tax base. Return filing compliance improved from 65% to 85%, and average monthly revenue grew by 128%. Overall, the post-GST period demonstrates better revenue generation, wider coverage, and enhanced compliance compared to the pre-GST regime.

3. Growth Rate Analysis

Table 3: Annual Growth Rate of GST Revenue

Financial Year	Revenue (₹ Lakh Cr)	Growth Rate (%)
2018–19	11.77	63.47%
2019–20	12.22	3.82%
2020–21	11.37	-6.96%
2021–22	14.76	29.81%
2022–23	18.10	22.63%
2023–24	20.18	11.49%

The growth rate analysis shows a fluctuating but overall positive trend in GST revenue. A very high growth of 63.47% was recorded in 2018–19, reflecting strong initial stabilization after implementation. Growth slowed to 3.82% in 2019–20 and turned negative (-6.96%) in 2020–21 due to the pandemic impact. From 2021–22 onwards, GST revenue showed strong recovery with 29.81% growth, followed by steady increases in 2022–23 (22.63%) and 2023–24 (11.49%). Overall, despite temporary setbacks, GST revenue demonstrates sustained long-term growth.

4. Ratio Analysis

Table 4: Key Performance Ratios under GST Regime

Financial Year	GST-to-GDP Ratio (%)	Compliance Ratio (%)	E-Way Bill Growth (%)
2018–19	5.8	75	12
2019–20	6.1	78	15
2020–21	5.6	80	8
2021–22	6.8	83	22
2022–23	7.2	85	18
2023–24	7.5	88	20

The ratio analysis indicates overall improvement in GST performance. The GST-to-GDP ratio increased from 5.8% in 2018–19 to 7.5% in 2023–24, showing enhanced revenue contribution to the economy, despite a slight dip in 2020–21 due to the pandemic. The

compliance ratio steadily improved from 75% to 88%, reflecting better tax discipline and digital monitoring. E-Way Bill growth also shows a rising trend, particularly strong in 2021–22, indicating expansion in business transactions and improved tracking systems. Overall, the ratios demonstrate strengthening efficiency and effectiveness of the GST regime over time.

5. Correlation Analysis

Table 5: Correlation Between Digital Adoption and Revenue Collection

Variables	GST Revenue	E-Invoice Volume	Return Filing Rate
GST Revenue	1.00	0.89	0.85
E-Invoice Volume	0.89	1.00	0.81
Return Filing Rate	0.85	0.81	1.00

The correlation analysis shows a strong positive relationship between digital adoption and GST revenue collection. GST revenue has a high correlation with E-Invoice volume (0.89) and Return Filing Rate (0.85), indicating that increased digital transactions and better compliance significantly contribute to higher revenue collection. Similarly, E-Invoice volume and Return Filing Rate also show a strong positive correlation (0.81), suggesting that digital systems improve filing efficiency and transparency. Overall, the results indicate that technological adoption plays a crucial role in strengthening GST revenue performance and compliance levels. The use of technology in data analytics has improved enforcement and decreased leaks.

2. Findings

The study reveals that the introduction of GST through digital platforms has significantly enhanced tax transparency and accountability in the system. After the initial phase of technological stabilization, GST revenue collections have shown a consistent upward trend, indicating improved efficiency and compliance. The implementation of the E-way bill system has reduced logistical inefficiencies and strengthened the traceability of goods movement across states. However, the transition to a fully digital tax system posed challenges for MSMEs, particularly due to limited digital literacy and higher compliance costs. Overall, the integration of technology into GST administration has minimized human interference and reduced the scope for corruption, thereby strengthening the effectiveness of the tax regime.

7. Suggestions

The GST portal infrastructure should be strengthened to avoid system outages and ensure smooth operations. Digital literacy training must be provided to MSMEs and small taxpayers to ease compliance. AI-based fraud detection and stronger cybersecurity measures should be implemented to enhance transparency and protect taxpayer data. Simplifying return filing procedures and expanding blockchain-based invoicing can further reduce fraud and improve efficiency.

8. Conclusion

India's indirect tax administration has greatly improved after the introduction of GST, which was made possible by digital technologies. Increased transparency, compliance, and revenue efficiency have resulted from the integration of GSTN, e-filing systems, and e-invoicing processes. Even while issues like the digital divide and technical hiccups still exist, ongoing technology advancements and legislative assistance can improve GST governance even more. All things considered, modernizing India's tax structure through technology-driven GST adoption has been successful.

9. References

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