

A Study on GST Revenue Efficiency in India: Sectoral and State-wise Comparative Analysis

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Abstract

The implementation of the Goods and Services Tax (GST) in India represents a major reform in the indirect tax system, replacing multiple taxes with a unified framework to enhance transparency, compliance, and revenue efficiency. This study examines GST revenue efficiency in India through a comparative analysis across selected sectors and states during 2017–2025, focusing on revenue trends, sectoral performance, inter-state variations, and key influencing factors.

A quantitative approach is adopted using secondary data from official government sources. Statistical tools including trend analysis, CAGR, linear regression, One-Way ANOVA, correlation, and multiple regression are applied. The analysis covers five major sectors manufacturing, services, trade, construction, and logistics and five leading states Maharashtra, Karnataka, Tamil Nadu, Gujarat, and Uttar Pradesh.

The results show a significant rise in GST revenue from ₹7.19 lakh crore in 2017–18 to ₹22.50 lakh crore in 2024–25, with a CAGR of 17.7%, indicating strong growth and system stabilization. Manufacturing and services emerge as dominant contributors, while construction and logistics show lower efficiency. ANOVA results confirm significant differences across sectors and states, highlighting structural and regional disparities. Regression findings indicate that tax compliance and economic growth significantly influence GST efficiency. The study concludes that GST has evolved into an effective tax system in India, though disparities across sectors and states call for targeted policy interventions to improve overall efficiency.

Keywords: GST Revenue Efficiency, Sectoral Analysis, State-wise Comparison, Tax Compliance, Economic Growth

1. Introduction

The introduction of the Goods and Services Tax (GST) in India on July 1, 2017, marked a major reform in the indirect taxation system by replacing multiple central and state taxes with a unified structure. The reform aimed to create a common national market, reduce cascading taxation, and improve transparency and compliance. Since its implementation, GST has become a key source of revenue and an important tool for fiscal management.

GST revenue efficiency reflects how effectively tax is collected relative to economic activity, compliance, and administrative performance. Its evaluation requires an analysis of overall revenue trends along with variations across sectors and states. Sectoral differences arise due to variations in scale, formalization, and compliance, while state-level differences are influenced by economic development and administrative capacity.

This study focuses on five major sectors Manufacturing, Services, Trade, Construction, and Logistics and five leading states Maharashtra, Karnataka, Tamil Nadu, Gujarat, and Uttar Pradesh. These sectors and states are selected based on their significant contribution to GST revenue. Factors such as economic growth, digitalization, and compliance behavior are also considered, as they play an important role in determining GST efficiency.

Using a quantitative approach, the study analyzes GST revenue efficiency for the period 2017-2025 with the help of statistical tools such as trend analysis, regression, ANOVA, and correlation. The objective is to provide a clear

understanding of GST performance, identify disparities, and highlight key factors influencing revenue efficiency.

2. Review of Literature

1. Dandonaa, I., Tomara, P. K., Guptab, S. K., & Vermaa, S. K. (2024)

This study examines GST as a major revenue source for central and state governments in India. It analyzes state-wise revenue trends using statistical tools such as t-tests and regression. The findings show fluctuations in GST collections, with Maharashtra contributing the highest share. A strong positive relationship between GST revenue and GDP is identified, highlighting regional disparities.

2. Sharma, N. S., & Dayama, V. (2020)

This study analyzes GST revenue trends using an exploratory design and secondary data. It focuses on GST structure and its role in improving tax collection efficiency. Year-wise comparison shows a steady increase in GST collections after implementation. However, early-stage fluctuations indicate the need for more detailed analysis.

3. Mukherjee, S. (2023)

This research evaluates GST revenue performance using indicators such as GST-to-GDP ratio and tax buoyancy. It compares pre- and post-GST periods to assess efficiency. The findings show improved buoyancy but limited increase in GST's share in GDP. Policy gaps are identified as a major source of inefficiency.

4. Chandar, G. B., & Mariselvam, P. (2025)

This study compares the initial GST framework with the reformed GST 2.0 system. It highlights issues of complexity and high tax burden in the earlier structure. Reforms aimed at simplification and transparency have improved efficiency. The study concludes that GST 2.0 positively impacts revenue and economic growth.

5. Jain, K., & Singh, S. (2025)

This study examines the impact of GST on tax revenue and economic growth in Haryana. It uses regression and t-test analysis on secondary data. The findings reveal a significant increase in tax revenue after GST implementation. A strong positive relationship between GST revenue and economic output is observed.

6. Adesh, A., Upadhyay, A., & Negi, A. (2025)

This study conducts a systematic review of GST's economic implications using multiple research papers. It finds improvements in revenue buoyancy, macroeconomic stability, and market integration. Manufacturing and export sectors benefit significantly, while MSMEs face compliance challenges. The study emphasizes the need for policy simplification.

7. Garg, S., Mittal, S., & Garg, A. (2025)

This study analyzes the relationship between GST revenue and economic growth using time-series data. It applies the ARDL model to assess short- and long-term impacts. The findings show a significant positive effect of GST on economic growth. Factors like FDI support growth, while inflation has a negative impact.

8. Rafee, B. M., Khatoon, S., Asan, S. J., Zaheed, S. M., Ali, R. M., & Pushpa, A. (2024)

This study explores disparities in tax revenue sharing between the Centre and states. It analyzes finance commission data to understand allocation patterns. Findings indicate that population-based criteria influence revenue distribution. Regional imbalances are highlighted, emphasizing the need for equitable fiscal policies.

9. Bhalla, N., Sharma, R. K., & Kaur, I. (2023)

This study examines GST's impact on MSMEs using empirical analysis. It finds that GST reduces operational costs and improves efficiency. Digital compliance enhances transparency and productivity. The study concludes that GST

positively supports small business growth.

10. Maheshwari, T., & Mani, M. (2023)

This study reviews GST's impact across various sectors using a large set of research papers. It finds positive effects in manufacturing, agriculture, and logistics sectors. Some sectors show mixed or negative outcomes depending on implementation. The study highlights the need for sector-specific policy measures.

3. Research Gaps

1. **Limited focus on GST revenue efficiency:** Existing studies largely examine GST's impact on growth and reforms, with limited attention to how efficiently revenue is generated.
2. **Lack of integrated sectoral and state-level analysis:** Most research studies sectors or states separately, lacking a combined approach to understand overall GST efficiency.
3. **Inadequate comparative analysis across states:** Comparative evaluation among multiple states is limited, restricting insights into regional disparities in GST performance.
4. **Absence of structured sector-wise comparison:** There is insufficient systematic comparison across major sectors to understand variations in contribution and compliance.
5. **Limited analysis of key determinants of efficiency:** Factors such as compliance, digitalization, and economic structure are not deeply examined in relation to GST efficiency.

4. Research Objectives

1. **To analyse GST revenue trends in India (2017-2025):** To examine the growth pattern, fluctuations, and overall performance of GST collections over time, including the impact of economic events.
2. **To compare GST revenue efficiency across sectors:** To evaluate how major sectors differ in their contribution and efficiency in GST revenue generation.
3. **To assess inter-state variations in GST efficiency:** To analyse differences in GST performance among selected states and identify regional disparities.
4. **To examine factors influencing GST efficiency:** To study the impact of economic, administrative, and compliance-related factors on GST revenue efficiency.

5. Research Methodology

5.1 Area of Study

The study focuses on analyzing GST revenue efficiency in India across selected sectors and states for the period 2017–2025. It examines five major sectors Manufacturing, Services, Trade, Construction, and Logistics and five leading states Maharashtra, Karnataka, Tamil Nadu, Gujarat, and Uttar Pradesh, based on their significant contribution to GST revenue.

5.2 Sources of Data

The study is based entirely on secondary data collected from reliable and official sources such as GST statistics reports, government publications, economic surveys, and related databases. The data includes GST revenue figures, sectoral contributions, state-wise collections, and macroeconomic indicators.

5.3 Sample Size

The dataset consists of 8 years of observations (2017-18 to 2024-25) across 5 sectors and 5 states. For analytical purposes, each sector and state includes 8 data points, ensuring consistency in comparative analysis.

5.4 Sampling Method

A purposive sampling method is used to select sectors and states based on their high contribution to GST revenue. This approach ensures that the analysis focuses on the most economically significant segments of the Indian economy.

5.5 Tools and Techniques

The study employs quantitative statistical tools for analysis:

1. **Trend Analysis and CAGR** - to examine growth patterns in GST revenue
2. **Linear Regression** - to analyze the trend and significance over time
3. **One-Way ANOVA** - to compare GST efficiency across sectors and states
4. **Correlation Analysis** - to measure relationships between variables
5. **Multiple Regression Analysis** - to identify factors influencing GST efficiency

5.6 Level of Significance

All statistical tests are conducted at a 5% level of significance ($\alpha = 0.05$). The null hypothesis is rejected when the p-value is less than 0.05, indicating statistically significant results.

6. Research Analysis

6.1 Hypothesis 1: Trend Analysis of GST Revenue Objective

To examine whether GST revenue in India has shown a significant trend over the period 2017–2025.

Method Used

Linear Regression and CAGR analysis were applied.

Key Results

- **CAGR = 17.7%**
- **R² = 0.93**
- **p-value < 0.05 Regression Statistics Output**

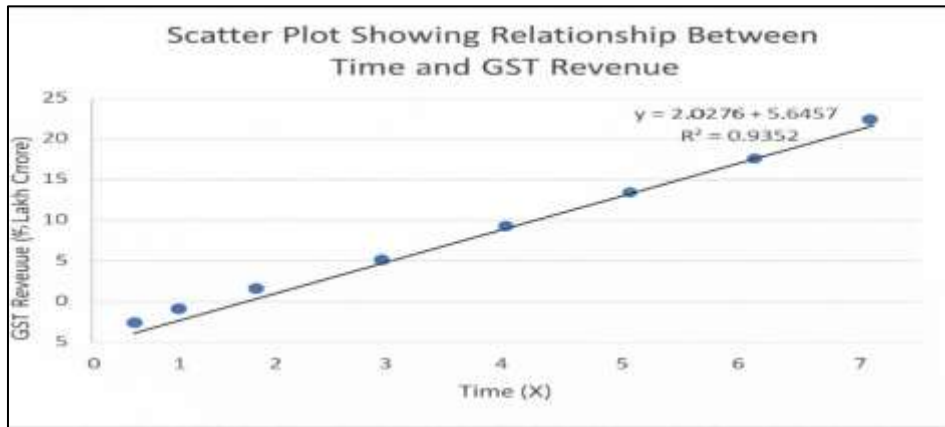
Measure	Values
Multiple R	0.967068083
R Square	0.935220677
Adjusted R Square	0.924424123
Standard Error	1.411875933
Observations	8

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	172.6720381	172.6720381	86.62214712	8.70968E-05
Residual	6	11.9603619	1.993393651		
Total	7	184.6324			

Variable	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	5.645714286	1.100124864	5.131884998	0.002153033	2.953805718	8.337622853

Time (X)	2.027619048	0.217857186	9.307101972	8.70968E-05	1.494541717	2.560696378
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Figure 6.1: Scatter Plot Showing Relationship Between Time and GST Revenue



Source: <https://gstcouncil.gov.in/gst-system-statistics>

Interpretation

GST revenue shows a strong and consistent upward trend over time. The high R^2 value indicates that time explains most of the variation, while the significant p-value confirms statistical reliability. The recovery after the pandemic further reflects system resilience and improved compliance.

Decision

Reject H_0 as the p-value is less than 0.05, indicating a significant trend in GST revenue.

Conclusion

GST revenue has increased significantly over the study period with consistent growth. This reflects improved tax compliance, digitalization, and strengthening of the GST system.

6.2 Hypothesis 2: Sector-wise GST Revenue Efficiency Objective

To determine whether GST efficiency differs across sectors.

Method Used

One-Way ANOVA was applied.

Table 3.2: Sector-wise GST Revenue Contribution as Percentage of Total GST Collection (2017–18 to 2024–25)

Year	Manufacturing (%)	Services (%)	Trade (%)	Construction (%)	Logistics (%)
2017-18	38	32	14	8	8
2018-19	39	33	13	7	8
2019-20	37	34	14	8	7
2020-21	36	35	15	8	6
2021-22	38	36	13	7	6
2022-23	40	37	12	6	5
2023-24	41	38	11	6	4
2024-25	42	39	10	5	4

Source: <https://www.mospi.gov.in/>

Key Results

- **F-value = 607.37**
- **p-value ≈ 0.000**
- **F-critical = 2.64**

Anova: Single Factor

SUMMARY				
Groups	Count	Sum	Average	Variance
Manufacturing (%)	8	311	38.875	4.125
Services (%)	8	284	35.5	6
Trade (%)	8	102	12.75	2.785714286
Construction (%)	8	55	6.875	1.267857143
Logistics (%)	8	48	6	2.571428571

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	8138.75	4	2034.688	607.369403	8.4587E-32	2.641465186
Within Groups	117.25	35	3.35			
Total	8256	39				

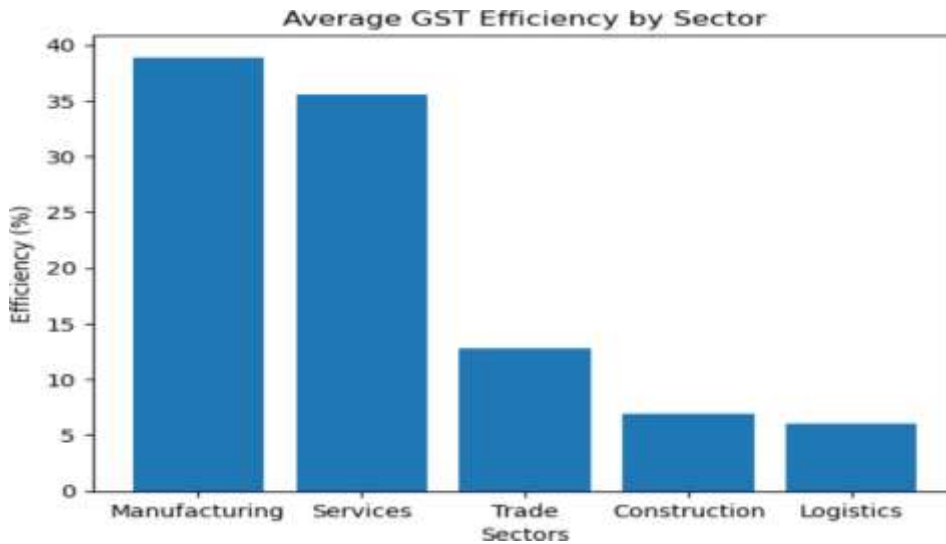
Interpretation

The very high F-value and negligible p-value indicate strong differences across sectors. Manufacturing and services show higher efficiency due to better compliance and structure, while construction and logistics lag due to operational and informal challenges.

Decision

Reject H₀₂ as the p-value is less than 0.05, indicating significant differences across sectors.

Figure: 3.1 Average GST Efficiency by Sector



Source: <https://gstcouncil.gov.in/gst-system-statistics>

Conclusion

GST efficiency varies significantly across sectors due to structural and compliance differences. Sector-specific policy measures are required to improve performance in weaker sectors.

6.3 Hypothesis 3: State-wise GST Revenue Efficiency Objective

To assess whether GST efficiency varies across states.

Method Used

One-Way ANOVA was used.

Table 6.3: State-wise GST Revenue Contribution as Percentage of Total GST Collection

Year	Maharashtra (%)	Karnataka (%)	Tamil Nadu (%)	Gujarat (%)	Uttar Pradesh (%)
2017-18	16.2	12.4	11.8	10.9	8.5
2018-19	17.1	13.1	12.3	11.5	9.0
2019-20	18.0	14.0	13.2	12.4	9.3
2020-21	17.3	13.2	12.5	11.6	8.7
2021-22	18.4	14.3	13.4	12.6	9.5
2022-23	19.2	15.1	14.0	13.2	10.2
2023-24	20.1	15.6	14.5	13.8	10.7
2024-25	21.0	16.3	15.2	14.4	11.3

Source: <https://gstcouncil.gov.in/> and <https://www.mospi.gov.in/>

Output Result

Anova: Single Factor

SUMMARY				
Groups	Count	Sum	Average	Variance
Maharashtra (%)	8	147.3	18.4125	2.598392857
Karnataka (%)	8	114	14.25	1.808571429
Tamil Nadu (%)	8	106.9	13.3625	1.345535714
Gujarat (%)	8	100.4	12.55	1.451428571
Uttar Pradesh (%)	8	77.2	9.65	0.988571429

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	322.6715	4	80.667875	49.23275862	6.72496E-14	2.641465186
Within Groups	57.3475	35	1.6385			
Total	380.019	39				

Key Results

- F-value = 49.23
- p-value 0.000
- F-critical = 2.64

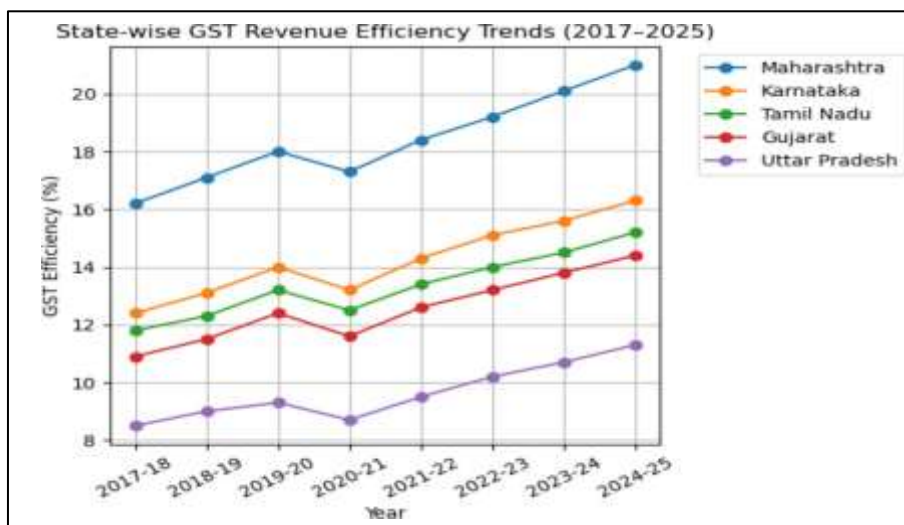
Interpretation

The results show significant variation in GST efficiency across states. Industrially advanced states perform better, while others show lower efficiency due to economic and administrative differences.

Decision

Reject H_0 as the p-value is less than 0.05, indicating significant variation across states.

Figure: 3.1 State-wise GST Revenue Efficiency Trends 2017-2025



Source: <https://gstcouncil.gov.in/gst-system-statistics>

Conclusion

GST efficiency differs significantly across states due to variations in economic structure and governance. Targeted

regional strategies are needed to reduce disparities and improve performance.

6.4 Hypothesis 4: Factors Affecting GST Revenue Efficiency Objective

To examine the relationship between GST efficiency and influencing factors.

Method Used

Correlation and Multiple Regression analysis were applied.

Table 4.4: Data on GST Revenue Efficiency and Key Influencing Factors in India (2017–18 to 2024–25)

Year	GST Efficiency (%)	GDP Growth (%)	Digitalization Index	Compliance Rate (%)	Industrial Growth (%)
2017-18	70	6.8	40	65	5.5
2018-19	74	6.5	45	68	6.2
2019-20	75	4	50	70	4.5
2020-21	72	-6.6	55	72	-2
2021-22	78	8.7	60	75	7.5
2022-23	82	7.2	68	78	6.8
2023-24	85	7.6	75	82	7
2024-25	88	7.8	80	85	7.2

Source: <https://www.rbi.org.in/Scripts/Statistics.aspx> and

Correlation Output

Variables	GST Efficiency	GDP Growth	Digitalization	Compliance	Industrial Growth
GST Efficiency	1	0.478	0.957	0.965	0.553
GDP Growth	0.478	1	0.248	0.270	0.994
Digitalization	0.957	0.248	1	0.998	0.328
Compliance	0.965	0.270	0.998	1	0.350
Industrial Growth	0.553	0.994	0.328	0.350	1

Regression Output

SUMMARY OUTPUT	
Regression Statistics	Values
Multiple R	0.993168877
R Square	0.986384417
Adjusted R Square	0.968230307
Standard Error	1.14724583
Observations	8

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	286.051481	71.51287025	54.3339444	0.003939416
Residual	3	3.948518981	1.316172994		
Total	7	290			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	8.585323975	54.45425564	0.157661213	0.884737881	-164.7124207	181.8830686
GDP Growth (%)	-0.872130627	1.212515313	-0.719273907	0.523938913	-4.730895504	2.986634251
Digitalization Index	-0.076960382	0.571768523	-0.134600593	0.901450614	-1.896583005	1.74266224
Compliance Rate (%)	0.918074817	1.199912365	0.765118224	0.499883731	-2.900581855	4.736731489
Industrial Growth (%)	1.922591083	1.995851039	0.963293875	0.406460295	-4.429097684	8.274279849

Key Results

- Strong correlation with compliance (0.965) and digitalization (0.957)
- $R^2 > 0.98$
- Significance $F < 0.05$

Interpretation

GST efficiency is strongly influenced by compliance and digitalization. While individual variables show limited significance due to multicollinearity, the overall model is highly significant, confirming combined influence.

Decision

Reject H_0 as the model p-value is less than 0.05, indicating a significant relationship between variables.

Conclusion

GST efficiency is driven by a combination of economic and administrative factors. Improving compliance and digital infrastructure is essential for enhancing tax efficiency.

7. Findings and Research Outcomes

1. GST revenue showed a strong upward trend, increasing significantly from 2017–18 to 2024–25.
2. The growth trend was statistically significant, confirming consistent expansion of GST collections over time.
3. Manufacturing and Services emerged as the highest contributors to GST revenue across the study period.
4. Significant differences in GST efficiency across sectors were confirmed through ANOVA results.
5. Construction and Logistics sectors demonstrated comparatively lower efficiency due to operational and compliance challenges.
6. State-wise analysis revealed significant variation in GST performance across selected states.
7. Industrially advanced states such as Maharashtra, Gujarat, and Tamil Nadu showed higher GST efficiency.

8. GST efficiency was strongly influenced by factors such as compliance and digitalization, indicating their critical role in revenue performance.

8. Discussions and Implications

8.1 Interpretation of Results

The results indicate a consistent increase in GST revenue, supported by improved compliance and system maturity. Manufacturing and services dominate due to higher formalization, while construction and logistics show lower efficiency due to operational constraints. State-wise differences reflect variations in economic structure and administrative capacity. Statistical results confirm that these differences are significant. The strong association between GST efficiency and factors such as digitalization and compliance highlights their critical role. Overall, GST performance is influenced by both structural characteristics and policy-driven improvements.

8.2 Comparison with Previous Studies

The findings align with earlier studies that emphasize the positive relationship between GST revenue and economic growth. Similar to past research, manufacturing and services are identified as major contributors, while sectoral and regional disparities persist. Studies on inter-state differences also support the observed variations in GST efficiency. However, this study extends prior research by combining sectoral and state-level analysis using recent data. It also strengthens existing literature through statistical validation, offering a more integrated and updated perspective on GST performance.

8.3 Implications for the Field or Real-World Application

The study provides important implications for policy and practice. Strengthening digital infrastructure and improving compliance mechanisms can enhance GST efficiency. Sectoral disparities suggest the need for targeted interventions in weaker sectors such as construction and logistics. Inter-state differences highlight the importance of region-specific strategies. The findings also support data-driven policymaking and efficient tax administration. For researchers, the study contributes empirical evidence on GST performance. Overall, it helps in designing effective policies to improve revenue efficiency and reduce disparities.

8.4 Limitation of the Study

1. **Use of secondary data:** Reliance on published data limits control over accuracy and restricts inclusion of real-time behavioral insights.
2. **Limited sample scope:** Focusing only on five sectors and five states may not fully capture the diversity of India's economic structure.
3. **Time period constraint:** The study covers 2017–2025, which may not reflect long-term structural changes in GST performance.
4. **Multicollinearity issue:** High correlation among variables reduces the ability to assess the individual impact of each factor clearly.

8.5 Scope for Further Study

1. **Expand dataset:** Future studies can include more sectors and states to provide a broader and more representative analysis.
2. **Use primary data:** Incorporating surveys or interviews can offer deeper insights into taxpayer behavior and compliance challenges.
3. **Apply advanced models:** Using advanced econometric techniques can improve accuracy and address limitations like multicollinearity.
4. **Conduct comparative studies:** Cross-country or sector-specific comparisons can provide wider insights into

GST efficiency and policy effectiveness.

9. Conclusion

9.1 Theoretical Conclusion

The study enhances understanding of GST revenue efficiency through a structured empirical approach. It shows that efficiency is influenced by economic growth, compliance, and digitalization. Sectoral and regional variations significantly impact overall performance. By applying statistical tools like ANOVA and regression, the study provides a clear framework for evaluating tax systems. The findings support existing theories on tax efficiency and revenue mobilization. Overall, the research contributes to academic knowledge on GST and its role in improving fiscal performance.

9.2 Managerial Conclusion

From a policy perspective, improving compliance and strengthening digital systems are essential for enhancing GST efficiency. Targeted measures are required to address sectoral and regional disparities. Simplifying tax procedures can improve participation and reduce inefficiencies. State authorities can use these insights to strengthen revenue administration. Continuous monitoring and data-based decision-making are necessary for better outcomes. Overall, the study provides practical guidance for policymakers to improve GST performance and ensure sustainable revenue growth.

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