

GST Implications for logistics cost structure in the textile industry- Focus on Bangalore City

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Abstract: GST reforms have made a big difference in how logistics costs are structured in the textile industry. These changes have made tax rates simpler, lowered costs, and fixed several past issues with taxes. Some key changes include cutting the GST rate on commercial goods vehicles from 28% to 18% and on logistics services from 12% to 5%. These changes directly reduce the cost of freight and transportation for textile manufacturers, retailers, and exporters. These rate reductions, especially for man-made fibers and yarns, have removed inverted duty structures, improved cash flow for small and medium businesses, and made the supply chain more efficient. By standardizing tax rates from the beginning of the process, like fiber, to the final product, such as garments, GST reforms help cut down on cost distortions, improve the competitiveness of exports, and offer better prices to end users. However, increasing GST on some transport services to 18% might lead to a build up of input tax credits for textile companies, especially those with a lot of finished goods taxed at lower rates. Overall, the reduction in logistics costs is making Indian textiles more competitive both within the country and internationally, improving supply chains and allowing the textile industry to support larger, more affordable manufacturing and exports. This paper looks at how changes to the Goods & Services Tax (GST) in India affect the logistics cost structure of textile companies. By reviewing existing literature, using tax rules, and analyzing a simulated firm-level dataset, the study identifies the impact of GST rate changes and Input Tax Credit (ITC) adjustments on freight, warehousing, handling, and insurance costs. A numerical example shows the impact on cash flow, and a small econometric exercise suggests potential cost reductions for companies following the September 2025 GST adjustments. The paper also offers policy implications and suggestions for textile manufacturers and logistics service providers.

Key Words: GST, logistics cost, textile industry, input tax credit, goods transport agency (GTA), reverse charge.

1. INTRODUCTION

The textile industry is one of India's oldest and most prominent industrial sectors, playing a vital role in employment generation, foreign exchange earnings, and industrial growth. It contributes significantly to the national economy through its extensive value chain, which includes fibre production, spinning, weaving, processing, garment manufacturing, and retail distribution. Due to the geographically dispersed nature of production units and markets, logistics has emerged as a major determinant of operational efficiency and cost competitiveness in the textile sector. Efficient logistics systems are essential for the smooth movement of raw materials, inventory control, and timely delivery of finished goods to domestic and international markets, yet this decentralisation often results in comparatively high logistics costs (Bhattacharya & Mukherjee, 2018).

The implementation of the Goods and Services Tax (GST) in 2017 brought a fundamental transformation to India's indirect taxation structure by subsuming multiple central and state taxes into a unified framework. The introduction of GST aimed to reduce tax cascading, enhance transparency, and create a seamless national market. Key mechanisms such as the removal of inter-state check posts, introduction of e-way bills, and provision of uninterrupted input tax credit were expected to significantly reduce transit delays and improve supply chain efficiency (Government of India, 2017). These reforms were particularly significant for logistics-heavy sectors like textiles, where frequent inter-state movement is integral to the production and distribution process (OECD, 2019).

Despite these intended benefits, the impact of GST on the logistics cost structure has been complex and uneven. While reductions in transit time and enhanced digital compliance systems have improved transparency, several textile firms have faced increased administrative burdens and technological challenges during the transition phase (Choudhury & Singh, 2020). Components such as transportation costs, warehousing expenses, inventory carrying costs, and compliance-related expenditures have experienced varied shifts following GST implementation, often differing by firm size and operational scale (World Bank, 2020).

In this context, the present study seeks to quantitatively analyse the implications of GST on the logistics cost structure in the Indian textile industry by examining changes across key logistics components in the pre- and post-GST periods. The research aims to evaluate whether GST has achieved its objective of logistics cost optimisation or introduced new operational complexities, thereby offering evidence-based insights for policymakers and industry stakeholders to enhance supply chain efficiency and strengthen sectoral competitiveness.

2. Review Related Literature

Logistics cost has long been recognised as a crucial determinant of competitiveness in manufacturing sectors, particularly in India where supply chains are geographically fragmented and operationally complex. The logistics system in India contributes significantly to the total cost of production, with transportation, warehousing, inventory carrying, and administrative expenses forming the major components. Bhattacharya and Mukherjee (2018) observed that inefficiencies in logistics operations, inadequate infrastructure, and regulatory bottlenecks substantially inflate logistics expenditure, especially in logistics-intensive industries like textiles. Their study highlighted that decentralised production patterns and dependence on road transport further compound cost pressures, thereby reducing profit margins and overall efficiency.

The introduction of the Goods and Services Tax (GST) in 2017 represented a structural shift in India's indirect taxation regime aimed at creating a unified national market and promoting supply chain efficiency. According to the Government of India (2017), GST subsumed multiple taxes such as VAT, CST, excise duty, octroi, and entry tax, which previously forced firms to structure supply chains around tax considerations rather than operational efficiency. Choudhury and Singh (2020) noted that the elimination of interstate check posts and the integration of taxation through GST significantly reduced transit delays, enhanced route optimisation, and improved transparency in freight movement. Their findings suggest that GST contributed to faster turnaround times, reduced idle vehicle hours, and increased predictability in logistics planning.

Several empirical studies have further examined the relationship between GST and logistics cost efficiency. OECD (2019) reported that the harmonisation of tax systems under GST facilitated warehouse consolidation and encouraged the adoption of hub-and-spoke distribution models. This restructuring was found to reduce redundant storage facilities and optimise inventory flow across regions. However, the transition phase also introduced new challenges such as increased compliance obligations, technology adaptation costs, and the requirement for digital documentation, which particularly affected small and medium enterprises (SMEs). World Bank (2020) observed that while GST improved overall transparency and monitoring of goods movement, its implementation led to short-term increases in administrative and compliance costs, thereby impacting operational expenditure.

In the specific context of the textile industry, logistics plays an even more critical role due to the industry's multi-stage production process and dependence on inter-state movement of raw materials and semi-finished goods. ClearTax (2022) pointed out that GST created a more integrated tax environment for the textile sector, allowing seamless input tax credit and reducing cascading effects. However, the study also highlighted regional variations in GST impact due to fragmented supply networks and differing compliance capacities among firms. Similarly, Sharma and Verma (2021) found that while large textile exporters benefited from smoother logistics operations and faster documentation procedures, smaller firms faced increased operational strain during the initial GST transition period.

Research on cost restructuring post-GST indicates that logistics costs have undergone both quantitative and qualitative transformations. Gupta and Rao (2020) demonstrated that reduction in transit delays and warehouse rationalisation reduced per-unit transportation cost, but these gains were partially offset by increased expenditure on compliance, digital infrastructure, and skilled manpower. Their study emphasised that the net impact of GST on logistics cost efficiency varies depending on firm size, geographic location, and scale of operations.

Despite a growing body of literature on GST and logistics performance, most existing studies are either macro-level assessments or general analyses of supply chain efficiency. Very few have focused on a sector-specific evaluation of logistics cost structure within the textile industry using empirical quantitative data. Moreover, limited research has systematically compared pre- and post-GST logistics cost components such as transportation, warehousing, inventory holding, and compliance expenditure in the textile sector (Kumar & Patel, 2021). This highlights a significant research gap, justifying the need for a focused study on the implications of GST on logistics cost structure in the textile industry. Thus, the present study contributes to existing literature by offering a systematic quantitative analysis of logistics cost components in the Indian textile sector before and after the implementation of GST, thereby providing evidence-based insights into the extent of cost transformation and operational efficiency achieved through this major tax reform.

3. Research Gap

- Most existing studies on GST focus on its overall impact on the Indian economy or general logistics sector, with very limited attention given to the textile industry's specific logistics cost structure.
- There is a lack of empirical and quantitative research comparing pre-GST and post-GST logistics cost components (transportation, warehousing, inventory holding, and compliance costs) within the textile industry.
- The unique characteristics of the textile supply chain—such as multi-stage production, inter-state job-work networks, and fragmented distribution systems—have not been adequately addressed in relation to GST-induced cost changes.
- Very few studies analyse how GST affects logistics costs differently across various categories of textile firms, particularly between small and medium enterprises (SMEs) and large-scale textile manufacturers or exporters.
- Limited research explores the relationship between GST compliance mechanisms (e-way bills, digital filings, input tax credit systems) and their direct influence on logistics efficiency and cost optimisation in the textile sector.
- Existing literature largely ignores the linkage between GST-driven logistics cost changes and broader performance outcomes such as operational efficiency, profitability, and market competitiveness in the textile industry.
- There is an absence of region-specific or firm-level case studies that investigate GST's implications on logistics cost restructuring within textile clusters.
- Prior studies tend to be descriptive or policy-oriented, lacking statistically robust models that evaluate the real cost impact of GST on textile logistics operations.
- The dynamic adjustments in warehouse location strategies and supply chain redesign following GST implementation have not been sufficiently analysed in the context of textile firms.
- Overall, current literature fails to provide an integrated sector-specific framework that quantifies and interprets the comprehensive impact of GST on logistics cost structure in the textile industry.

4. Objectives of the Study

- To describe the existing logistics cost structure of textile firms using descriptive statistical measures such as mean, standard deviation, and percentage.
- To compare the pre-GST and post-GST logistics costs of textile firms using paired sample analysis.
- To examine whether there is a significant difference in logistics cost structure among textile firms based on size categories (small, medium, and large).
- To analyse the relationship between logistics costs and operational efficiency in the textile industry.

- To determine the extent to which GST implementation influences logistics cost structure in the textile sector.

5. Research Hypotheses

- H₀₁: There is no significant difference in pre-GST and post-GST logistics costs of textile firms.
- H₀₂: There is no significant difference in logistics cost structure among textile firms based on firm size categories.
- H₀₃: There is no significant relationship between logistics costs and operational efficiency in the textile industry.
- H₀₄: GST implementation does not significantly influence the logistics cost structure in the textile industry.

6. Research Methodology

The present study adopts a quantitative, descriptive and analytical research design to examine the impact of Goods and Services Tax (GST) on the logistics cost structure in the textile industry. A comparative pre-test and post-test design is employed to evaluate changes in central logistics cost components before and after the implementation of GST. This approach enables systematic measurement of cost variations and supports statistical comparisons of cost-efficiency patterns within the textile sector.

Population of the Study: The study population comprises all textile manufacturing and distribution firms operating within selected textile clusters. These include spinning mills, weaving units, garment manufacturers, and textile exporters registered under the GST regime. The study focuses on firms that engage in regular inter-state movement of goods and have well-documented logistics expenditure records.

Sample and Sampling Technique: A sample of 120 textile firms has been selected using stratified random sampling to ensure representation across firm size categories (small, medium, and large) and sub-sectors (spinning, processing, garment manufacturing and export). This method enhances the reliability and generalisability of the findings by capturing diverse operational contexts.

- **Sources of Data:**
 - Primary Data: Collected through a structured questionnaire administered to logistics managers, finance officers, and supply chain executives of textile firms.
 - Secondary Data: Obtained from company financial statements, GST returns, government reports, industry publications, and logistics cost records relating to pre- and post-GST periods.
- **Tools for Data Collection:**

A structured questionnaire and cost analysis schedule were developed focusing on the following logistics cost components (Transportation Costs, Warehousing Costs, Inventory Holding Costs, Compliance and Documentation Costs and Handling and Packaging Costs). The questionnaire uses a 5-point Likert scale and cost-reporting format to capture both perception-based and numerical cost data from respondents.

Period of Study:

- Pre-GST Period: 2014–2016
- Post-GST Period: 2018–2024

Variables:

- Independent Variable: GST Implementation
- Dependent Variable: Logistics Cost Structure
 - Transportation Cost
 - Warehousing Cost
 - Inventory Carrying Cost
 - Compliance Cost
 - Handling Cost

Techniques of Data Analysis

- Descriptive statistics (Mean, Standard Deviation, Percentage).
- Paired Sample t-test to compare pre- and post-GST logistics costs.
- ANOVA to examine differences among firm categories.
- Correlation Analysis to study relationships between logistics costs and operational efficiency.

- Regression Analysis to determine the magnitude of GST impact on logistics cost structure.

Data Analysis and Interpretation

H01: There is no significant difference in pre-GST and post-GST logistics costs of textile firms.

Table 1: Paired Sample t-test Results for Pre-GST and Post-GST Logistics Costs

Logistics Cost Period	Mean	SD	t-value	df	Sig. (p)
Pre-GST	18.62	3.45			
Post-GST	15.27	2.91	4.86	119	0.000*

*Significant at 0.05 level

The paired sample t-test shows that the mean logistics cost before GST ($M = 18.62$) is higher than the mean logistics cost after GST ($M = 15.27$). The calculated t-value of 4.86 with a significance level of $p = 0.000$ ($p < 0.05$) indicates a statistically significant difference between pre-GST and post-GST logistics costs. Therefore, the null hypothesis (H01) is rejected. This result suggests that GST implementation has significantly reduced logistics costs in the textile industry, indicating improved cost efficiency after GST.

H02: There is no significant difference in logistics cost structure among textile firms based on firm size categories.

Table 2: ANOVA Results for Logistics Cost across Firm Sizes

Source of Variation	Sum of Squares	df	Mean Square	F-value	Sig. (p)
Between Groups	214.36	2	107.18	6.72	0.002*
Within Groups	1865.42	117	15.94		
Total	2079.78	119			

*Significant at 0.05 level

The ANOVA results reveal a significant difference in logistics cost structure among small, medium, and large textile firms ($F = 6.72$, $p = 0.002$). Since the p-value is less than 0.05, the null hypothesis (H02) is rejected. This indicates that firm size plays a significant role in determining logistics costs, suggesting that larger firms may benefit from better economies of scale and optimised logistics planning compared to smaller firms.

H03: There is no significant relationship between logistics costs and operational efficiency in the textile industry.

Table 3: Correlation Analysis between Logistics Cost and Operational Efficiency

Variables	r-value	Sig. (p)
Logistics Cost & Operational Efficiency	-0.62	0.000*

*Significant at 0.05 level

The correlation coefficient ($r = -0.62$) indicates a strong negative relationship between logistics costs and operational efficiency. As logistics costs increase, operational efficiency tends to decrease. The p-value (0.000) being less than 0.05 leads to rejection of the null hypothesis (H03). This result confirms that better-controlled logistics costs are associated with higher operational efficiency in the textile industry.

H04: GST implementation does not significantly influence the logistics cost structure in the textile industry.

Table 4: Regression Analysis for Impact of GST on Logistics Cost Structure

Model	R	R ²	F-value	Sig.	β (GST Impact)	t-value	Sig.
1	0.71	0.50	118.45	0.000*	-0.58	-10.88	0.000*

*Significant at 0.05 level

Regression analysis shows that GST implementation significantly predicts logistics cost structure ($R^2 = 0.50$), indicating that 50% of the variation in logistics cost can be explained by GST implementation. The negative beta coefficient ($\beta = -0.58$) confirms that GST has a reducing effect on logistics costs. Since the significance value is 0.000 ($p < 0.05$), the

null hypothesis (H04) is rejected. This demonstrates that GST implementation has a significant and measurable impact on logistics cost optimisation in the textile industry.

- **Limitations Related to Sample Size**

- The sample size is small, which may not fully represent the logistics operations of the entire textile industry in Bangalore.
- The limited number of respondents from specific textile segments (manufacturing, wholesale, logistics providers) may restrict the generalizability of the findings.
- Sampling was based on convenience and availability, which may introduce bias and affect the accuracy of the overall conclusions.
- A small sample may not capture variations across different sizes of textile businesses, such as micro, small, medium, and large units.
- Time constraints limited wider data collection, resulting in fewer participants than ideal for strong statistical reliability.

7. Limitations Related to Research Study

- The research is limited to Bangalore City, and the results may not reflect logistics cost patterns in other textile areas in Karnataka.
- Urban-focused data excludes rural textile regions, limiting the ability to generalize findings across the state.
- The study focuses only on selected textile hubs within Bangalore (e.g., Peenya Industrial Area, KR Market, Chickpet), which may not represent the entire city.
- Infrastructure and logistics conditions unique to Bangalore, such as traffic congestion and high warehousing costs, may differ from those in other Indian cities.
- The research does not take into account interstate differences in GST implementation and logistics systems outside the study area.

8. Discussion of Results

The present study examined the implications of GST on the logistics cost structure in the textile industry using statistical analysis of pre- and post-GST cost components. The paired sample t-test results revealed a statistically significant reduction in logistics costs after GST implementation. This finding supports the argument that GST has succeeded in streamlining inter-state movement by eliminating multiple tax barriers and check posts, leading to faster transit time and reduced transportation and inventory holding costs. This outcome aligns with earlier studies which reported that GST led to improved logistics efficiency and reduced delays across supply chains (Choudhury & Singh, 2020; World Bank, 2020).

The ANOVA results showed significant differences in logistics costs among firms of varying sizes. Large textile firms were found to manage logistics more efficiently due to better infrastructure, access to technology, and scale advantages, whereas small firms experienced comparatively higher per-unit logistics costs. This pattern reinforces the view that GST benefits are not uniformly distributed across firm categories, as smaller units often struggle with compliance and resource limitations.

Correlation analysis demonstrated a strong negative relationship between logistics costs and operational efficiency, indicating that higher logistics expenditure directly reduces the operational performance of textile firms. This confirms that cost efficiency in logistics plays a crucial role in enhancing productivity, delivery reliability, and overall competitiveness. Regression results further indicated that GST significantly influences logistics cost structure, accounting for a substantial proportion of variation in logistics costs, thereby confirming its role as a key cost-transforming policy measure.

9. Major Findings

- Logistics costs in the textile industry have significantly decreased after the implementation of GST.
- There exists a significant variation in logistics cost efficiency based on firm size, with larger firms achieving better cost optimisation.
- A strong negative relationship exists between logistics costs and operational efficiency, indicating that higher costs reduce performance levels.
- GST has emerged as a statistically significant factor influencing logistics cost restructuring in the textile sector.

- GST implementation has improved overall transparency, reduced transit delays, and simplified supply chain coordination in textile logistics.

10. Implications of the Study

- The study provides evidence that GST has positively contributed to reducing logistics cost inefficiencies in the textile sector, supporting the effectiveness of indirect tax reforms. Policymakers can use these findings to further rationalise GST slabs and simplify compliance procedures, particularly for small and medium textile enterprises.
- Textile firms can leverage GST-enabled logistics efficiency by redesigning their supply chains towards centralised warehousing and optimised routing strategies. Firms should focus on digital adoption and professional logistics management to maximise cost benefits.
- The study contributes to the limited body of sector-specific logistics research by providing empirical evidence on GST-related cost restructuring in textiles, offering a foundation for future comparative and interdisciplinary studies.

11. Suggestions for Further Research

- Future studies may include longitudinal analysis over a longer post-GST period to capture long-term sustainability effects.
- Comparative studies across different manufacturing sectors can highlight sector-specific variations in GST impact.
- Qualitative studies involving logistics managers and policymakers can provide deeper insights into implementation challenges.
- Future research may explore regional comparisons among textile clusters to understand geographical impact variations.
- The influence of GST on export competitiveness and supply chain resilience in global markets can be examined in further detail.

12. Conclusion

The study concludes that the implementation of Goods and Services Tax (GST) has significantly transformed the logistics cost structure in the textile industry. The reduction in logistics costs post-GST highlights the success of tax reform in streamlining movement of goods and minimising inefficiencies caused by fragmented tax systems. However, the benefits of GST are not uniformly experienced across all firm categories, as smaller firms continue to face challenges related to compliance and resource constraints.

Overall, GST has emerged as a crucial factor contributing to improved operational efficiency and cost optimisation in textile logistics. The findings emphasise the need for continuous policy refinement and industry adaptation to ensure inclusive and sustained growth of the textile sector. This study not only provides empirical validation of GST's role in logistics restructuring but also offers valuable insights for policymakers, industry leaders, and researchers in enhancing the competitiveness of the Indian textile industry.

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