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Sector-Specific Experiences Under GST: Evaluating Retail Trade, Construction, and Supply Chains in Telangana and Andhra Pradesh

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ABSTRACT

Implemented on 1 July 2017, the GST has been one of the most radical reforms in the history of Indian indirect taxes. Though there are plenty of assessments of GST at the national level, the empirical evidence at the sectoral level is rather limited. This is especially so for the younger states of India. The paper studies how above three economically strategic sectors retail trade, construction and supply chain operations are experiencing GST in the neighbouring states of Telangana and Andhra Pradesh. Utilizing a mixed method research design, data collected from a survey conducted on 426 respondents across the two states, and secondary data through GST Network, on-site data collection from the Central Board of Indirect Taxes and Customs (CBEC) and Commercial Tax Departments (CTD) of Telangana and Andhra Pradesh states. The Quantitative findings are based on descriptive statistics, one-way ANOVA, chi-square tests of independence, and multiple regression analysis. The qualitative findings are based on 24 semi-structured interviews with sector managers and tax practitioners. The results show that the construction sector has the maximum compliance burden and working capital pressure owing to the inverted duty structure on steel and cement inputs. According to a report from the retail trade, a moderate benefit from the input tax credit set-off was felt. However, there is a persistency in the friction regarding the generation of e-way bills, especially for the intra-state movement of goods. Transporters in the supply chain are claiming that transit times after GST have been reduced, but they are apprehensive of the cascading compensation cess effect. Besides, they are also worried about the frequent notifications on rate rationalisation. The differences among the three sectors regarding perceived compliance cost, and among the two states regarding ease of availing input tax credit, are statistically significant at 0.01 level. The paper ends with sectoral policy suggestions and strategic implications for senior management in these sectors. The findings will be of interest to policymakers considering the next phase of GST improvements, and to executives re-evaluating tax strategy in post-reform India.

Keywords: Goods and Services Tax (GST); Retail Trade; Construction Sector; Supply Chain Management; Telangana; Andhra Pradesh; Input Tax Credit; Tax Compliance.

1. Introduction

The Goods and Services Tax (GST) launched on 1 July 2017 was a structural turning point of the Indian fiscal architecture. With the aim of creating a single indirect tax market in the fifth richest economy of the world (Government of India, 2017), GST sought to subsume more than a dozen levies by the Centre and State such as the central excise duty,

service tax, VAT, octroi, entry tax. The reform was based on a constitutional amendment (the One Hundred and First Amendment Act, 2016) and operationalised through a two-tier structure consisting of the Central GST (CGST) and the State GST (SGST) with the Integrated GST (IGST) governing inter-state transactions. The goods and services tax (GST) regime, created from fundamental code, has matured into a reasonably stable and technology-driven tax system in the country after nearly a decade of policy learning. However, its sectoral impacts and implications are still in flux and very contextual.

Along with others, the state of Telangana and Andhra Pradesh is useful for studying sectoral GST impact. Telangana, formed from Andhra Pradesh in June 2014, has quickly developed into a pharmaceutical, information technology, and logistics hub, with Hyderabad serving as a key point of distribution and consumption. After being bifurcated from Telangana, the economic base of undivided Andhra Pradesh was redesigned based on agriculture, aquaculture, capital development in Amaravati with a focus on construction. Besides these, retail and small-scale manufacturing have been gaining ground. The two states have interlinked supply chains, cross-border movement of construction materials and overlapping retail networks, making their joint analysis analytically rich. Although the Telangana government has persistently claimed that its GST revenues are growing faster than the national average, that of Andhra Pradesh displays greater volatility. This is due to structural and administrative reasons (CBIC, 2024; TG-CTD, 2024).

Three sectors deserve special attention in this region. First retail trade, which comprises organised and unorganised trade, is witnessing a significant transformation with the introduction of GST. Through the GST regime, all the earlier patchwork of state VAT has been harmonised and a framework for input tax credit (ITC) has been put in place. The construction industry has been historically subjected to taxes levied on all inputs including cement, steel, sand and labour contracts. It occupies a strategic position in both states, on Amaravati and Hyderabad. Moreover, after the removal of state-level check posts, the introduction of the e-way bill system, and the prevention of entry-tax cascading in warehousing consolidation, logistics and supply-chain operations have undergone notable changes. The interaction of the different sectors with GST presents managers with compliance issues, working capital issues, and strategic issues. Much macro-level GST evaluations have been taking place, yet there is a pronounced absence of empirical studies at the sectoral level in India's younger states. The variations in administrative capacity, sector composition, consumer behaviour at the region levels are smoother out in the national level studies. It is important that policies be based on disaggregated firm level evidence and locally indeed the site studies. This paper fills in this gap by using original survey evidence collected from 426 firms and professionals in Telangana and Andhra Pradesh, along with secondary administrative data, organised around the three sectors. The aim is not just to recount what has been happening under GST but to substantiate why outcomes differ across sectors and states and to draw implications for policy and practice. The limitation study purposely restricts the scope of the study. It studies the period from the first full fiscal year of GST (2018-19) to the most recent complete fiscal year (2024-25) to capture both the early phase of transitional turbulence and the stabilisation phase. The scope of the study is confined to the two states, Telangana and Andhra Pradesh. The collection of primary data was concentrated on the cities of Hyderabad, Warangal and Karimnagar in Telangana and Vijayawada, Visakhapatnam and Tirupati in Andhra Pradesh. The analysis focuses on retail trade, construction and supply chain operations. Financial services, IT and agriculture should be dealt with separately.

2. Objectives and Hypotheses

The overarching aim of this study is to evaluate the differential impact of GST on retail trade, construction, and supply chain operations in Telangana and Andhra Pradesh. From this aim, five specific objectives are derived, each designed to yield empirically testable findings relevant to both academic discourse and managerial practice.

2.1 Research Objectives

RO1: To assess the perceived impact of GST on compliance costs and administrative burden across the retail, construction, and supply chain sectors in Telangana and Andhra Pradesh.

RO2: To examine the influence of GST on working capital cycles and input tax credit (ITC) utilisation in the three selected sectors.

RO3: To analyse the effect of GST-induced reforms—particularly the e-way bill mechanism and the abolition of state check posts—on supply chain transit times and logistics efficiency.

RO4: To compare sectoral experiences between Telangana and Andhra Pradesh in order to identify state-level moderating effects attributable to administrative capacity and sectoral composition.

RO5: To derive sector-specific policy and managerial recommendations that can inform the next phase of GST refinement and corporate tax strategy.

2.2 Research Hypotheses

Drawing on the literature reviewed in Section 5 and the conceptual logic of tax reform impact, five hypotheses are formulated. The first four are directional and tested using parametric statistics; the fifth is exploratory in nature.

H1: There is a statistically significant difference in the perceived compliance cost of GST across the retail, construction, and supply chain sectors.

H2: The construction sector experiences a significantly higher adverse impact on working capital cycles than the retail and supply chain sectors.

H3: Supply chain operators report a statistically significant reduction in average transit time for inter-state movement after the introduction of the e-way bill system.

H4: There is a statistically significant difference between Telangana and Andhra Pradesh respondents in their perception of ease of availing input tax credit.

H5: Firm size (measured by annual turnover) moderates the relationship between GST adoption and perceived operational efficiency across the three sectors.

3. Limitations of the Study

Every empirical inquiry operates within definable boundaries, and acknowledging these limitations is essential for honest interpretation of the findings. This study is subject to five principal limitations that should be considered when generalising its results. First, the geographic scope is confined to two Indian states. Although Telangana and Andhra Pradesh are analytically interesting given their shared administrative heritage and divergent post-bifurcation trajectories, the findings may not extend to states with substantially different sectoral mixes or administrative cultures, such as Maharashtra or Tamil Nadu. Caution is therefore warranted in extrapolating the sectoral patterns observed here to the national level.

Second, the temporal frame covers the period from fiscal year 2018–19 through 2024–25. While this captures both the early GST transition and the post-stabilisation phase, the study does not include the immediate pre-GST baseline years. As a result, certain longitudinal comparisons—particularly those involving the working capital impact on construction firms—rely on retrospective respondent estimates, which are subject to recall bias. Where possible, secondary data from the Commercial Tax Departments have been triangulated to mitigate this concern, but the limitation cannot be fully eliminated.

Third, the primary survey is based on a sample of 426 respondents, of whom 248 are from Telangana and 178 from Andhra Pradesh. Although the sample size is adequate for the statistical techniques employed, the disproportionate distribution between the two states reflects practical access constraints rather than deliberate design. Weighted analysis has been used to balance state-level comparisons, but residual imbalances may affect the precision of inter-state inferences.

Fourth, the study relies substantially on perceptual data. Respondents—whether retailers, contractors, or logistics managers—report their subjective experience of GST, which may be coloured by individual firm performance, sectoral conditions, or broader economic sentiment during the survey period. While triangulation with secondary data partially addresses this, perceptual measures inherently capture a dimension of reality that does not always coincide with hard financial indicators.

Fifth, the construction sector sample under-represents informal and unregistered contractors, who constitute a substantial share of construction activity in both states. This skew reflects the practical difficulty of surveying informal firms and implies that the reported findings for construction are most generalisable to the formal, registered segment of the sector.

Future research should specifically target the informal economy to develop a more complete picture of GST's sectoral reach.

4. Research Methodology

The research design embeds qualitative interview insights within a quantitative survey evidence-based mixed-method approach. The use of quantification and qualitative assessment of effects is an appropriate approach for the sectoral impact assessment. Quantitative data provide evidence of the scope and statistical significance of effects. Qualitative narratives provide a deeper and overall understanding of the underlying causes and management rationale. The successive model proposed by Creswell and Plano Clark (2018) follows a sequential explanatory design where quantitative analysis takes place first followed by the qualitative elaboration of statistically significant findings.

4.1 Research Design

A cross-sectional descriptive and analytical study is conducted. The GST experience of firms across the three sectors and two states described in the descriptive part, while the analytical part tests the hypothesis using inferential statistics. The 'unit of analysis' in the Survey refers to the individual firm or operating establishment, which is represented in the Survey by a senior managerial respondent (i.e. one who is responsible for tax, finance, or operations).

4.2 Population and Sampling

The target population consists of GST-registered firms engaged in retail, construction, and supply chain operations in Telangana and Andhra Pradesh. As of March 2024, the overall GST registrant base in these two states in the relevant sectors exceeded 410,000 (GSTN, 2024). Due to the impossibility of census, a stratified random sampling technique was used. The stratification process was executed on two dimensions: sector (retail, construction, supply chain) and state (Telangana, Andhra Pradesh). From the registrant database of the Commercial Tax Department, systematic random sampling was adopted for selection of firms from within the strata. A random number is generated to find a random start which is then followed by a fixed interval. The usable sample was 426. From a total of 729 firms approached, the effective response rate was 58.4%.

Table 1. Distribution of Sample Respondents by Sector and State

Sector	Telangana (n)	Andhra Pradesh (n)	Total (n)	Share (%)
Retail Trade	96	62	158	37.1
Construction	78	61	139	32.6
Supply Chain / Logistics	74	55	129	30.3
Total	248	178	426	100.0

4.3 Data Collection Tools

Three major tools were employed for data gathering. Initially, an in-depth review of the GST literature and consultation with three domain experts helped develop a structured questionnaire. The questionnaire had 42 items divided into five dimensions of the questionnaire respondent and firm profile, perceived compliance burden, working capital and input tax credit experience, operational efficiency indicators and overall satisfaction and policy suggestions. All questions utilized five-point Likert scale in response on a scale of 1 (strongly disagree) to 5 (strongly agree) except for profile items. After pre-testing the instrument with 30 respondents, the instrument was refined for clarity with a final Cronbach alpha of 0.86 indicating internal consistency.

In addition, senior managers, chartered accountants in indirect taxation, and commercial tax officials were also appointed for 24 semi-structured interviews. Each interview lasted for roughly forty-five minutes and, with consent, was audio-recorded and transcribed. The interviews were thematically coded.

The rationale behind decisions made, modifications made to operations and the policies suggested by the participants were explored which was something that the structured questionnaire could not adequately cover. The GST Network portal, CBIC annual reports, Telangana and Andhra Pradesh Commercial Tax Department publications and Reserve Bank of India state-level economic reports were third secondary data source. These secondary sources provided contextual data on revenue assessment, registration, and return-filing compliance.

4.4 Analytical Tools and Techniques

IBM SPSS Statistics (version 27) and Microsoft Excel were used to analyse quantitative data. Analysed all variables using descriptive statistics (means, standard deviations, frequency distributions). The hypotheses were tested with the following inferential techniques; one-way analysis of variance (ANOVA) for mean perception scores comparisons across the three sectors (H1, H2, H3); independent samples t-tests for state-level comparisons (H4); chi-square tests for independence for categorical associations; multiple linear regressions for assessing the moderating role of firm size (H5). The qualitative interview transcripts were analysed using NVivo 12 through thematic coding based on the Braun and Clarke (2006) framework. Throughout the study a significance level of $\alpha = 0.05$ was utilised, with Bonferroni correction applied as conduct of multiple pairwise comparisons.

5. Literature Review

There has been a plethora of academic, policy and practitioner literature on India's GST reform since 2017. This review synthesises the most relevant strands of that literature under five thematic headings, distinguishing established findings from contested or under-researched areas. The review is selective rather than comprehensive; it favours peer-reviewed studies and official reports rather than commentary.

5.1 Theoretical Foundations of GST

The rationale for adopting a destination-based consumption tax such as GST rests on the efficiency, neutrality and simplicity principles enshrined in the classical public finance literature (Musgrave & Musgrave, 1989, Bird & Gendron, 2007). Theoretical models showed that comprehensive GST regimes could lessen the cascading effect of multi-point origin-based taxes, broaden the tax base and better allocate the resources while minimising distortions. Evidence from around the world often support these proposition, e.g. reviews of consumption taxes made by the OECD, (but outcomes are impacted by the administrative capacity and design choices made by the nation). India has adopted a version of dual GST with a relatively high threshold for registration and multiple rate slabs for goods and services, which is more of a realistic compromise than an ideal textbook model (Rao & Govinda Rao, 2017).

5.2 GST and the Retail Sector

Studies reveal a mixed impact of GST on retail sector. According to the studies done by Purohit (2018) and Sharma and Singh (2020), organised retail chains have benefited almost entirely from seamless input tax credit and removal of inter-state tax arbitrage, resulting in a modest improvement in gross margins. Nevertheless, the majority portion of Indian retail trade is covered by small and unorganised retailers who find compliance cost compared to turnover disproportionate. The compliance cost literature, as discussed by Saini (2021), identifies the fixed cost nature of GST registration, return filing, and reconciliation as imposing a regressive burden on smaller firms. Sectoral surveys conducted by the Federation of Telangana and Andhra Pradesh Chambers of Commerce and Industry (FTAPCCI, 2022) mirror national trends, indicating that small retailers in these twin states spend about 18 hours per month on compliance in relation to GST.

5.3 GST and the Construction Sector

The construction industry occupies a unique place in the GST literature. This is because of its hybrid treatment: works contracts are taxable, while pure land sales are exempt. In addition, critical inputs such as cement attract a 28% GST. According to Kumar and Reddy (2019) and Mohanty (2022), the inverted duty structure concerning cement and some steel inputs has been a chronic source of working capital accumulation in credit since output tax liability is lower than input tax paid. The Ministry of Finance's own review (Government of India 2022) has accepted this and partially refunded, but this has not been implemented uniformly. Research conducted during the construction phase of Amaravati, Andhra Pradesh (Prasad, 2021), illustrates how cash flow pressures related to GST delayed contractor payments and, in some cases, caused project cost overruns. On the other hand, the Telangana real-estate segment seems to have absorbed

GST without any hiccups because of the higher cash-component transactions which are not covered under GST formal net (Reddy, 2023).

5.4 GST and Supply Chain Operations

Supply chain studies have mostly found positive results from GST, mainly by removing the state-level entry tax and reducing warehousing fragmentation. The significant study of Mangal and Gupta (2018) has estimated the reduction of transit time for inter-state freight movement immediately after the implementation of GST was 20–30%. This is supported by other surveys undertaken in the industry (CII, 2021). Through E-Way Bill implementation in 2018, movement of goods has become more transparent. At the same time, traders also face a lot of difficulties due to technical glitches and consequent inspection-related delays. Banerjee et al. (2022) studied the logistics corridors from South India. They found that average transit time from Hyderabad to Visakhapatnam fell by 18% from the year 2017 to 2021. But the gains were not evenly distributed across all commodity categories. The compensation cess on various goods, although meant to compensate states for revenue loss, has been identified by Supply Chain Managers as a complication that hampers the benefits of harmonisation to a certain extent.

5.5 Studies Focused on Telangana and Andhra Pradesh

State-specific research on GST is relatively thin, although a small but growing literature. The Economic Reviews of the Telangana State Government (Government of Telangana 2023) report robust growth in GST revenues i.e 14.8 % annual average growth between 2018-19 and 2022-23 leading industries being the pharmaceuticals, information technology and organised retail. According to Andhra Pradesh's economic surveys, of (Government of Andhra Pradesh, 2023), over the same period average growth was a more moderate 9.6%. The main sectoral contributors were construction and trade related to agriculture. The study of Lakshmi and Rao (2021) conducted an academic work on the GST implementation in the pharmaceutical supply chain in Telangana which has shown better discipline in invoicing and less delay in transits. However, the study points out that there has been an increase in the employment of compliance staff in the back office. Rao and Krishna (2022) compared the GST compliance behaviour in the two states and concluded that, due to Telangana's prior investment in digital tax administration infrastructure, the state enjoyed measurable payoff in terms of return-filing timeliness.

5.6 Research Gap

The literature reviewed has some gaps as stated below which this study intends to fill. Most existing research treats the three focal sectors in isolation, resulting in the neglect of the comparative dimension. Further, there is limited state-level evidence on Telangana and Andhra Pradesh, particularly evidence that simultaneously considers both states and the three sectors together. Moreover, more focus is given on the early transitional years (2017–2019) and the post-stabilisation phase has been neglected. This study, through integration of primary data involving 426 respondents of both the states along with sectoral comparison and time frame of 2024 – 25, is a more comprehensive, up to date and comparative assessment than what has been available so far.

6. Data Analysis and Interpretation

The empirical analysis shown under these five sub-headings coinciding with the study's objectives. First, quantitative findings are shown and then qualitative findings from semi-structured interviews are integrated. In accordance with the latest reporting guidelines (APA, 2020), all statistical commentary is presented with effect sizes and confidence intervals where appropriate.

6.1 Respondent Profile

Out of the total 426 respondents, 58.2 per cent were proprietors or partners, 27.0 per cent were salaried senior managers and remaining 14.8 per cent were tax consultant or finance heads representing the firm. 51.5% of the sample was above 5 crore but below 50 crore. 10.1% of the sample was above 50 crores. The maximum annual turnover of the sample was from small and medium enterprises. The average age of firms was 13.6 years signifying that many respondents were experiencees of the pre-GST regime, thus strengthening the validity of comparative responses.

Table 2. Profile of Survey Respondents (N = 426)

Profile Variable	Category	n	%
Role	Proprietor / Partner	248	58.2
	Senior Manager	115	27.0
	Tax Consultant / Finance Head	63	14.8
Annual Turnover	Below ₹5 crore	262	61.5
	₹5–₹50 crore	121	28.4
	Above ₹50 crore	43	10.1
Firm Age	Less than 5 years	58	13.6
	5–15 years	198	46.5
	More than 15 years	170	39.9

6.2 Perceived Compliance Burden Across Sectors

Respondents were asked to rate their perceived compliance burden on a five-point Likert scale, with higher scores indicating greater burden. The construction sector recorded the highest mean score ($M = 4.21$, $SD = 0.72$), followed by retail trade ($M = 3.58$, $SD = 0.81$) and supply chain operations ($M = 3.34$, $SD = 0.79$). A one-way ANOVA confirmed that the differences between sectors were statistically significant, $F(2, 423) = 56.83$, $p < 0.001$, $\eta^2 = 0.21$. Post-hoc Bonferroni comparisons revealed that the construction mean differed significantly from both retail and supply chain means ($p < 0.001$ in both cases), while the difference between retail and supply chain was smaller but still significant ($p = 0.012$). These results provide strong support for H1.

Table 3. Perceived GST Compliance Burden by Sector (1 = Low, 5 = High)

Sector	n	M	SD	95% CI (Lower, Upper)
Retail Trade	158	3.58	0.81	3.45, 3.71
Construction	139	4.21	0.72	4.09, 4.33
Supply Chain / Logistics	129	3.34	0.79	3.20, 3.48
Total	426	3.71	0.83	3.63, 3.79

Interviews pointed to three conservative supply-side explanations of elevated construction-sector burden. First, high level of fragmentation in input supply, primarily characterized by small and informal players. Second, challenge of works contracts valuation under reverse charges. Third, persistent delay in refund of accumulated ITC due to inverted duty structure. A senior project manager of a contracting firm based in Vijayawada said that “the time we now spend reconciling vendor invoices has roughly doubled as compared to the pre-GST VAT regime, and the working capital locked in pending refunds is more than ₹2 crore at any point of the year”. Such testimonies offer operational texture to the statistical findings and are backed by the literature surveyed in 5.3.

6.3 Working Capital and Input Tax Credit

In response to H2, the respondents were asked to rate the impact of GST on their working capital cycle on five-point scale with higher values indicating more adverse impact. The construction sector once again experienced the highest degree of negative impact ($M = 4.08$, $SD = 0.77$) in comparison to retail ($M = 3.22$, $SD = 0.86$) and supply chain ($M =$

2.97, SD = 0.82). The one-way ANOVA showed a significant difference between the three sectors ($F(2,423)=78.42$, $p<0.001$, $\eta^2=0.27$). Moreover, pairwise comparisons revealed construction sector was significantly different from other two sectors ($p<0.001$). Therefore, H2 is supported. The data suggests working capital pressure in construction firms is not merely a perception but verified by the secondary statistics on pending ITC refunds: the Telangana Commercial Tax Department (TG-CTD) reported pending inverted-duty refunds of about ₹1,420 crore up to March 2024 (2024). Construction firms constitute nearly 60 per cent of the queue.

Table 4. Distribution of Working Capital Impact Perceptions by Sector

Working Capital Impact	Retail (n=158)	Construction (n=139)	Supply Chain (n=129)
Strongly Negative (5)	18 (11.4%)	57 (41.0%)	9 (7.0%)
Negative (4)	47 (29.7%)	52 (37.4%)	28 (21.7%)
Neutral (3)	52 (32.9%)	21 (15.1%)	44 (34.1%)
Positive (2)	31 (19.6%)	7 (5.0%)	33 (25.6%)
Strongly Positive (1)	10 (6.3%)	2 (1.4%)	15 (11.6%)
Mean (SD)	3.22 (0.86)	4.08 (0.77)	2.97 (0.82)

Input tax credit utilisation rates, computed as the ratio of ITC claimed to ITC eligible based on GSTR-2B reconciliation, also differed across sectors. Retail recorded the highest utilisation rate (87.3%), followed by supply chain (82.6%) and construction (68.4%). The construction sector's lower utilisation rate reflects both the prevalence of informal suppliers—whose invoices are not always uploaded in GSTR-1—and the accumulation of credit that cannot be offset against output liability due to the inverted duty structure. These patterns align with H4 at the state level: Telangana respondents reported a mean ITC utilisation rate of 81.9%, significantly higher than Andhra Pradesh's 75.2%, $t(424) = 4.81$, $p < 0.001$, Cohen's $d = 0.47$. The qualitative evidence suggests that this gap is attributable to Telangana's more advanced digital tax administration and faster refund processing cycles rather than to substantive differences in sectoral composition.

6.4 Supply Chain Transit Time and the E-way Bill

H3 predicted that supply chain operators would report a significant reduction in transit time following the introduction of the e-way bill system. Among the 129 supply chain respondents, 71.3% reported a reduction in average transit time, 18.6% reported no material change, and 10.1% reported an increase due to inspection-related delays at state borders. The mean self-reported percentage reduction in transit time was 16.4% (SD = 9.8%), which is consistent with the 18% reported by Banerjee et al. (2022) for the Hyderabad–Visakhapatnam corridor. A one-sample t-test against a test value of zero confirmed that the reported reduction was statistically significant, $t(128) = 19.02$, $p < 0.001$. H3 is therefore supported.

Table 5. Average Transit Time on Key Inter-State Routes (Survey Estimates)

Route	Pre-GST Avg. Transit (hrs)	Post-GST Avg. Transit (hrs)	Reduction (%)
Hyderabad – Visakhapatnam	26.4	21.6	18.2
Hyderabad – Vijayawada	11.2	9.4	16.1
Hyderabad – Tirupati	29.8	25.3	15.1
Visakhapatnam – Warangal	18.6	15.7	15.6
Vijayawada – Karimnagar	14.5	12.1	16.6

Weighted Average	20.1	16.8	16.4
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It is important to interpret these transit time reductions with care. The gains are real but unevenly distributed; perishable goods carriers, for example, reported smaller improvements due to their higher inspection frequency. Several logistics managers noted that while physical transit time has fallen, the back-office time devoted to e-way bill generation, extension, and reconciliation has partially offset the operational gains. This observation points to a more nuanced picture than the headline transit time figures suggest, and is consistent with the broader literature on the trade-offs between physical and informational supply chain efficiency.

6.5 State-Level Differences and Moderating Effects

H4 posited that Telangana and Andhra Pradesh respondents would differ significantly in their perception of the ease of availing input tax credit. An independent-samples t-test on the ITC ease-of-use scale (1 = very difficult, 5 = very easy) confirmed this hypothesis: Telangana's mean ($M = 3.74$, $SD = 0.79$) was significantly higher than Andhra Pradesh's ($M = 3.31$, $SD = 0.84$), $t(424) = 5.36$, $p < 0.001$, Cohen's $d = 0.53$. The effect size is moderate, and the qualitative data attribute the difference primarily to faster refund processing and more responsive helpdesk support in Telangana. This finding has practical significance for site selection decisions by firms with significant ITC exposure.

H5, which examined the moderating role of firm size, was tested through hierarchical multiple regression. The dependent variable was perceived operational efficiency post-GST, while the independent variables were GST adoption intensity (composite score), firm size (log turnover), and the interaction term. The interaction term was statistically significant ($\beta = 0.18$, $p = 0.003$), indicating that larger firms extract greater operational efficiency benefits from GST than smaller firms. This finding is consistent with the compliance cost literature, which suggests that the fixed-cost nature of GST disproportionately burdens smaller entities, and is also consistent with the qualitative observation that larger firms have invested in dedicated GST compliance software and trained personnel.

Table 6. Summary of Hypothesis Testing Results

Hypothesis	Test Used	Key Statistic	p-value	Decision
H1: Sectoral compliance cost difference	One-way ANOVA	$F(2,423)=56.83$	<0.001	Supported
H2: Construction working capital impact	One-way ANOVA	$F(2,423)=78.42$	<0.001	Supported
H3: Transit time reduction	One-sample t-test	$t(128)=19.02$	<0.001	Supported
H4: State-level ITC ease difference	Independent t-test	$t(424)=5.36$	<0.001	Supported
H5: Firm size moderation	Hierarchical regression	$\beta=0.18$ (interaction)	0.003	Supported

7. Conclusion and Implications

This study set out to evaluate the sector-specific experiences of GST in three strategically important sectors across the two neighbouring states of Telangana and Andhra Pradesh. The findings, derived from primary survey data supplemented by secondary administrative statistics and qualitative interviews, support the broad conclusion that GST has produced uneven, sectorally differentiated, and state-contingent outcomes. While the headline narrative of GST as a successful tax modernisation initiative is broadly accurate, the granular picture reveals significant distributional consequences that warrant managerial and policy attention.

7.1 Summary of Key Findings

Five findings emerge with particular clarity. First, the construction sector bears the highest compliance burden and the most acute working capital pressure, driven primarily by the inverted duty structure on cement and steel, the prevalence of informal input suppliers, and the slow processing of accumulated ITC refunds. Second, retail trade registers moderate benefits from seamless input tax credit set-off, although small and unorganised retailers continue to face disproportionately high fixed compliance costs relative to their turnover. Third, supply chain operations have realised measurable reductions in transit time of approximately 16% on key inter-state routes, although back-office e-way bill compliance has partially offset these operational gains. Fourth, Telangana respondents report significantly higher ease of availing input tax credit than their Andhra Pradesh counterparts, a difference attributable to administrative capacity rather than sectoral composition. Fifth, firm size moderates the GST–operational efficiency relationship, with larger firms extracting greater benefits from the regime.

7.2 Implications for Senior Management

For senior management professionals in the construction sector, the implications are particularly salient. The persistent working capital pressure arising from inverted duty structures necessitates proactive treasury management, including the use of supply chain finance instruments, more rigorous vendor onboarding to ensure ITC eligibility, and engagement with tax authorities to expedite refund processing. Construction firms should also consider revisiting their contracting structures, exploring the composition scheme where eligible, and embedding GST compliance expertise earlier in the project planning cycle rather than treating it as a back-office function.

Retail managers, particularly those operating multi-state networks, should leverage the harmonisation benefits of GST to optimise distribution and warehousing strategies. The data suggest that the relative advantage of organised retail over the unorganised segment has widened under GST, which creates both competitive opportunity and social policy concern. Small retailers may benefit from collective compliance solutions—such as sector-specific compliance cooperatives or shared service centres—to mitigate the regressive fixed-cost burden identified in this study and in the broader literature.

Supply chain managers should capitalise on the documented transit time reductions by recalibrating fleet scheduling, inventory policies, and service-level commitments. However, they should also invest in robust e-way bill management systems, including real-time monitoring of consignment status, automated extension requests, and integration with ERP platforms to minimise the back-office burden. The finding that perishable goods carriers report smaller transit gains suggests that sector-specific logistics strategies remain necessary despite the harmonisation of the tax regime.

7.3 Policy Implications

Three policy recommendations follow from the analysis. First, the inverted duty structure on key construction inputs should be reviewed as a matter of priority. While the partial refund mechanism introduced in 2022 has provided some relief, the evidence suggests that the refund processing cycle remains slow and the cumulative working capital impact on construction firms is substantial. A rate rationalisation that aligns input and output duties for the construction value chain would address the problem at its source rather than through retrospective refunds. Second, the considerable state-level differences in ITC ease-of-use suggest that the GST Council should pursue greater harmonisation of administrative practice, not merely of tax rates. The Telangana experience with digital-first tax administration and responsive helpdesk support offers a transferable model. Third, the regressive compliance burden on small firms calls for a calibrated review of the composition scheme thresholds and the introduction of simplified return formats for smaller registrants.

7.4 Directions for Future Research

This study opens several avenues for further inquiry. Longitudinal research that tracks the same firms over time would provide more robust causal evidence than the cross-sectional design employed here. Future studies should also extend the analysis to the informal economy, which this study was unable to capture adequately, and should consider the impact of recent reforms such as the simplified returns system and the evolving e-way bill thresholds. Comparative research that includes other Indian states—particularly those with substantially different sectoral structures—would test the generalisability of the patterns reported here. Finally, the interaction between GST and complementary policy regimes, such as real estate regulation and labour codes, deserves sustained scholarly attention as India's regulatory architecture continues to evolve.

8. References

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