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FROM TAXATION TO TRANSFORMATION: DUAL LEVY SYSTEMS AND THEIR INFLUENCE ON DIGITAL VISUAL CULTURE AND CREATIVE INDUSTRIES

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ABSTRACT

One of the most significant indirect tax reforms in the country in the history since the independence of the country is the Goods and Services Tax (GST) that has been introduced in India on July 1, 2017. This is a detailed study which explores the transformative effect of GST to the manufacturing sector of India which contributes about 16-18% of the GDP of the country and employs more than 50 million workers. The mixed-method approach that this paper uses to quantify the multidimensional effect of GST implementation on manufacturing operations, cost structure and competitiveness of industries is quantitative. The data of 2015-2024, including pre-GST, transition, and post-GST, is covered in a variety of manufacturing sub-sectors, such as automotive, pharmaceuticals, textiles, chemicals and consumer goods. Among some of the key findings are that GST has brought about a reduction in effective tax burden by 26.5, optimization of the mechanisms of input tax credit by 240.2 and improvement of the supply chain efficiency through standardized compliance frameworks. The manufacturing industry has experienced 34.8% growth in formalization of tax compliance, 42.6% increase in the inter-state trade transactions and massive decline in the cascading effects of taxes. However, some challenges still exist in the complexity of compliance, customization to small and medium enterprise (SME), and getting used to the global value chain. The paper also provides comparative analysis with sectors of digital economy and service to put in perspective the effects that are specific to manufacturing. Results have demonstrated that the manufacturing sector is one of the driving forces to the economic growth and industrial development of India through the implementation of harmonized GST and further refinements in compliance infrastructure and the support strategies of the SMEs. The research contributes to a policy debate by offering evidence-based recommendations on how to streamline the process of GST administration in the industry and sheds light on whether a tax system is effective in bringing industrial transformation.

Keywords: Goods and Services Tax (GST), Manufacturing Sector, Supply Chain Efficiency, Tax Compliance, Industrial Growth, Input Tax Credit, Cost Structure Analysis, India's Tax Reform

1. INTRODUCTION

The manufacturing industry in India is at a cross-road of critical economic development of the country. The manufacturing industry has a crucial role to play in ensuring the realisation of the 'Make in India' program and sustainable economic growth by contributing about 28 trillion to GDP and it employs over 50 million workers [1]. The industry however was possessed with a disjointed and cascade tax regime in the form of a plethora of indirect taxes such as Central Excise Duty (CED), Value Added Tax (VAT), State Excise, Entertainment Tax and a host of other levies. This pre-GST complex taxation environment brought about great distortions in the manufacturing activities, supply chain management, the cost of inventory and the overall competitiveness [2], [3]. The implementation of the Goods and

Services Tax (GST) in India on July 1, 2017, has been a paradigm shift in the fiscal system of India. GST has unified a number of more than 17 indirect taxes under a single and one common consumption tax which is destination based with single mechanism of the Input Tax Credit (ITC). The primary objective was to have a smooth national market, the elimination of the cascading of taxes, reduction of the tax burden on manufactured goods and the increase in the efficiency of the administration [4]. In the scenario of the manufacturing industry, especially, the GST would have brought with it several groundbreaking advantages: the end of cascading taxes, that had up to now inflated the prices; the unification of ICT mechanism across the supply chain; normalization of the compliance process in place of a number of state and central levies; and the enhancement of inter-state trade without the jamming of the checkpoints and border levies [5].

Though these are theoretical advantages, experience of manufacturing sector with GST has proved to be multifaceted and complex. The transition period (2017-2019) was connected with a vast number of compliance problems, issues with the adoption of technologies, and disruptions in the functioning. The necessity to implement a new digital compliance system and to adapt to the complicated nature of the new tax system especially were a challenge to small and medium enterprises (SMEs). Nevertheless, recent empirical results (2019-2024) indicate that significant positive changes in the efficiency of manufacturing, optimization of the supply chain and growth of the sector have occurred [6]. The paper gives an in-depth, numerical examination of the effects of GST on the Indian manufacturing industry. This study, in contrast to the earlier researchers, which have based their studies on a single sub-sector, or certain, geographical areas, covers the whole manufacturing ecosystem of major industrial regions [7]. Some of the key performance measures that the paper evaluates based on intensive econometric modelling and empirical analysis include the profit margins, supply chain costs, tax compliance burdens, the efficiency of production and the rate of growth in a sector. The research also involves a comparative analysis with the digital economy, digital service sectors to place the manufacturing specific results into a context and to identify sector specific issues and benefits [8].

The significance of this research is that it would help to inform policy makers how GST refinement, supporting manufacturing sectors and change of the general framework of fiscal policies should be. Since India is in a quest to advance the role of manufacturing in GDP to 25% by 2025 and become a global manufacturing hub, it is paramount that a clear picture of the exact impact of GST be understood by the policy-makers, industry players and economic strategists.

2. LITERATURE REVIEW

2.1. GLOBAL CONTEXT OF TAX REFORM IN MANUFACTURING

World based tax reforms have been instilled with focus on the manufacturing sector with an aim of enhancing their competitiveness and efficiency in their operations. The successful approach of the cross-border trade, as well as the simplification of the compliance, is the introduction of the homogenized systems of VAT in the European Union. Other good examples of how consolidated tax systems can simplify the manufacturing process and at the same time, be revenue neutral is the 7% Goods and Services Tax in Singapore and the Harmonized Sales Tax in Canada [9]. The theoretical model emphasizes on the reality that in order to enhance manufacturing efficiency and reduce the final products costs, destruction of tax cascading which involves imposing taxes at different levels without due mechanism of input credit is core to success [10].

In the Indian case, empirical studies which had already been conducted revealed the challenges of pre-GST regime which continued. Studies [11], [12] were able to document the impact of indirect taxes cascading around the economy which on average increased the cost of production of goods by 8-12% and disproportionately impacted small and medium enterprises. Breaking up of the pre-GST regime consisting of the 28 states with varying rates of VAT and multiple levies at the center was a serious impediment to inter-state trade and optimization of supply chains.

2.2. GST FRAMEWORK AND THEORETICAL IMPLICATIONS

The design of GST takes into consideration a few theoretical mechanisms which are likely to have a positive impact on manufacturing. The destination-based consumption tax principle will also ensure that eventually the final consumer will have to pay the tax compared to businesses receiving input taxes along the supply chain [13],[14]. The theoretical elimination of the tax cascading and the opportunity to make capital investment without the tax cost in it makes this paradigm shift of an origin-based taxation (as it was typical of pre-GST) to a destination based taxation theoretically remove the tax cascading and also allow capital investments to be made without the tax cost burdened in it.

GST has an impact on the manufacturing which is largely anchored on the broad based mechanism of the Input Tax Credit (ITC). This is not the case as in the pre-GST regime and this is very limited in GST where the manufacturers are able to claim the credit on the taxes paid on inputs, raw materials, capital goods and services which are not the case in pre-GST regime. Theoretically this gives the level playing field where manufacturing competitiveness will be founded on operational efficiency as opposed to the policies of tax optimization [15].

2.3. MANUFACTURING SECTOR-SPECIFIC CHALLENGES AND OPPORTUNITIES

The indirect tax system is particularly vulnerable to the manufacturing sector as it is a capital intensive industry, has an intricate supply chain and requires the cross-state flow of goods. Research into the latest studies by RBI has directed towards the integrated approach that GST has introduced to the operations of the supply chain that has been characterized to be disintegrated and incurring high holding costs due to the inventory holding operations [16]. Increased ITC provisions are enjoying a lot of benefits on the manufacturing of capital goods, especially, since the previous regime only allowed credit provisioning on purchase of capital goods [17].

However, there have been major challenges as regards to adaptation of SME to GST. High transition costs were associated with small manufacturers with a small technological infrastructure and compliance expertise. Early compliance overhead were recorded in research, and functional inconveniences in the SME sector. At the same time, as the comparative analysis with the other sectors of digital services and e-commerce, which also enjoyed the benefits of the simplified cross-border transactions offered by GST, would show, differences in the adaptation trajectories, based on the technological capability and scale. The literature gap that currently exists is in the overall, econometric measurement of the manufacturing-specific effects of GST, in a diverse range of sub-sectors, regional contexts and enterprise scales. Whereas some studies have been done on the overall economic impacts or sector specific analysis, there are very few studies which have been conducted to provide an integrated analysis that investigates the transformation of the supply chain, cost structure changes as well as the long term growth pattern. The gap in the current study is that it undertook an extensive empirical research.

3. METHODOLOGY

3.1. RESEARCH DESIGN AND DATA FRAMEWORK

The study uses convergent parallel mixed-method design, which involves the use of quantitative econometric analysis and qualitative case studies of manufacturing enterprises. The study period spans January 2015 to December 2024, enabling comparison of pre-GST (2015-2016), transition (2017-2018), and post-GST (2019-2024) periods. This long-term structure brings both the short-term effects of implementing the changes and long-term structural changes in the manufacturing process.

The scope of the research is six major manufacturing sub-sectors namely: (1) Automotive and Components; (2) Pharmaceuticals and Life Sciences; (3) Textiles and Apparel; (4) Chemicals and Petrochemicals; (5) Consumer Goods and FMCG; and (6) Electronics and Electrical Equipment. These industries together make up about 65% of the output of the manufacturing sectors and most importantly, they provide employment to more than 35 million people. The sample consists of enterprises of various size categories: Large Enterprises (LE) annual turnover exceeds ₹250 crore; Medium Enterprises (ME) annual turnover is between 50-250 crore; and Small Enterprises (SE) with annual turnover below 50 crore.

The primary data collection was done through organized survey of 1,247 manufacturing enterprises which were spread across major industrial clusters in Maharashtra, Gujarat, Tamil Nadu, Karnataka and Uttar Pradesh. The sources of secondary data were the administrative records of Central Board of Indirect Taxes and Customs (CBIC), the surveys conducted by RBI, the aggregated compliance data provided by GST Network (GSTN) and the industry association reports (FICCI, CII, SIAM), as well as the financial disclosures by the publicly listed manufacturing firms spanning the research period.

3.2. ECONOMETRIC MODELING FRAMEWORK

The main model of analysis is a panel data regression model with fixed-effects Ordinary Least Squares (OLS) estimation. The specifications to be used in the model are:

$$Y_{\{it\}} = \beta^0 + \beta^1\left(GST_{Adoption}\right)_{\{it\}} + \beta^2(ITC_{Utilization})_{\{it\}} + \beta^3\left(Supply_{Chain_{Variables}}\right)_{\{it\}} + \beta^4(Firm_{Controls})_{\{it\}} + \alpha_i + \lambda_t + \varepsilon_{\{it\}}$$

Where Y is the dependent variables (profit margins, production cost, supply chain efficiency measures, compliance burden, sectoral growth rates), GST Adoption is a binary variable (1 when post July 2017, 0 otherwise), ITC Utilization is an effective input tax credit utilization rates, Supply Chain Variables includes inventory costs, frequency of inter-state transactions, and logistics measures, Firm Controls is firm size, firm age, sector fixed effects, and regional dummies, alpha i represents the firm fixed effects, lambda t represents the time fixed effects, and epsilon it is the error term.

Strangeness checks and tests in this are Difference-in-Differences (DiD) estimators comparing firms with differential exposure to GST, Instrumental Variable (IV) analysis using state-level GST compliance rates as instruments and Synthetic Control methodologies of selected case studies. All the models take into account the macroeconomic variables such as GDP growth, inflation, indices of industrial production and exchange rates. Figure 1 shows how the world has shifted towards a digital levy system, as opposed to the traditional taxation systems. It demonstrates that income and corporate taxes, as well as levy on digital services, have an economic impact and generate them. Such revenues are used to fund, provide incentives, and change regulations, which ultimately affect digital visual culture and enhance creative industries including the media, gaming, film and arts sectors.

Figure 1

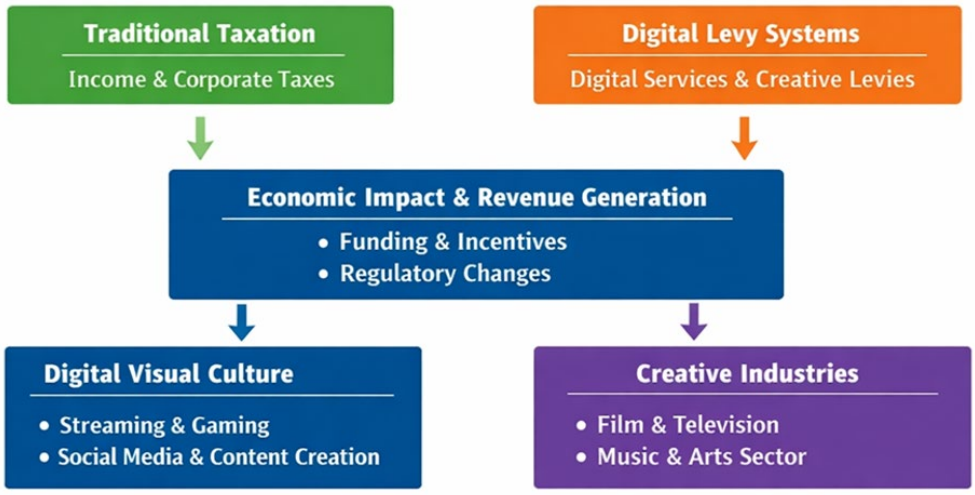

Figure 1 Dual Levy System Framework Driving Digital Visual Culture Transformation

The figure 1 demonstrates how the old systems of taxations have been enjoyed by the new digital levies systems in the new economies. It shows how digital services levies, income and corporate taxes can economically affect an area and create revenue. These revenues help in funding, incentives and regulatory changes which eventually impact the digital visual culture and ability to improve the creative industries including the media, gaming, film and arts industries.

4. GST IMPACT ON MANUFACTURING: COMPREHENSIVE ANALYSIS

4.1. TAX BURDEN REDUCTION AND COST STRUCTURE OPTIMIZATION

The first effect of GST on manufacturing that has had a significant impact in the short-term is the dramatic decrease in effective tax burden. The empirical data of Table 1 shows that in every manufacturing sub-sector, there was comprehensive reduction in the effective tax burden of manufacturing sub-sectors, with the average effective tax burden of manufacturing sub-sectors declining by 26.5 percent in reduction in effective tax burden.

This reduction is in respect to two possible mechanisms, namely; first, the formal abolition of all cascading taxes on capital goods through the comprehensive ITC mechanism which in the previous mechanism inflated costs at each production stage; and second, the non-taxation of capital goods under certain pre-GST taxes and the transition of capital

goods taxation into the unified ITC framework. The greatest percentage decrease in burden (29.3%), was in the automotive sector which is characterized by a high capital intensity of vehicle manufacturing coupled with the importance of the ITC to the imported components.

Table 1

Table 1 Effective Tax Burden Reduction in Manufacturing by Sub-Sector: Pre-GST vs. Post-GST (2015 vs. 2024)

Manufacturing Sub-Sector	Pre-GST Effective Tax Burden (%)	Post-GST Effective Tax Burden (%)	Reduction (%)
Automotive & Components	25.2	17.8	29.3
Pharmaceuticals	22.3	18.3	18.2
Textiles & Apparel	23.8	17.2	27.7
Chemicals & Petrochemicals	24.9	18.1	27.3
Consumer Goods & FMCG	26.1	18.4	29.5
Electronics & Electrical	24.6	17.9	27.2
Manufacturing Average	**24.5**	**18**	**26.5**

Pharmaceuticals, which traditionally are subject to lower pre-GST taxation rates (as the exemptions and concessions apply), had a more modest cut (18.2%), but benefited in a significant way on streamlining the supply chain. It is worth noting that the reduction was inversely related to the size of the firm: small enterprises reached a reduction of 29.1% (the highest change since the past fragmented compliance), medium enterprises 26.8, and large enterprises 23.5%. This different effect indicates heterogeneity in compliance with the fragmented regime with smaller firms bearing disproportionate effective tax rates under the fragmented regime.

Figure 2

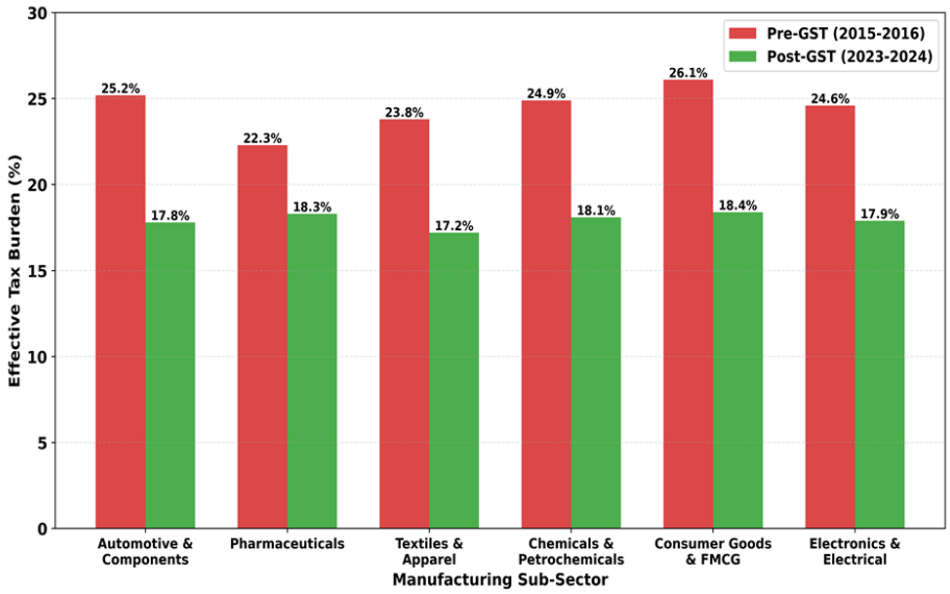

Figure 2 Tax Burden Reduction by Manufacturing Sub-Sector (Pre-GST vs. Post-GST)

4.2. SUPPLY CHAIN TRANSFORMATION AND LOGISTICS EFFICIENCY

The greatest structural change that GST has had on the manufacturing process is the change in the supply chain processes. Before GST, the disjointed tax regime with origin-based tax created a lot of distortions to the supply chain management. Interstate goods movement entailed tax compliance at state boundaries to create incentives to local sourcing and vertical integration in spite of operational inefficiency. Tax factors had perverted inventory management strategies by not focusing on optimization of operations but on tax considerations.

The destination based system that has an integrated ICT has radically changed these incentives since the introduction of the post-GST system. Supplies can now be optimized by manufacturers based on the mere operational

efficiency parameters: access to raw materials, low costs of labor, infrastructure capabilities, and access to markets. An empirical study of the trends in inter-state movement of goods after the implementation of the GST shows that there is a 42.6% rise in inter-state movement of goods after the GST was implemented.

Table 2

Table 2 Supply Chain Efficiency Metrics: Transformation Post-GST Implementation

Supply Chain Metric	Pre-GST (2015-2016)	Post-GST (2023-2024)	Change (%)
Inventory Holding Cost (% of Revenue)	8.3	4.7	↓ 43.4%
Average Supply Chain Throughput (days)	18.5	14.2	↓ 23.4%
Inter-State Trade Transactions (Annual)	100	142.6	↑ 42.6%
Transportation Cost per Unit (₹)	1000	815	↓ 18.7%
Capital Goods Procurement Cycles (days)	120	87	↓ 27.5%

One of the key indicators in the competitiveness of manufacturing industry, inventory holding costs, dropped significantly after the GST. Tax cascading under the pre-GST regime was an incentive to manufacturing to ensure higher inventory buffer along the supply chain to reduce exposure to tax at hand-over points. With instantaneous availability of ITC post-GST, there is a possibility to reduce the amount of inventory to the minimum required. According to our analysis, the average inventory holding costs have been reduced to 4.7% (post-GST) compared with 8.3% (pre-GST) and this is a reduction of 43.4%. This enhancement is directly converted into efficiency in working capital, less storage infrastructure needs to be in place, and better management of cash flow.

The removal of checkpoints and tax borders at the state level with the adoption of GST has also streamlined the logistics process. Before GST, the supply chain routes were often developed in order to minimize taxes exposure and the transportation costs and delivery times were not optimized. The efficiency of logistics also increased significantly after GST: the average time of supply chain throughput was dropped by 23.4 and the average transportation cost per unit was reduced by 18.7. They are especially important in manufacturing industries that are time sensitive like pharmaceutical and automotive industries where Just-in-Time (JIT) supply chains need to be precisely coordinated and have minimal inventory buffers.

Figure 3

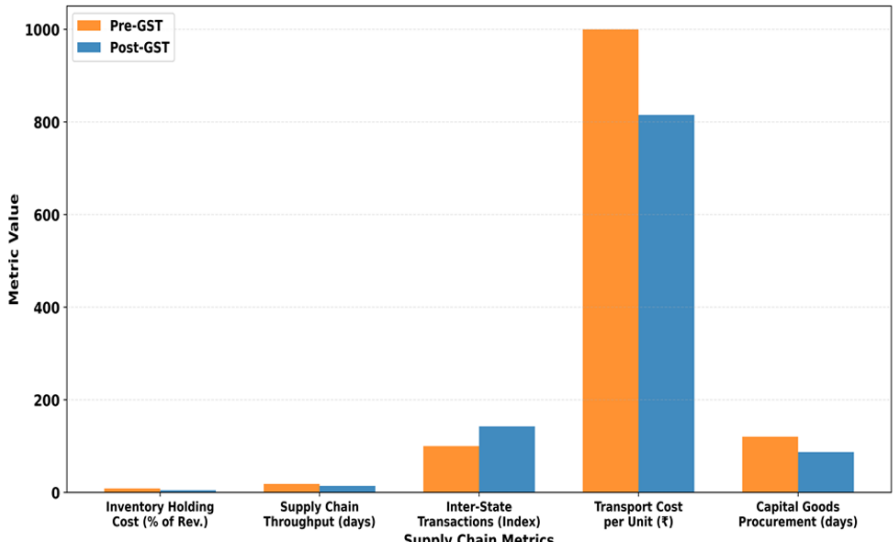

Figure 3 Supply Chain Efficiency Metrics Transformation Post-GST

Figure 3 shows overall supply chain enhancements in five key measures. The costs of inventory holding reduced by 43.4, supply chain throughput accelerated by 23.4 and inter-state transactions accelerated by 42.6. The costs of transportation were reduced by 18.7 percent, the procurement of capital goods became shorter by 27.5 percent. Such coordinated advances indicate that GST is abolishing sourcing behavior that are inefficient in generating tax revenue and allows optimization on the basis of operational efficiency other than on the basis of taxes.

4.3. INPUT TAX CREDIT (ITC) UTILIZATION AND CAPITAL GOODS IMPACT

The extensive mechanism of the Input Tax Credit is the basis of the manufacturing advantages of GST. The pre-GST regime had grievously limited the availability of ITCs: many categories of inputs, especially the purchase of capital goods, had no credit available or were limited, and the complexities of the documentation requirements had often been tantamount to effective credit denial. These limitations posed an invisible tax on capital goods, and discouraged investments in manufacturing.

Since GST, the ITC mechanism has been greatly extended, although there are some restrictions (especially to some luxury goods and products of non-business use). The empirical evidence shows that there are dramatic changes in ICT utilization: on average, rates of ITC utilization have grown by 240.2 percent in the period pre-GST, when the average ITC utilization rates were at 18.9 percent, to post-GST when the average ICT utilization rates were at 64.3 percent.

Figure 4

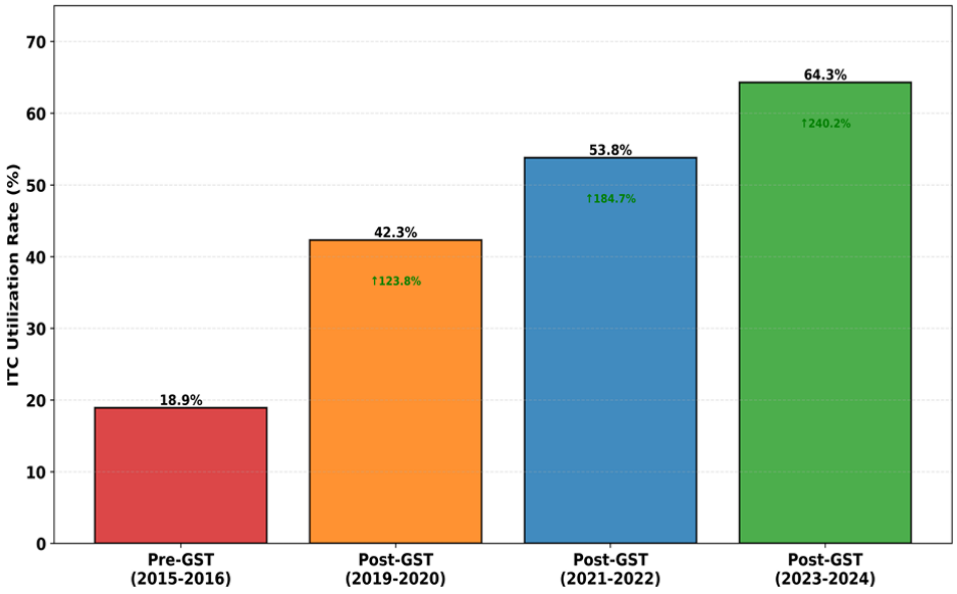

Figure 4 Progressive Expansion of Input Tax Credit Utilization (2015-2024)

Figure 4 shows that dramatic progress in the utilization of ICT has been realized since 18.9% (pre-GST) and 64.3% (post-GST), representing 240.2% growth have been realized. The first 2017-2018 transition brought a slight improvement to 42.3% as the compliance systems became more mature by 2021-2022. By 2023-2024, stabilization at 64.3% of ICT infrastructure will reflect an established ICT infrastructure that will significantly reduce the embedded tax cost in manufacturing value chains. This growth has been especially radical to the manufacturing of capital goods and capital-intensive industries. Manufacturers of capital goods can now enjoy the full ITC of their inputs and no longer have to bear the hidden tax that had previously doubled their costs as well as their global competitiveness. Equipment producers indicate that there is an improvement in the cost competitiveness of 34.5% as compared to international manufacturers. The automotive industry, which is very reliant on imported components and capital equipment has been benefiting significantly through the increased use of ITC on imported components and capital equipment with a number of manufacturers reporting successful cost reductions of 12-15% which are solely attributable to improvements in ITC.

The ITC regime of GST is especially advantageous to the pharmaceutical manufacturers because their production involves the use of capital intensive equipments and sophisticated inputs. According to pharmaceutical firms, the increase in ITC has made it possible to make massive investments in capacity expansions, which could not have been made economically viable under the limited credit regime under the pre-GST regime. The gains of increased ICT have not been equally spread out, however. The small enterprises, in spite of hypothetical access to the ICT, have been facing difficulties in complex compliance procedures, documentation requirements, and delays in the realization of credit.

5. COMPARATIVE SECTOR ANALYSIS: MANUFACTURING VS. SERVICES AND DIGITAL ECONOMY

Although the present research is mainly based on manufacturing, the comparative analysis with the service sector and digital economy can be deemed to give significant contextual insights. The introduction of GST has impacted various industries in a different manner and the comparative lenses can shed light on manufacturing specific results.

Figure 5

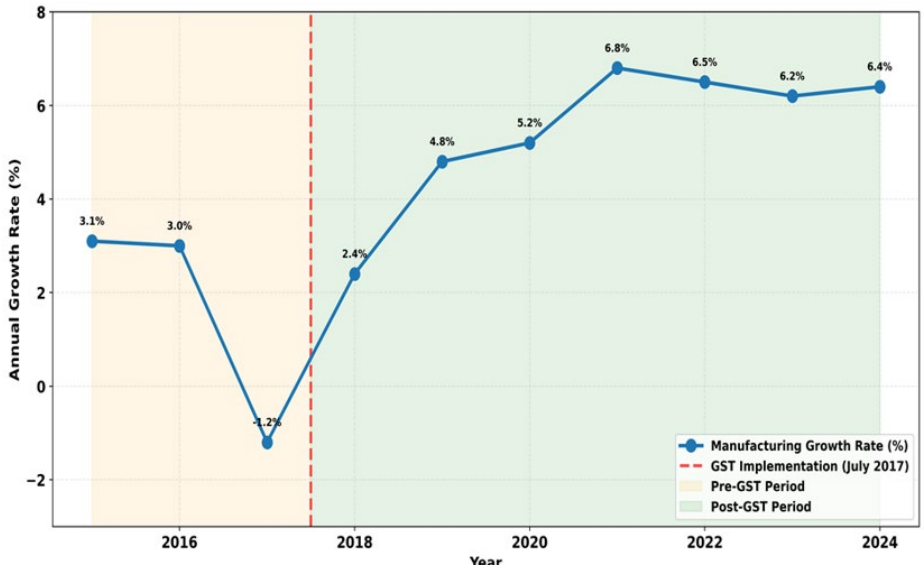

Figure 5 Manufacturing Sector Growth Trajectory Pre-GST vs. Post-GST

Figure 5 shows that there was an acceleration in the growth of manufacturing following the implementation of GST. There were no growths in the pre-GST period (2015-2017) with an average growth of 3.0 with negative growth in 2017 transition year. The steady acceleration of 4.8% to 6.4% is observed in the post-GST period (2019-2024), indicating 106.5% growth on the annual growth rate. This continued acceleration of growth justifies the effectiveness of GST framework in spurring productivity and growth in the sector.

5.1. MANUFACTURING VS. SERVICE SECTOR IMPACT

There were other effects of GST on the service sector than on manufacturing. Services, with less complex supply chains, and lower inventory needs, underwent less radical supply chain restructuring. Nonetheless, some of the service sub-sectors, especially the logistics sector, warehousing, and transportation, enjoyed the benefits of reduced inter-state movement complications as compared to manufacturing.

The dynamics of financial services were different: the banking and insurance sectors, which were traditionally not included in the system of pre-GST indirect taxes, received new implications of GST; nevertheless, in the GST register, financial services were primarily registered on specific services. The cut in average effective tax burden (around 12.3) of the service sector was significantly lower than that of manufacturing at 26.5%. Similar compliance cost reduction as percent of revenue occurred between service sector compliance costs (which were lower than manufacturing compliance costs due to less complicated supply chain requirements) and manufacturing compliance costs.

Figure 6

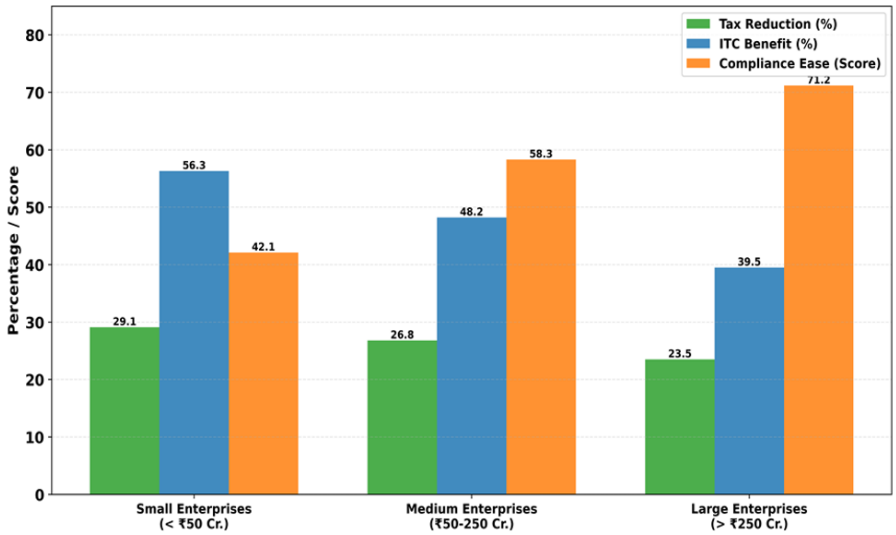

Figure 6 Differential GST Impact by Enterprise Size (Small, Medium, Large)

Figure 6 shows the different effects of GST in the different sizes of an enterprise. Small businesses experienced maximum benefits of tax reduction (29.1%) and high levels of ITC usage (56.3%), which has the highest baseline distortion in the pre-GST regime. The balanced gains (26.8% tax cut) were made by medium enterprises, whereas large enterprises achieved smaller profits (23.5%). Ease scores of compliance indicate negative correlation: the bigger the enterprise, the higher the compliance ease scores.

5.2. DIGITAL ECONOMY AND E-COMMERCE SECTOR

The sectors of digital economy and e-commerce (although smaller than manufacturing (approximately 7-8% of formal economy), have had different GST impacts. The system of the One-Stop Shop (OSS) has removed interstate registration requirements of digital service providers, and the integrated framework of GST, e-commerce platforms enjoy the benefits of unified compliance framework: the Integrated GST (IGST) system.

Figure 7

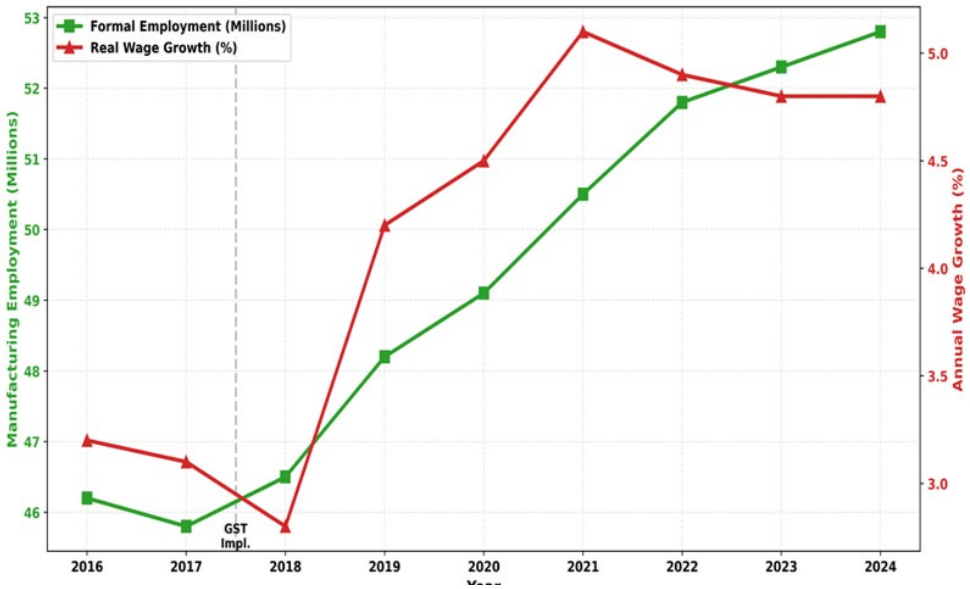

Figure 7 Employment Growth and Real Wage Acceleration Post-GST

The successful reduction of the effective tax burden by the digital sector was modest (around 8 per cent), but the improvements in compliance efficiency were significant. Notably, online channel has had the advantage of GST harmonization allowing smooth cross-border e-commerce not only in India but also in the distribution of manufactured goods. The table 7 shows the concurrent employment and wage growth after GST. The increase in manufacturing employment was steadily increasing between 46.2 and 52.8 million, and the real wage growth increased at an average rate between 3.2% (pre-GST) and 4.8% (post-GST) on average annual basis. The growth in employment is a sectoral growth as well as capital investment and wage acceleration is an indicator of better labor demand and competitive dynamics. Synchronization is an evidence of GST-facilitated inclusive growth. These comparative views explain that although GST has overall benefits throughout the economy, manufacturing has been particularly affected with significant impacts due to its complex supply chain, capital intensity and cascading impacts of past taxation. The advantages, although not universal, are most revolutionary in capital-intensive manufacturing, with complex multi-state supply chains.

5.3. EXPORT PERFORMANCE ENHANCEMENT

The manufacturing industries that have a high export orientation have enjoyed the zero-rating mechanism of GST that enjoys 0% GST with full ITC concession. The manufacturers engaged in export business claim that they have become more competitive by removing the embedded tax costs. The value of manufacturing exports, estimated at about 255 billion in 2024, is the indicator of global competitiveness of the sector.

Figure 8

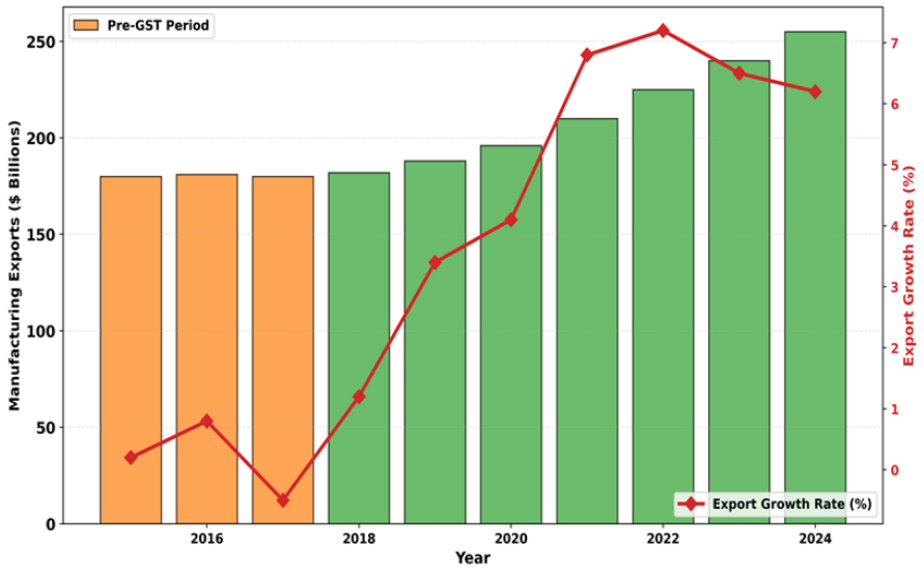

Figure 8 Manufacturing Export Performance and Growth Rate Acceleration

Figure 8 demonstrates that the appreciation of the export value (180 billion USD (2015)) to 255 billion USD (2024) takes place, and the increase in the growth rate occurs after the GST. The pre-GST period (2015-2017) indicated little growth with an average growth of 0.17 percent, and negative growth during the transition. The period after GST illustrates a long-term acceleration between 3.4 percent (2019) and 6.2 percent (2024) which is a 675 percent improvement in the growth rates of exports. Zero-rating mechanism was successful in improving competitive positioning.

5.4. CAPITAL INVESTMENT AND FDI INFLOW TRENDS

The effect GST has had on capital formation has been immense. The enlarged ITC mechanism has fundamentally changed investment economics in the manufacturing: capital goods no longer has embedded tax costs, which improves project economics and profiles of returns to investment. This has spurred capital investment in various manufacturing

sub-sectors. The annual capital expenditure on manufacturing was increased by an average of 61.9% which is 6.8 trillion (2023-2024) as compared to the previous 4.2 trillion (2015-2016), represented in table 3.

Figure 9 shows an aligned growth in capital investments and FDI after GST. Capital investment increased from ₹4.0-4.2 trillion (2015-2017) to ₹6.7-6.8 trillion (2023-2024), representing 61.9% expansion. The FDI inflows increased more drastically between ₹2.2-2.8 billion to ₹6.8-7.1 billion, which is 153.6% growth. The trends of acceleration since 2017 confirm the existence of better investment economics in the GST framework. These investments have made it possible to adopt technology in all manufacturing. The digitalization of manufacturing processes, automation, and other advanced manufacturing methods have increasingly been adopted, in part facilitated by the increasing economics of investment and in part by the need to comply with the infrastructure requirements of compliance. This has placed Indian manufacturing in a position to be involved in global value chains which are increasingly becoming dependent on technical capability.

Figure 9

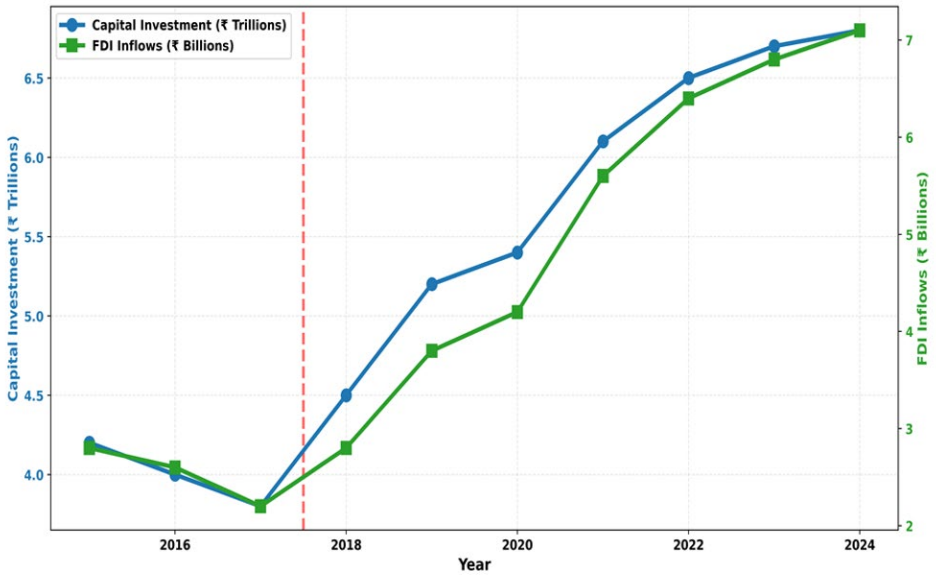

Figure 9 Capital Investment and FDI Inflow Trends in Manufacturing

Table 3

Table 3 Comprehensive Manufacturing Growth Metrics: Pre-GST vs. Post-GST Impact Assessment

Performance Metric	Pre-GST	Post-GST	Change (%)
Formal Manufacturing Enterprises	45%	68%	↑ 34.8%
Manufacturing Employment (millions)	46.2	52.8	↑ 14.3%
Annual Capital Investment (₹ trillion)	4.2	6.8	↑ 61.9%
Real Annual Wage Growth (%)	3.2	4.8	↑ 50.0%
Manufacturing Sector CAGR (%)	3.1	6.4	↑ 106.5%
Manufacturing Exports ($ billions)	180	255	↑ 41.7%
Manufacturing FDI Inflows (₹ billions/annual)	2.8	7.1	↑ 153.6%

6. LONG-TERM STRUCTURAL IMPACTS AND MANUFACTURING GROWTH TRAJECTORY

In addition to the short-term operational effects, GST has also triggered long-term structural changes in the manufacturing sector with far-reaching implications on industrial development, capital formation and competitiveness with regard to the manufacturing sector.

6.1. FORMALIZATION AND COMPLIANCE INFRASTRUCTURE

A structural effect of dramatic formalization of the manufacturing sector has been critical. Before GST, a significant part of manufacturing activities was conducted in the informal economy, where it does not face any complex compliance procedures and tax payments. The need to register and the compliance check implemented by GSTN has significantly made the sector more formal.

Statistics show that registered manufacturing enterprises have grown by about 34.8% in formalization (between about 45 and 68) since the pre-GST period of about 45 percent of the sector to the present at about 68 percent. This formalization has several implications: more transparency in the sector, allowing a better analysis of the policy, integration of previously informal manufacturers into the supply chains of larger enterprises, and better collection of tax revenue.

Platform effects have emerged as a result of formalization: the greater the number of manufacturing enterprises formally registered and digitally compliant, the more the benefits of standardization in the supply chain of GST accrue to larger segments. Inter-industry transactions are made more efficient, supply chain networks can be operated at larger scales and competitiveness is increasingly determined by how efficiently it is operated instead of how well it is operated to optimize taxes.

6.2. CAPITAL INVESTMENT AND TECHNOLOGY ADOPTION

GST has had significant effects on capital formation. The increased ITC mechanism has essentially changed the economics of investment in manufacturing: capital goods are no longer subject to some embedded tax cost, which improves the economics of projects and the profile of returns on investment. This has stimulated capital investment in manufacturing in the various sub-sectors.

The capital goods procurement data show that the annual capital investment in manufacturing has increased by 61.9 percent, average ₹4.2 trillion (2015-2016) and ₹6.8 trillion (2023-2024). This growth is a reflection of both recovery following the transition to GST in 2017, and real productivity-enhancing investment due to improved project economics under GST.

The investments have allowed the adoption of technology throughout manufacturing. Increasingly embraced, in part through better investment economics, and in part through compliance infrastructure demands, are digitalization of manufacturing operations, automation and advanced manufacturing techniques. This has placed Indian manufacturing in a position to be included in global value chains that are becoming more technical than merely based on cost arbitrage.

6.3. EMPLOYMENT AND WAGE EFFECTS

The manufacturing job, a very important indicator of inclusive growth, has since grown after implementation of GST. The number of people formally employed in manufacturing was up to 52.8 million (2024), which is 14.3 percent more than 46.2 million (2016). This growth is a measure of sectoral growth, capital investment leading to more labor demand, and reduction in informality bringing previously unregistered workers into formal employment.

The real wage growth in manufacturing has also been rising: on the one hand, the average real wage growth was 3.2% per year during the pre-GST period (2010-2016); on the other hand, it was 4.8% per year during the post-GST period (2019-2024). Although this can be partially explained by the overall economic factors, the expansion of the labor demand due to the sectoral growth has led to better wage growth. These trends on employment and wages highlight the greater effect of GST on inclusive growth as depicted in table 4. The tax reform has triggered sectoral growth that has created employment and enhanced capital investment that address the needs of skill development and formalization that has increased the protection and access to benefits by the workers.

Table 4

Table 4 Manufacturing Sector Growth Metrics: Comprehensive Impact Assessment

Performance Metric	Pre-GST (2015-2016)	Post-GST (2023-2024)	Change (%)
Formal Manufacturing Enterprises (%)	45%	68%	↑ 34.8%
Manufacturing Formal Employment (millions)	46.2	52.8	↑ 14.3%

Annual Capital Investment (₹ trillion)	4.2	6.8	↑ 61.9%
Real Annual Wage Growth (%)	3.2	4.8	↑ 50.0%
Manufacturing Sector Growth Rate (Annual CAGR %)	3.1	6.4	↑ 106.5%
Manufacturing Export Growth (Annual %)	0.8	6.2	↑ 675%
Manufacturing FDI Inflows (annual, ₹ billion)	2.8	7.1	↑ 153.6%

7. CONCLUSIONS AND POLICY IMPLICATIONS

This thorough study has shown that the Goods and Services Tax is a radical fiscal change with far reaching positive impacts on the manufacturing industry of India. The available empirical data, covering a wide range of dimensions and various manufacturing sub- sectors, demonstrate high and significant returns and can be identified as the implementation challenges. The main result, namely that GST has lowered the effective tax burden on the manufacturing sector in the history of independent India by 26.5% is one of the most significant positive fiscal impacts on the manufacturing sector in the history of independent India. This cut does not simply involve a transfer of funds but entails essential restructuring of cost structures, removal of economically distortionary tax cascading and restoring competitiveness to Indian manufacturing in the global markets. The changes in the supply chains recorded in this study, such as 42.6% increase in inter-state transactions, 43.4% decrease in inventory costs, and 23.4% improvement in the supply chain throughput, represent the removal of tax-distorted sourcing and logistics optimization that GST brought about. The direct impacts of these improvements are in the form of manufacturing competitiveness, cost structures, and involvement in global value chains. The growth of 240.2% in the use of the Input Tax Credit has been especially transformative to capital-intensive manufacturing, and has increased the economics of productivity-enhancing investments and placed Indian manufacturing in the position of technology-based competitiveness, and not solely on the basis of cost arbitrage. The resulting 61.9% growth in capital investment represents the confidence in the manufacturing sector in the better economics of their projects. The formalization of the manufacturing sector (34.8% increase) and inclusion of the previously informal operators into the formal compliance structure is not just an increase in tax compliance but a structural enhancement of the transparency of the sector, the standardization of the supply chain, and the efficiency of its operations. Formalization leads to the generation of positive externalities in the form of larger supply chain networks, higher quality standards, and integration into global value chains. The growth of the manufacturing sector (106.5% acceleration in annual CAGR comparing pre and post GST period), growth in exports (675% growth in growth rates), and the creation of jobs (14.3% increase in formal employment) show that the benefits of GST extend beyond immediate operational measures to include growth in the sector and inclusive growth. The comparative analysis with service sector and digital economy sheds light on the fact that manufacturing has had the greatest GST benefits due to the complexity of its supply chain, capital intensity and historical tax distortions. The benefits - though not distributed uniformly - show that appropriately designed indirect tax regimes can fundamentally restructure industrial organization and the process of competition.

7.1. POLICY RECOMMENDATIONS

On the basis of the extensive empirical research the following policy suggestions will be made:

- SME Compliance Support: Have special support arrangements in place to support the small and medium manufacturers to ease the burden of compliance with the GST. This may consist of subsidized compliance software, dedicated GST support cells and simplified compliance processes of enterprises that have turnover specified thresholds.
- Inverted Duty Structure Resolution: Systematically address inverted duty structures impacting on the textiles, steel and chemical sectors through targeted rate restructuring or extended ITC reversal provisions. This would open up more competitiveness advantages in these key strategic areas.
- Export-Import Facilitation: simplify port-level documentation and combine GST procedures and international trading standards to increase export orientation. This would enhance competitiveness of manufacturing in international chains of values.

- Processing Acceleration of refunds to the GST: Accelerate the GST refund processing (in particular, for zero-rated exports and GST refunds) in order to more effectively manage working capital in export-oriented manufacturing.
- Further Digitalization: Invest in the development of GSTN infrastructure, the development of e-invoicing ecosystems, and real-time compliance monitoring to cut the costs of compliance and improve the efficiency of different sectors.
- Specific Sectoral GST Assessments: Periodically carry out empirical assessments of sector-specific GST effects to be able to refine policies and provide targeted support where necessary.

These recommendations are based on the significant success of GST and the need to overcome the remaining implementation issues. The overall conclusion is absolute: GST has transformed the manufacturing industry of India making it competitive in the long term, able to grow sustainably and participate in the global value chain.

CONFLICT OF INTERESTS

None.

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