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Structure and Geographical Concentration of Textile Industry in India: A Cross-sectional Analysis

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Abstract

The Textile and Wearing Apparel is one of the most significant and highly heterogenous sector of Manufacturing Sector in India with substantial contribution to output, employment and exports. This study aims to examine the structural profile and geographical spread of organised textile industry of India in cross sectional settings by using Annual Survey of Industries data for 2023–24 on four textile sub-sectors as classified under three-digit level the National Industrial Classification, 2008. The study uses five structural variables: number of registered firms, employment, gross value added, fixed capital and raw material consumption comprises of 31,167 firms employing 30,52,519 employees generating a Gross value added of Rs.1,53,102 crores with fixed capital of Rs.2,51,718 crores and raw material consumption of Rs.4,49,574 crores. The study uses the Location Quotient (LQ) Analysis and Ellison-Glaeser (EG) index thereby capturing both relative specialisation and sub-sector level agglomeration. There is pronounced divergence at sub sectoral level. EG index values supports that Manufacture of Knitted and Crocheted Apparel EG (γ)=0.3317 and Manufacture of Wearing Apparel EG (γ)=0.0808 are highly concentrated. Spinning, Weaving and Finishing of Textile EG (γ)=0.0334 and Manufacture of Other Textiles EG (γ)=0.0269 are moderately concentrated. Location Quotient analysis identifies regional specialisation as Tamil Nadu and Punjab are specialised in Knitted apparel, Karnataka and Uttar Pradesh in Wearing Apparel while Gujarat and West Bengal in spinning and Weaving. These findings accentuate regional heterogeneity within the industry and carry direct policy relevance for industrial clustering strategies, targeted investment and regional value chain development.

Keywords: Textile Sector, Wearing Apparel, Location Quotient, Ellison Glaeser Index, Geographical concentration, India

1. Introduction

Textile and Wearing Apparel industry is one of the most significant and highly heterogenous sector of Manufacturing Sector in India with substantial contribution to output, employment and exports. It is one of the largest employment providers in organised sector by employing over 30 lakh people with 31,167 registered factory units with gross value added (GVA) share of Rs 1,53,101 crore in year 2023–24. The industry comprises of five sub sectors: Spinning, weaving and finishing of textiles; manufacture of other textiles; manufacturing of wearing apparel (excluding fur); manufacture of articles of fur and manufacture of knitted and crocheted apparel. Each sub-sector has its distinct profile, capital intensity, labour intensity and geographical concentration which makes it a rich case for the study of industrial geography and structural economics. Geographical distribution of this sector across different states is shaped by a confluence of historical, geographic and policy driven factors. Cotton growing land in Gujarat and Rajasthan have historically paved the way for spinning and weaving activity in these states. The trained garment workforce in Haryana and Karnataka have supported the growth of export-oriented apparel clusters. The industry is highly heterogeneous as evidenced by high geographical concentration of some sectors like knitted apparel manufacturing in Tiruppur belt of Tamil Nadu. Understanding of dual dimension of heterogeneity is essential for informed industrial policy formation specifically in the context of policies such as production linked incentive (PLI) scheme for textile and PM MITRA (Mega Integrated Textile Region and Apparent Parks Initiative) (Tewari, 2006; Krugman, 1991).

The theoretical foundation for structural analysis of manufacturing industries is well established. Kaldor (1966) emphases the importance of industrial structure in terms of output, productivity differential and employment dynamics which are central to the present study. Thomas (2013) said that manufacturing growth has been characterised by capital deepening without commensurate employment expansion, a pattern which is relevant to labour intensive industries like textile and apparel where employment intensity is intrinsically linked to the sub-sectoral mix of production. The economies of scale, transportation cost and backward-forward linkages generate self-reinforcing process of geographic concentration, Krugman (1991). Industries generally concentrate in areas which have market access, input availability and supplier networks. The industry's historical segmentation across mill, power loom and unorganised segments constrained its capacity to compete on scale and quality in global markets. In the Post Multi Fibre Arrangement (MFA) environment increasing return transport cost and labour mobility interact to generate a core periphery spatial structure–the pattern observable in India's textile sector where limited number of states dominates production while other contribute minimal (Dixit and Stiglitz, 1977). Venables (1966) shows that forward and backward linkages generate additional centripetal forces that reinforce agglomeration. The comprehensive synthesis by Fujita, Krugman & Venables (1999) establishes the condition of multiple spatial equilibria in industrial location while Brackman, Garretson and Van Marrewjik (2009) provided an empirical treatment of these predictions. Duranton and Puga (2004) systematically reviewed a micro foundation of agglomeration . Rosenthal & Strange (2004) and Combes & Gobillon (2015) provide extensive empirical surveys confirming that agglomeration economies vary significantly across industries and spatial scales underscoring the necessity of the disaggregated sector level analysis. Jacobs (1969) argues that inter-industry diversity rather than intra-industry specialisation derives long-run urban and industrial growth. Glaeser et al. (1992) and Beaudry & Schiffauerova (2009) have tested this competitive hypothesis variously labelled Marshallian and Jacobian externalities–with mixed finishing across different industries and geographies. The quantitative measurement of geographical concentration begins with Hoover's (1936) Location Coefficient and Florence's (1948) Location Quotient and Coefficient of Localisation. The landmark contribution of Ellison and Glaeser (1997) provided Dartboard model of firm location. Their index (γ) corrects for industry level plant size concentration using the Herfindahl Index (H) and benchmark's observed spatial concentration. Henderson (2003) and Audertsch & Feldman (1996) said that R&D intensive and knowledge-based industries exhibit high concentration than resource based or labour-intensive industries. In India Lall, Shalizi & Deichmann (2004) provides early evidences that agglomeration economies significantly enhance total factor productivity in Indian industry with variation across sectors and regions. Lall & Chakravorty (2005) examined the spatial dynamics of manufacturing locations across Indian states using district level data, according to them agglomeration patterns are shaped by geographic endowment, market access and infrastructure. Chakravorty (2003) said that economic liberalisation since 1991 reinforced industrial concentration specially in western and southern states. Kathuriya and Bhardwaj (1998) highlights the structural disparities between composite mill segments, decentralised power loom and handloom segments. Kuwatsuka (2024) examined regional industrial diversity and industrial co-location patterns in Indian Manufacturing sector through co-occurrence and location quotient methods. According to Deepana & Vani (2024), technological advancement and sustainable material use maintains the competitiveness of Tirupur knitwear industry. Goldar (2002) examined firm heterogeneity and provided the macro context within with textile sectors progress is embedded. Ramaswamy (2013) examined size dependent effects in Indian manufacturing. Coughlin& Segev (2002) contribute cross country perspective on industrial location. According to Saikia (2011) regional concentration in Indian manufacturing increased post liberalisation. There are region and state specific influences on both the performance and characteristics of Indian manufacturing industry (Kambhampati & McCann, 2007). Existing literature does not cover the aspects of structure and geographical concentration of the Indian textile and apparel industry at three-digit level product classification (NIC–2008). This study attempts to fill these gaps.

The remainder body of the paper is organised as follows. Section 2 presents the research questions identified after reviewing the literature on the subject. Section 3 lists the objectives of the study. Section 4 explains the methodology and data used in the study. Section 5 analyses the results of the study and discuss them. In the last section 6, the study concludes the results of the study.

2. Research questions

(i) What is the structure of Indian textile and wearing apparel industry?
(ii) Which states dominate industrial activity in textile and wearing apparel?
(iii) What is the degree of geographic concentration in the Indian textile and apparel industry?

3. Objectives of the study

(i) To examine the structure of organised textile and wearing apparel industry.
(ii) To rank and compare Indian states according to their contribution to each structural variables of the Indian textile and wearing apparel industry.
(iii) To evaluate the geographical concentration of sub-sectors of Indian textiles and apparel industry.

4. Methodology and data

The study uses data one four variables: number of firms, GVA, employment, fixed capital for four sub-sectors. This data has been sourced from Annual Survey of Industries (ASI) for year 2023–24 published by Ministry of Statistics and Programme Implementation (MoSPI). The database covers five sub-sectors disaggregated at 3-digits level (NIC–2008) which includes Spinning, weaving and finishing of textiles (NIC–131), Manufacture of other textiles (NIC–139), Manufacture of wearing apparel, except fur apparel (NIC–141), Manufacture of articles of fur (NIC–142) and Manufacture of knitted and crocheted apparel (NIC–143).

Manufacture of articles of fur was excluded from analysis as data for certain variables on this sub–sector was not available in the database. The data was analysed for 33 states and Union Territories for which complete observation are available in ASI 2023–24 dataset while Sikkim, Andaman & Nicobar Islands and Lakshadweep are excluded from analysis due to non-availability of data. Data on the number of firms and employment is taken in absolute numbers while data on all other variables has been used in value terms (Rs. Crores).

The study employed three analytical tools. First, the descriptive cross-sectional analysis is used to rank the states by each of the five variables, compute state level shares of national totals and profile the industry's structural composition at the sub-sector level. Second, the Location Quotient (LQ) is computed for each state sub-sector combinations using total textile employment as a reference distribution. The LQ for state i in sub-sector s is defined as:

$$LQ_{\mathrm{is}} = \frac{e_{\mathrm{is}}}{E_{\mathrm{s}}} \Big/ \frac{E_{\mathrm{i}}}{E}$$

Where,

e_{is} is the employment of state i in sub-sector *s*

E_s is national employment in sub-sector *s*

E_i is total textile employment in state *i*

E is national total textile employment.

An LQ > 1.25 indicates that the state is overrepresented in that sub-sector relative to its overall textile employment share (moderately specialised: $1.25 \leq LQ < 2.0$; strongly specialised: $LQ \geq 2.0$). LQ values between 0.75 and 1.25 indicate near-average representation, while $LQ < 0.75$ indicates underrepresentation (Florence, 1948; Bhatia, 2014). Third, Ellison Glaeser index (1997)is computed for each sub-sector. The EG index is computed as:

$$\gamma = \frac{G - H}{(1 - H)(1 - \Sigma {x_{\mathrm{i}}}^2)}$$

Where,

$G = \Sigma_i(s_i - x_i)^2$ is the raw geographic concentration index (s_i = sub-sector employment share of state *i*; x_i = state share of total textile employment)

$H \approx \Sigma_i(e_{is}^2/f_{is})/E_s^2$ is the Herfindahl index of plant sizes (approximated from state-level aggregates, where f_{is} is the number of firms)

Σx_i^2 is the sum of squared region shares.

The thresholds are: $\gamma < 0.02$ (not concentrated), $0.02 \leq \gamma < 0.05$ (moderately concentrated), and $\gamma \geq 0.05$ (highly concentrated). The EG index corrects for industrial size concentration (H), thereby isolating genuine geographic agglomeration from the mechanical concentration that would arise from a skewed plant-size distribution (Rosenthal & Strange, 2001).

5. Analysis and discussion

5.1 Structural Profile of the Indian Textile and Wearing Apparel Industry

Table 1 presents the all-India structural profile of the textile and wearing apparel industry for 2023–24 by sub-sector. The industry comprised 31,167 registered factories, employed 30,52,519 workers, consumed raw materials worth Rs.4,49,574 crore, operated with a fixed capital base of Rs.2,51,718 crore and generated GVA of Rs.1,53,102 crore.

Table 1: Structural Profile of the Indian Textile and Wearing Apparel Industry, 2023–24

NIC Code	Sub-sector	No. of Firms	Employment	Fixed Capital (Rs. Crore)	Raw Material (Rs. Crore)	GVA (Rs. Crore)
NIC–131	Spinning, Weaving & Finishing of Textiles	12,561 (40.30)	12,72,905 (41.70)	1,36,745 (54.32)	2,63,932 (58.71)	65,581 (42.83)
NIC–139	Manufacture of Other Textiles	5,793 (18.59)	4,41,112 (14.45)	63,945 (25.40)	76,889 (17.10)	29,649 (19.37)
NIC–141	Manufacture of Wearing Apparel (excl. Fur)	7,990 (25.64)	8,98,734 (29.44)	35,001 (13.90)	70,698 (15.73)	40,692 (26.58)
NIC–143	Manufacture of Knitted & Crocheted Apparel	4,823 (15.47)	4,39,763 (14.41)	16,006 (6.36)	38,022 (8.46)	17,155 (11.20)
NIC 131–143	**Industry Total**	**31,167**	**30,52,519**	**2,51,718**	**4,49,574**	**1,53,102**

Source: *ASI, MoSPI, Government of India;% share in parentheses.*

Spinning, Weaving and Finishing is structurally dominant which accounts for more than 40% firms, it provides employment to 41.7% persons of the total textile and wearing apparel employment with utilisation 54.3% of fixed capital and 58.7% of raw material consumption of the textile industry. It contributes 42.8% of GVA. The capital dominance of this sub-sector reflects the high machinery content of spinning and weaving operations and the presence of large integrated mills (Mazumdar & Sarkar, 2013; Kathuria & Bhardwaj, 1998). Wearing Apparel is the second-largest employer with 29.4% of total employment and contributes 26.6% in GVA. As the capital per worker in wearing apparel industry is 27 times lower than in spinning and weaving which indicates this sub-sector is labour-intensive. The GVA per worker in Manufacture of other textiles is very high which indicates the presence

of specialised technical textile and home furnishing operations, while the GVA per worker is very less in manufacture of knitted and crotched apparel.

5.1.1 State-wise Distribution of Gross Value Added

Table 2 ranks states by GVA wherein the geographic concentration of economic value creation is pronounced.

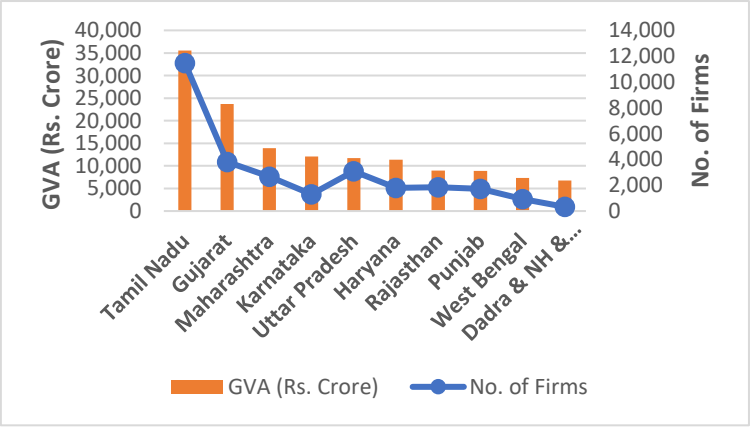
Table 2: State-wise Distribution of Gross Value Added, 2023–24

State	No. of Firms	GVA (Rs. Crore)	Rank
Tamil Nadu	11,467	35,554	1
Gujarat	3,806	23,696	2
Maharashtra	2,674	13,913	3
Karnataka	1,293	12,057	4
Uttar Pradesh	3,086	11,713	5
Haryana	1,791	11,345	6
Rajasthan	1,839	8,943	7
Punjab	1,714	8,923	8
West Bengal	926	7,310	9
Dadra & Nagar Haveli & Daman & Diu	327	6,773	10
Others	2244	12875	11
All India Total	**31,167**	**1,53,102**	

Source: *ASI, MoSPI, Government of India.*

The state's dominance is driven primarily by the Tiruppur knitwear cluster, which is globally integrated and accounts for a substantial share of India's knitwear exports (Tewari, 2006; Balasubramanian, 2018). Gujarat ranks second at Rs.23,696 crore, sustained by large-scale spinning and synthetic textile operations in Surat and Ahmedabad. Maharashtra (Rs.13,913 crore), Karnataka (Rs.12,057 crore), Uttar Pradesh (Rs.11,713 crore), and Haryana (Rs. 11,345 crore) constitute the second tier. The top 10 states collectively account for 91.6% of total GVA, 89.8% of raw material consumption, 89.5% of fixed capital, and 88.7% of employment, confirming the extreme spatial concentration of economic activity documented for Indian manufacturing by Chakravorty (2003) and Lall and Chakravorty (2005).

Figure 1: State-wise Distribution of GVA and No. of Firms, 2023–24



Source: *Authors' creation based on ASI, 2023–24*

5.1.2 State-wise Distribution of Employment, 2023–24

Table 3 presents state-wise distribution of employment in textile and wearing apparel industry during 2023–24. Tamil Nadu alone absorbs 28.3% of the industry's total workforce Gujarat with 14.2% workforce acquires the second position. Followed by Uttar Pradesh, Karnataka and Punjab in employment share.

Table 3: State-wise Distribution of Employment, 2023–24

State	No. of Firms	Employment	% Share in Employment	Rank
Tamil Nadu	11,467	8,63,911	28.30	1
Gujarat	3,806	4,34,468	14.23	2
Uttar Pradesh	3,086	2,71,055	8.88	3
Karnataka	1,293	2,51,660	8.24	4
Punjab	1,714	2,11,019	6.91	5
Maharashtra	2,674	2,01,658	6.61	6
Haryana	1,791	1,87,897	6.16	7
West Bengal	926	1,70,990	5.60	8
Rajasthan	1,839	1,53,215	5.02	9
Andhra Pradesh	451	72,891	2.39	10
Others	2,120	2,33,755	7.66	11
All India	**31,167**	**30,52,519**	**100.00**	

Source: *ASI, MoSPI, Government of India.*

A notable structural asymmetry emerges between employment and firm-count rankings: Karnataka ranks fourth in employment but eighth in firms, implying above average firm size consistent with the presence of large integrated garment factories in Bengaluru's Special Economic Zones (Ghani et al., 2013). Andhra Pradesh appears in the employment top 10 but does not feature in the GVA top 10, signalling comparatively lower labour productivity relative to higher GVA states such as Gujarat and Maharashtra (Das & Kalita, 2009).

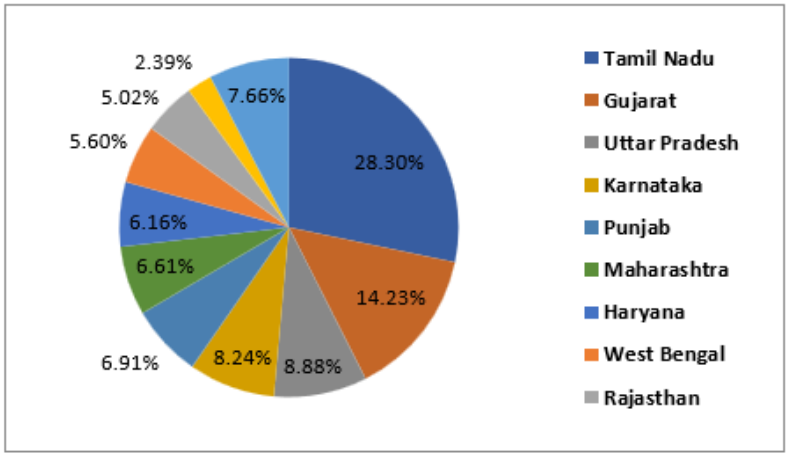


Figure 2: State-wise Employment Share in Textile and Wearing Apparel, 2023–24

Source: *Authors' creation based on ASI, 2023–24*

5.1.3 State-wise Distribution of Textile and Apparel firms, 2023–24

Table 4 provides state-wise distribution of Indian textile firms (in terms of absolute number as well as in terms of Percentage share) in year 2023–24.

Table 4: State-wise Distribution of firms, 2023–24

State	No. of Firms	Percentage share of number of firms (%)	Rank
Tamil Nadu	11,467	36.79	1
Gujarat	3,806	12.21	2
Uttar Pradesh	3,086	9.90	3
Maharashtra	2,674	8.58	4
Rajasthan	1,839	5.90	5
Haryana	1,791	5.75	6
Punjab	1,714	5.50	7
Karnataka	1,293	4.15	8
West Bengal	926	2.97	9
Kerala	472	1.51	10
Others	2,120	6.80	
All India	**31,167**	**100.00**	

Source: *ASI, MoSPI, Government of India.*

Tamil Nadu accounts for 36.8% of all registered factories more than three times the share of second-ranked Gujarat. The divergence between employment and firm-count rankings signals significant heterogeneity in average establishment size across states: Karnataka employs 2,51,660 workers through only 1,293 firms (average of ~195 workers per firm), while Kerala's 472 firms employ only 30,230 workers (~64 workers per firm), indicative of small-scale traditional textile enterprises. This heterogeneity in establishment size has direct implications for the plant-size correction embedded in the EG index (Devereux et al., 2004).

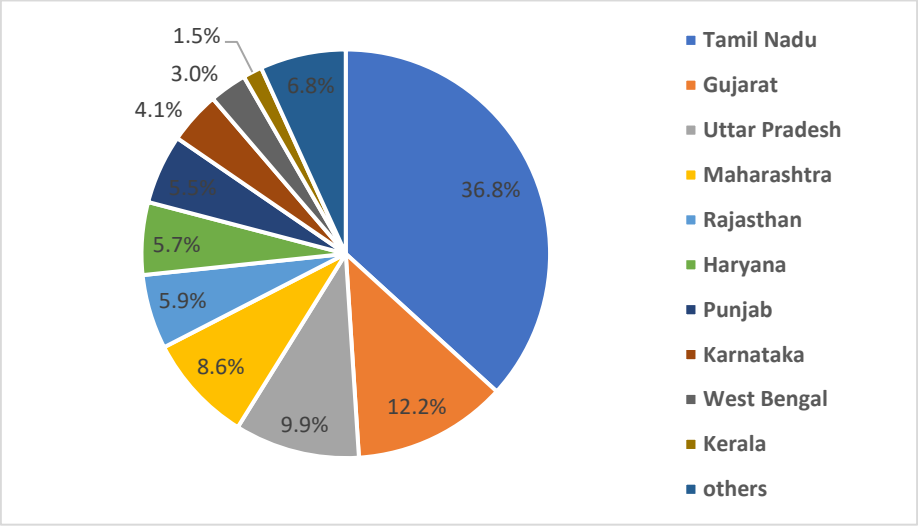


Figure 3: State-wise No. of Textile and Apparel Firms, 2023–24

Source: *Authors' creation based on ASI, 2023–24*

5.1.4 State-wise Distribution of Fixed Capital in Textile and Apparel Industry, 2023–24

Table 5 shows state-wise distribution of fixed capital in the Textile and Apparel Industry during 2023–24. Also, it presents percentage share of major Indian states in the total fixed capital in the said industry, and ranks them accordingly.

Table 5: State-wise Distribution of Fixed Capital in Textile and Apparel Industry, 2023–24

State	Fixed Capital (Rs. Crore)	% Share in fixed capital	Rank
Tamil Nadu	62,827	25	1
Gujarat	41,608	16.5	2
Karnataka	29,809	11.8	3
Maharashtra	20,813	8.3	4
Rajasthan	16,460	6.5	5
Dadra & NH & D&D	14,004	5.6	6
Punjab	12,355	4.9	7
Haryana	11,058	4.4	8
Uttar Pradesh	9,296	3.7	9
Madhya Pradesh	8,705	3.5	10
Others	24,783	9.8	11
All India Total	**2,51,718**	**100**	**12**

Source: *ASI, MoSPI, Government of India.*

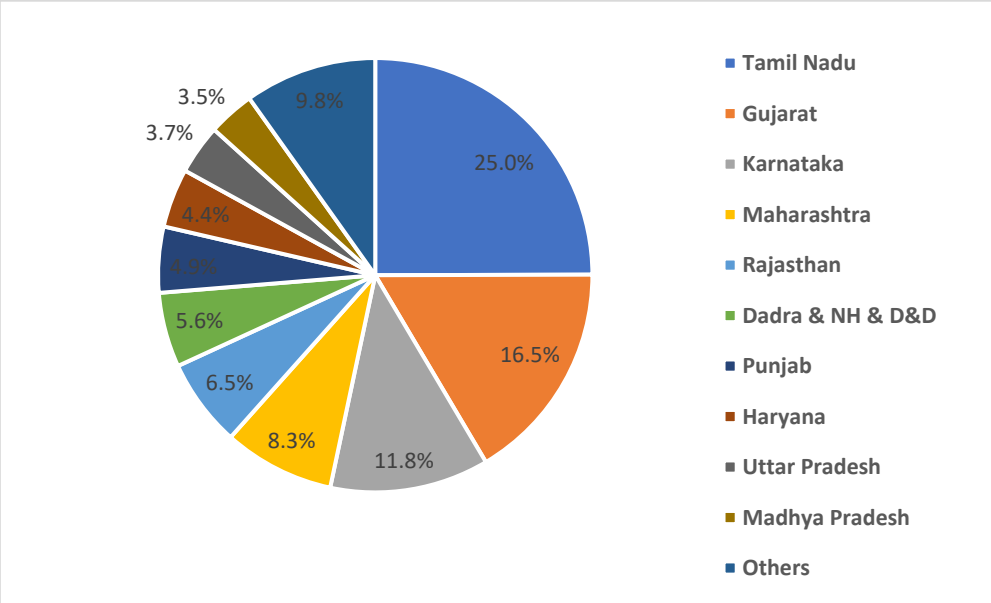


Figure 4: State-wise Distribution of Fixed Capital in Textile and Apparel Industry, 2023–24

Source: *Authors' creation based on ASI, 2023–24*

Tamil Nadu and Gujarat together account for 41.5% of national fixed capital, reflecting the concentration of mechanised spinning mills and large weaving complexes. Karnataka ranks third (11.8%) despite being primarily a garment state, driven by capital investment in automated apparel manufacturing facilities in Bengaluru. Dadra and Nagar Haveli and Daman and Diu record an exceptionally high capital per worker (Rs.21,80,867)far exceeding the all-India average of Rs.82,454 reflecting capital-intensive textile processing within its export-oriented industrial zones. Madhya Pradesh also records a high capital per worker (Rs.1,73,624), attributable to large-scale spinning mills in Indore and Pithampur.

5.1.5 State-wise Distribution of Raw Material Consumption in Textile and Apparel Industry, 2023–24

Table 6: State-wise Distribution of Raw Material Consumption in Textile and Apparel Industry, 2023–24

Rank	State	Raw Material (Rs. Crore)	Share (%)
1	Tamil Nadu	1,02,411	22.8
2	Gujarat	89,999	20.0
3	Maharashtra	39,189	8.7
4	Punjab	32,571	7.2
5	Rajasthan	29,346	6.5
6	Haryana	29,187	6.5
7	Uttar Pradesh	24,953	5.6
8	Dadra & NH & D&D	22,154	4.9
9	Karnataka	17,046	3.8
10	West Bengal	16,911	3.8
11	Other	45,807	10.2
12	All India Total	4,49,574	100.0

Source: *ASI, MoSPI, Government of India.*

Gujarat's material per worker (Rs.20,71,476) substantially exceeds the national average (Rs.14,72,970), reflecting the raw material-intensive nature of synthetic fibre and fabric production in Surat where imported yarns and petroleum-based feedstocks constitute a large share of input costs. Dadra and Nagar Haveli and Daman and Diu record the highest material per worker (Rs.34,50,080), consistent with its capital-intensive export-processing character. By contrast, Karnataka exhibits the lowest material per worker among the top 10 (Rs.6,77,342), reflecting the labour-intensive cut-make-trim garment operations that dominate its textile economy and require comparatively modest material inputs per worker (Ghani et al., 2013).

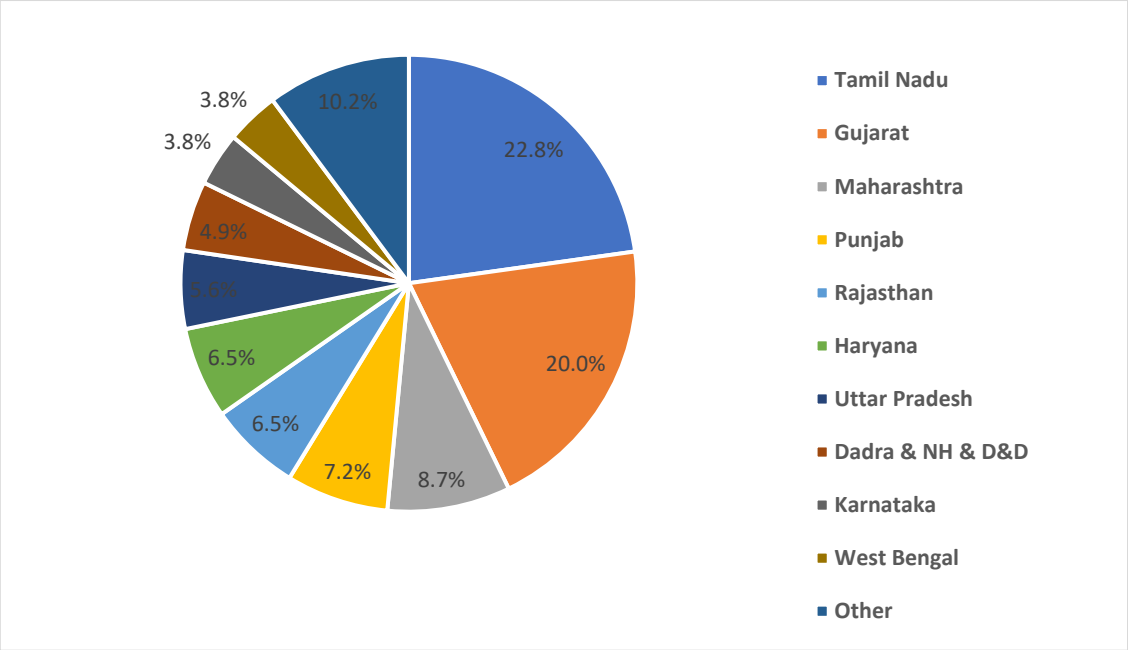


Figure 5: State-wise Distribution of Raw Material Consumption in Textile and Apparel Industry, 2023–24

Source: *Authors' creation based on ASI, 2023–24*

5.2 Regional Specialisation: Location Quotient Analysis

Table 7 presents LQ values for 10 major states across all four sub-sectors of Indian textile. The LQ identifies states where sub-sector employment share exceeds the overall textile employment share, capturing functional specialisation (Florence, 1948).

Table 7: Location Quotients by State and Sub-sector, 2023–24

State	LQ NIC 131	LQ NIC 139	LQ NIC 141	LQ NIC 143	Dominant Sub-sector
Tamil Nadu	0.84	0.67	0.53	2.73	NIC–143: Strongly
Gujarat	1.73	1.37	0.26	0.01	NIC–131: Moderately
Uttar Pradesh	0.20	1.48	2.36	0.05	NIC–141: Strongly
Karnataka	0.06	0.44	2.80	0.61	NIC–141: Strongly
Punjab	1.04	0.86	0.49	2.08	NIC–143: Strongly
Maharashtra	1.40	1.31	0.71	0.12	NIC–131: Moderately
Haryana	0.37	2.23	1.76	0.04	NIC–139: Strongly
West Bengal	1.77	0.48	0.56	0.19	NIC–131: Moderately
Rajasthan	1.48	0.49	1.05	0.01	NIC–131: Moderately
Kerala	0.54	2.94	1.10	0.18	NIC–139: Strongly

Source: *Author's calculation based on ASI Data, ASI, MoSPI, Government of India.*

Note: *LQ ≥ 2.0 = Strongly Specialised; 1.25 ≤ LQ < 2.0 = Moderately Specialised; 0.75 ≤ LQ < 1.25 = Near Average; LQ < 0.75 = Under-Represented (Florence, 1948). LQ values rounded to 2 decimal places.*

Tamil Nadu registers an LQ of 2.73 in sub-sector-knitted and crocheted apparel which confirms that Tamil Nadu is India's knitwear capital. The state accounts for 77.4% of national knitwear employment while representing only 28.3% of aggregate textile employment, a disparity that translates into a near-threefold overrepresentation in the sub-sector (Balasubramanian, 2018). Ludhiana in Punjab is second largest knitwear production centre in India which we can see in LQ value of 2.08. LQ value of 1.73 in Gujarat indicates supremacy of sub-sector spinning, weaving and finishing of textiles as we can know that Surat is a synthetic textile hub while Ahmedabad holds a legacy of cotton mills. West Bengal's LQ of 1.77 in this sub-sector indicates its spinning and weaving base in Howrah and Murshidabad.

The LQ value of 2.80 in sub-sector – manufacturing of wearing apparel reflects export-oriented apparel factories in Bengaluru's SEZs (Karnataka). Panipat's home furnishings and recycled textile cluster is the best representation of Haryana's LQ value of 2.23 in sub-sector - manufacture of other textiles. The cross-state LQ evidence demonstrates that specialisation is sub-sector-specific and state-idiosyncratic, consistent with the argument of Rosenthal and Strange (2001, 2003) that agglomeration externalities operate at fine industrial classification levels.

5.3 Spatial Concentration: Ellison–Glaeser Index

Table 8 presents the estimated values of EG Indices showing geographical concentration the sub-sectors of the textile and wearing apparel industry.

Table 8: Ellison–Glaeser Index–Textile and Wearing Apparel Sub-sectors, 2023–24

Sub-sector (NIC Code)	Emp. (Es)	G	H	Σx_i^2	γ (EG Index)	Classification
NIC–131: Spinning, Weaving & Finishing	12,72,905	0.0290	0.0001	0.1351	0.0334	Moderately Concentrated
NIC–139: Manufacture of Other Textiles	4,41,112	0.0235	0.0002	0.1351	0.0269	Moderately Concentrated
NIC–141: Wearing Apparel (excl. Fur)	8,98,734	0.0700	0.0002	0.1351	0.0808	Highly Concentrated
NIC–143: Knitted & Crocheted Apparel	4,39,763	0.2871	0.0003	0.1351	0.3317	Highly Concentrated

Note: *G = raw geographic concentration index; H = Herfindahl plant-size index; Σx_i^2 = sum of squared region shares; γ = EG agglomeration index. Thresholds: γ < 0.02 Not Concentrated; 0.02–0.05 Moderately Concentrated; γ ≥ 0.05 Highly Concentrated (Ellison & Glaeser, 1997).*

Source: *Author's calculation based on ASI Data, ASI, MoSPI, Government of India.*

Tamil Nadu accounts for 77.4% of knitted and crocheted apparel employment (3,40,235 out of 4,39,763 workers). The raw geographic concentration index (G) = 0.2871. The Herfindahl index (H) = 0.0003, confirms that this concentration is geographic rather than an artefact of plant-size skewness. The Ellison-Glaeser index value(γ) = 0.3317. This indicates that the sub-sector Knitted & Crocheted Apparel falls in the highly concentrated category, confirming strong agglomeration economies anchored in Tamil Nadu and Punjab (Tewari, 2006; Rosenthal & Strange, 2001).

The sub-sector wearing apparel is also highly concentrated with EG value (γ) =0.0808. Karnataka (LQ = 2.80) and Uttar Pradesh (LQ = 2.36) together accounted for 43.9% of sub-sector employment. Karnataka's apparel industry is oriented towards global brand buyers in Bengaluru's SEZs; Uttar Pradesh servicing domestic markets

through the Greater Noida corridor and Lucknow's embroidery clusters produce comparable LQ values through distinct institutional mechanisms (Ghani et al., 2013; Athukorala & Ekanayake, 2015).

Spinning, Weaving and Finishing sub-sector is moderately concentrated with EG value (γ) = 0.0334. The lower EG value reflects a geographically reflects that the production base is scattered over Gujarat, West Bengal, Tamil Nadu, Maharashtra, Punjab, and Rajasthan all host significant spinning and weaving capacity, consistent with India's distributed composite mill and power loom structure (Kathuria & Bhardwaj, 1998). The sub-sector manufacture of other textiles is also moderately concentration EG value (γ) = 0.0269, with Haryana (LQ = 2.23), Kerala (LQ = 2.94), Uttarakhand (LQ = 3.38), and Gujarat (LQ = 1.37) as primary clusters.

The study is based on ASI data which covers only organised sector. The unorganised segment constitutes significant share of India’s textile activity and employment but it falls outside the ASI coverage. The EG index is estimated using state level aggregates rather than plant level microdata. The cross-sectional design cannot show the structural shifts induced by different interventions. The LQ is computed with employment as the reference variable future research may adopt multi variable LQ frameworks.

6. Conclusions

The study provides a comprehensive cross-sectional analysis of structural and spatial profile of textile and wearing apparel industry in India using 3-digit ASI data. Th industry comprised of 31167 registered productive units by employing 3052519 workers. It generating a GVA of Rs.1,53,102 crore supported by fixed capital of Rs.2,51,718 crore and raw material consumption of Rs.4,49,574 crore. The sub–sectors Manufacture of Knitted and Crocheted Apparel and Manufacture of wearing apparel are highly concentrated as we have Tamil Nadu’s Tiruppur Knitwear cluster and Karnataka & Uttar Pradesh as codominant production clusters. On the other hand, the sub-sectors Spinning, Weaving and Finishing and Manufacture of other textile are moderately concentrated.

LQ analysis confirms sub-sector specific geographic specialisation. Tamil Nadu and Punjab are specialised in knitwear. Karnataka, Uttar Pradesh, and Delhi show geographical specialisation for wearing apparel. Gujarat and West Bengal for spinning and weaving. Haryana and Kerala for other textiles.

High agglomeration in NIC–143 and NIC–141 suggests that cluster-based instruments PM MITRA Mega Textile Parks, Integrated Textile Parks, and Production Linked Incentive schemes should be calibrated to sub-sector specific spatial realities rather than deployed as generic textile promotion instruments. Spatially lagging states with large labour pools but low LQ values represent potential sites for geographic diversification of organised production, conditional on targeted infrastructure investment and skill development.

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