



**APPAREL MADE-UPS & HOME FURNISHING
SECTOR SKILL COUNCIL**



Manpower Skill Gap Study in Apparel, Made-Ups, & Home Furnishing Sector

July 2026

Chairman's Message

It gives me great pleasure to present the **Manpower Skill Gap Study for the Apparel, Made-Ups and Home Furnishing Sector**, undertaken by the Apparel, Made-Ups & Home Furnishing Sector Skill Council (AMHSSC). The study represents an important contribution to strengthening the evidence base for workforce planning and skill development in the Apparel, Made-Ups and Home Furnishing sector.

India's apparel and textile sector remains an important contributor to the country's employment, exports, and inclusive economic growth. The Apparel, Made-Ups and Home Furnishing segments provide livelihoods to a large workforce and remain integral to India's participation in global value chains. As the sector continues to evolve in response to technological advancements, sustainability imperatives, and changing global trade dynamics, ensuring the availability of a skilled and future-ready workforce has become increasingly important.

It is in this context that the study has been undertaken to develop a comprehensive understanding of the sector's workforce requirements through primary research, stakeholder consultations, and secondary analysis across major manufacturing clusters of the country. It examines current workforce characteristics, emerging skill requirements, technology adoption, training ecosystems, and future manpower demand. The study also highlights the need for closer collaboration between industry and training institutions to ensure that skilling initiatives remain aligned with evolving industry requirements.

The report presents forward-looking market and manpower projections under multiple growth scenarios, outlining the workforce development requirements associated with different growth trajectories. The recommendations provide a practical framework for aligning skilling interventions with industry needs while supporting the broader objectives of employment generation, export growth, and manufacturing competitiveness.

I appreciate the efforts of industry representatives, training partners, the consulting team, and all other stakeholders whose contributions made this study possible. It is my sincere hope that the findings and recommendations presented in this report will serve as a useful reference for policymakers, industry, training institutions, and other stakeholders, and contribute to informed planning and collaborative action for strengthening workforce capabilities, empowering millions, including youth and women, with future-ready skills in apparel, made-ups, and home furnishing sector, strengthening livelihoods, boosting the economy, and realizing **PM Modi's vision of a skilled, self-reliant India**.

Mr. Premal Udani

Chairman-AMH SSC

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Report Structure

The study findings are presented across six parts in this report.

Part A is the *Executive Summary*. It presents the key findings from primary and secondary research, and a summary of the skill gap assessment across technical, behavioural, and emerging dimensions.

Part B covers the *Study Framework*. It documents the deliverable series, primary research instruments and coverage, secondary research sources, the three-scenario framework, the projection methodology, and market growth & manpower demand projections to 2030 along with projected job role wise employment distribution.

Part C presents the *Cluster Profiling* across eleven production clusters — Ludhiana, Delhi NCR, Panipat, Jaipur, Vapi, Indore, Kolkata, Bengaluru, Tiruppur, Karur, and Bhubaneswar, selected for their scale of activity, market orientation, value chain representation, and geographic spread. Each cluster is profiled across its workforce characteristics, dominant product categories, key occupational roles, training infrastructure, and skill needs.

Part D presents the *State and National Level Findings*. It covers the macro context including global benchmarking, state-wise export and wage structures; employer demand signals across job roles, technology adoption, skill level, attrition, and workforce availability; worker demand signals covering workforce profile, migration patterns, training access, aspirations, and automation readiness; stakeholder consultation evidence from machinery manufacturers, industry associations, and training institutions; a training ecosystem assessment; and the infrastructure enabler framework for hostel facilities in clusters.

Part E covers *Market Growth and Manpower Projections to 2030*. It presents the detailed projection methodology, base data and historical context, scenario design parameters, apparel and home textiles market projections under three scenarios (Business As Usual, Likely Expansion and Optimistic) and manpower demand projections by sector, formalisation trajectory, and employment intensity norms.

Part F presents the *Analysis and Recommendations*. It covers the consolidated skill gap assessment, cross-cutting patterns, an emerging and aspirational job role framework with progression pathways, and strategic recommendations.

A. Executive Summary

Sector Context

India's textile and apparel sector is the country's second-largest employer, supporting ~45 Mn. direct employment and operating at USD 194 Bn. in combined market size (domestic and exports). The Government's target of USD 350 Bn. market size by 2030 sets a growth ambition that the sector is structurally positioned to pursue.

Global Positioning

India holds ~3% of global apparel trade, against Bangladesh and Vietnam at 7% each and China at 28%. India is a major textile producing nation with self-sufficiency in cotton and a complete value chain spanning fibre to finished garment. However, in the garment exports, the potential has remained untapped.

Geographic Distribution

Export activity is geographically concentrated in top five states, Tamil Nadu (23%), Gujarat (16%), Haryana (11%), Maharashtra (11%), and Uttar Pradesh (8%), account for ~69% of national T&A exports. The state-level overview below maps export scale, sub-sector specialization, workforce composition, wage structure and the primary skill gaps.

Table 1: State-Level Sector Overview

State	Cluster(s) Covered	Export Performance (USD Mn.)		Cluster Specialisation	Female Workforce %	Skilled Min. Wage (INR /month)	Primary Skill Gap(s)
		Apparel	Home Textiles ¹				
Tamil Nadu	Tiruppur / Erode-Karur	5,415	1,009	Knit RMG; Home Textiles (Karur)	60–80%	14,004	Speed maintenance; multi-style changeover; MMF fabric transition
Uttar Pradesh	Noida (Delhi NCR)	2,239	892	Woven RMG; Womenswear	30–35%	16,868	Advanced machine operation; Quality management systems
Haryana	Panipat; Gurgaon / Faridabad	2,193	1,438	Home Furnishing (Panipat); Woven RMG (Gurgaon)	30–40%	18,500	Supervisory pipeline; ESG/compliance; Multi-skill SMO
Karnataka	Bengaluru	2,057	211	Woven RMG (export)	60–80%	23,376	QMS & traceability; Supervisory & IE pipeline development

¹ Home Textiles include Home Furnishing and Made-Ups

State	Cluster(s) Covered	Export Performance (USD Mn.)		Cluster Specialisation	Female Workforce %	Skilled Min. Wage (INR /month)	Primary Skill Gap(s)
		Apparel	Home Textiles ¹				
Delhi	Delhi NCR (Metro segment)	765	78	Woven RMC; Womenswear	30–40%	22,411	Supervisory pipeline; QMS; ESG compliance
Gujarat	Vapi / Silvassa / Dadra & Nagar Haveli	424	933	Garment; Home Furnishing; MMF Processing	20–25%	15,808	Machine maintenance; MMF & complex fabric handling
Punjab	Ludhiana	386	179	Knitwear; Hosiery; Woollen	20-25%	15,414	Multi-skill SMO; Process adaptation; Knitwear-specific technical skills
West Bengal	Kolkata	337	15	Hosiery; Ethnic Wear	30–35%	11,807	Style change handling; Quality inspection; Fabric type adaptation
Rajasthan	Jaipur	324	146	Ethnic Apparel; Block-print; Home Furnishing	30–40%	8,034	Style change adaptation; Machine changeover; Basic quality skills
Madhya Pradesh	Indore / Dhar	39	306	Cotton Garments	40–50%	14,869	Machine breakdown; Process adaptation; Technical instruction comprehension
Odisha	Bhubaneswar	32	-	Anchor-led new investments	60-80%	14,872	Fabric type handling; Style changes

Source: Trade Intelligence and Analytics Portal, Department of Commerce, Labour Department, Delhi, Labour Department, Haryana, Labour Department, Uttar Pradesh, Department of Labour Madhya Pradesh, Labour Directorate, Odisha, Department of Labour Gujarat, Labour Department, Punjab, Labour Department, Government of Karnataka, Labour Commissionerate, West Bengal, Department of Labour, Rajasthan

Key Findings

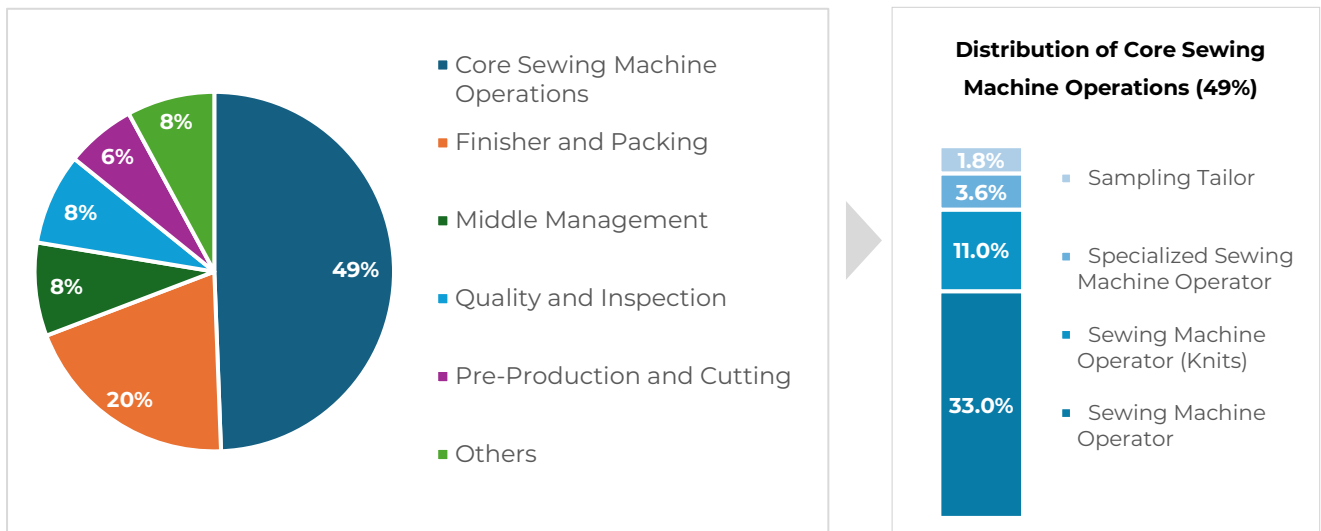
Production Structure and Skill Demand

Role Composition

Core sewing machine operations account for 49% of total employment, while finishing & packing contribute a further 20%, together representing ~69% of the workforce in core assembly and post-assembly functions.

Within core sewing operations, conventional sewing machine operators account for the largest share (33%), followed by knit sewing operators (11%), specialised sewing machine operators (4%), and sampling tailors (2%).

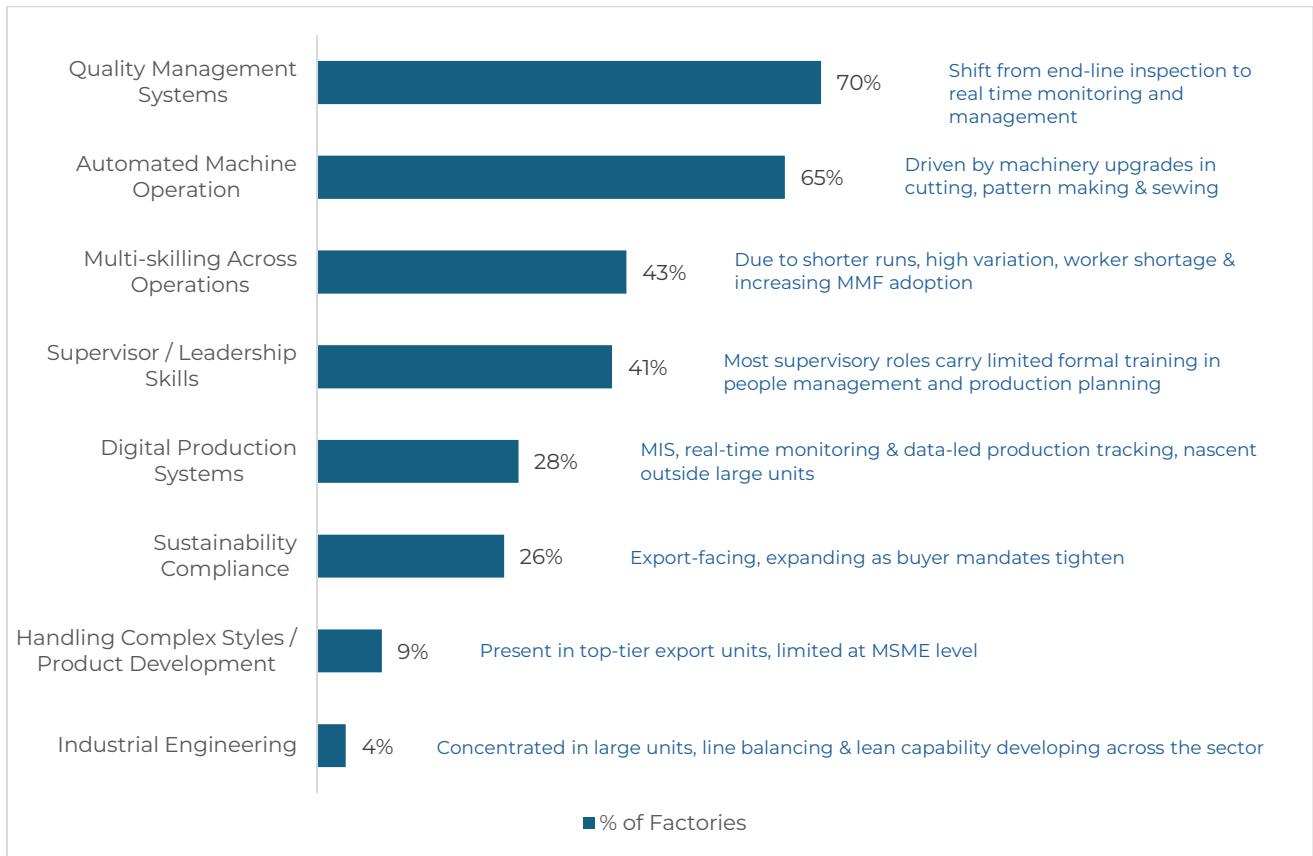
The survey findings in terms of role composition were as follows:



Source: Primary Research Findings

Emerging Skill Priorities

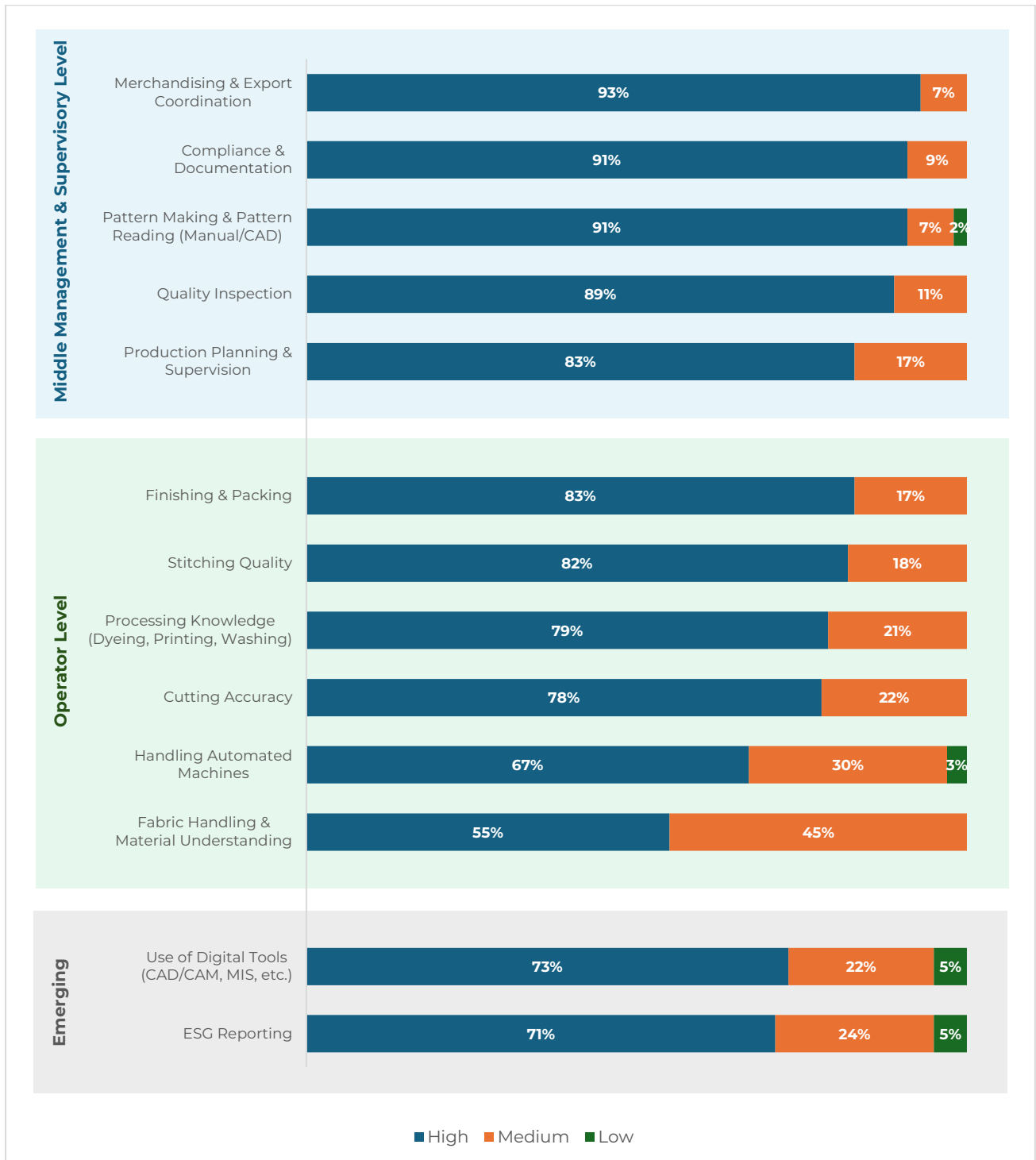
Quality management systems are cited as an emerging priority by 70% of factories; automated machine operation by 65%; multi-skilling across operations by 43%; supervisory and leadership capability by 41%. These emerging priorities indicate that the sector is moving towards a more technology-driven, quality-focused, and multi-skilled workforce.



Source: Primary Research Findings

Employer Assessment of Workforce Capability

Employer assessment indicates that workforce capability is relatively higher in functions such as Merchandising and Export Coordination (93%), Compliance and Documentation (91%), Pattern Making (91%), and Quality Inspection (89%). Skill levels are comparatively lower in areas requiring higher technical knowledge and technology adoption, particularly Fabric Handling and Material Understanding (55%) and Handling Automated Machines (67%). Emerging areas such as the use of Digital Tools (73%) and ESG Reporting (71%) indicate that workforce capabilities are evolving in line with changing industry requirements.

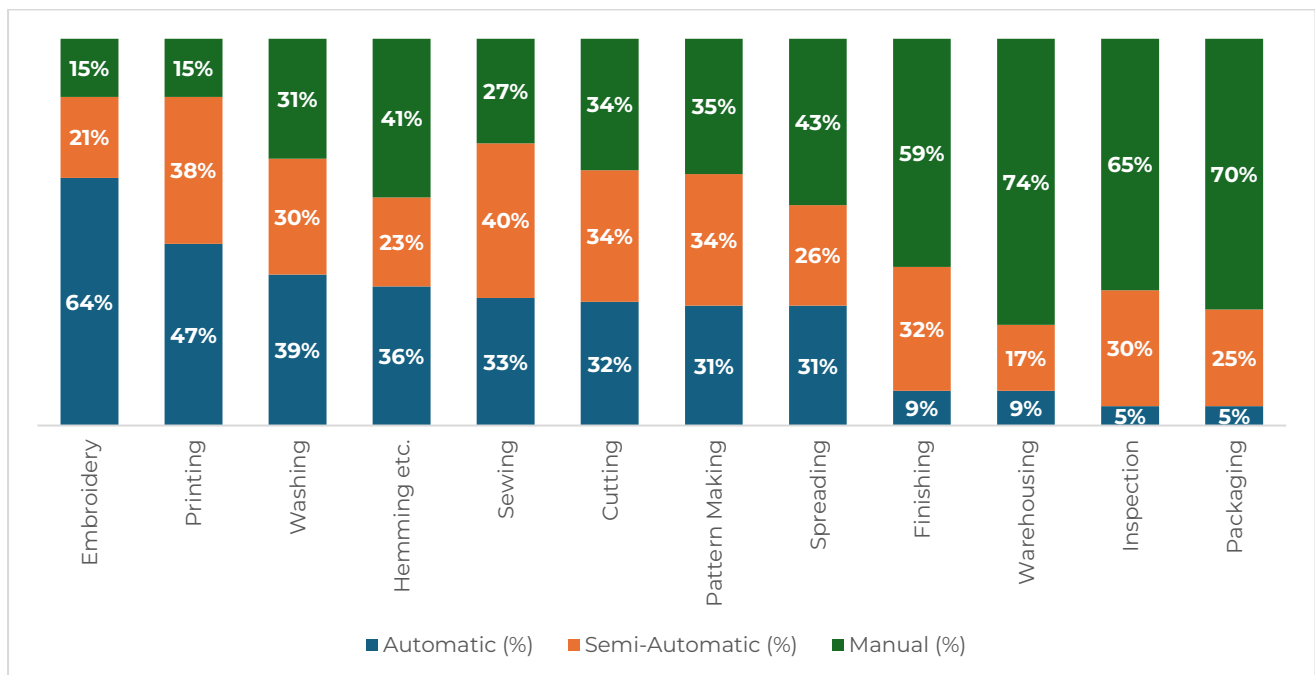


Source: Primary Research Findings

Overall, the findings suggest that while the workforce is prepared for established manufacturing functions, continued skill development will be important to support increasing automation, digitalisation, and sustainability across the sector.

Technology Adoption

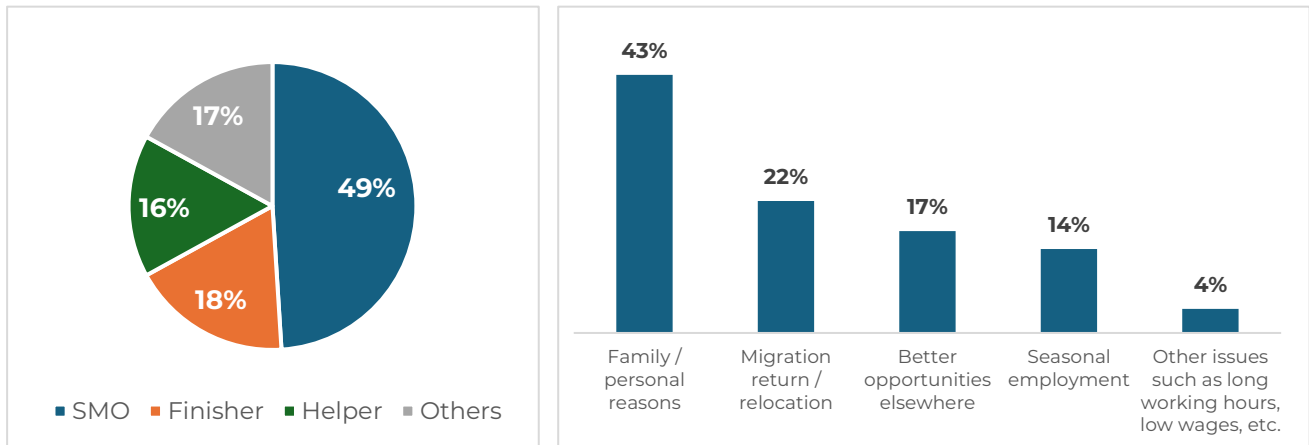
Technology adoption varies considerably across production processes rather than following a uniform pattern. Automation is relatively higher in processes such as Embroidery (64%) and Printing (47%), while core production functions including Sewing, Cutting, Pattern Making, and Spreading operate through a mix of automatic, semi-automatic, and manual systems. Downstream activities such as Finishing (59% manual), Warehousing (74%), Inspection (65%), and Packaging (70%) continue to rely predominantly on manual operations, indicating significant scope for technology adoption in these functions.



Source: Primary Research Findings

Workforce Attrition and Mobility

Attrition remains a recurring feature of the sector, with an average monthly attrition rate of 7.3%. Attrition is higher among MSMEs (8.9%) than non-MSMEs (6.0%), indicating relatively greater workforce instability in smaller enterprises. Sewing Machine Operators account for ~49% of total attrition, reflecting the concentration of employment in this occupation. Attrition is driven primarily by family or personal reasons (43%), migration or relocation (22%), and better employment opportunities (17%).

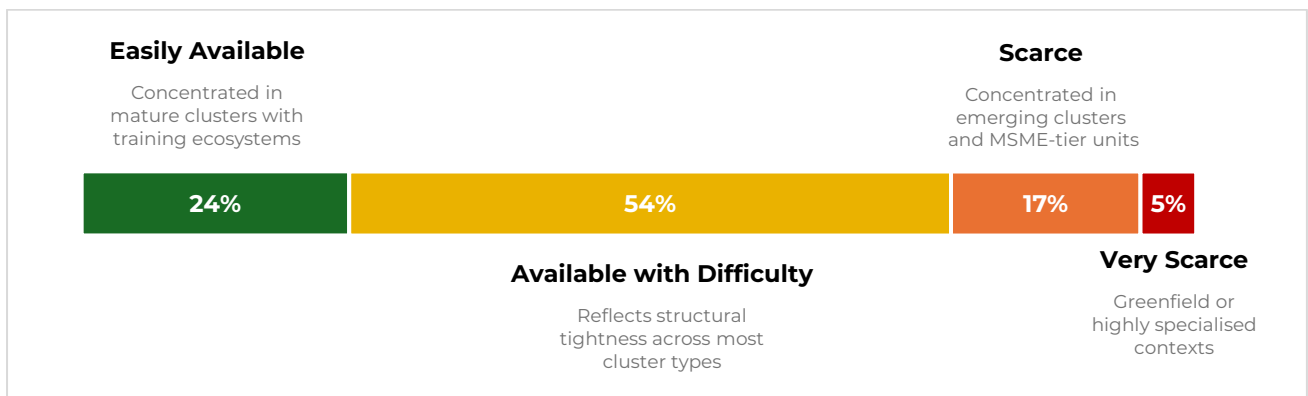


Source: Primary Research Findings

Skilled Workforce Availability Across Clusters

The availability of skilled workers remains a challenge across most clusters. Only 24% of employers reported that skilled workers are easily available, while a majority (54%) indicate that they are available with difficulty. A further 17% describe skilled workforce availability as scarce and 5% as very scarce.

The survey findings indicate the following availability of skilled force for each cluster:

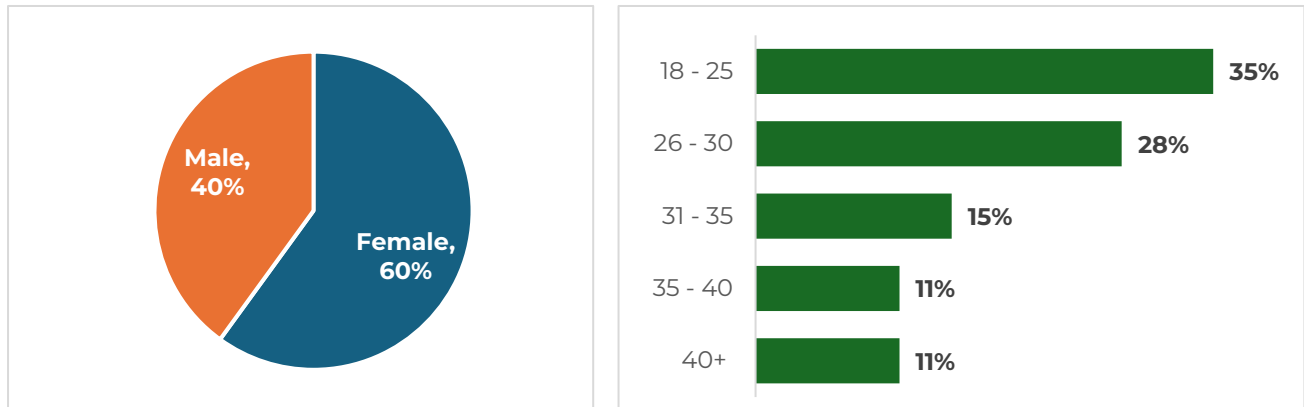


Source: Primary Research Findings

The findings indicates that the challenge lies less in the overall availability of labour and more in accessing production-ready workers with the required skills. Availability also varies across clusters, reflecting differences in industrial maturity and the strength of local training ecosystems.

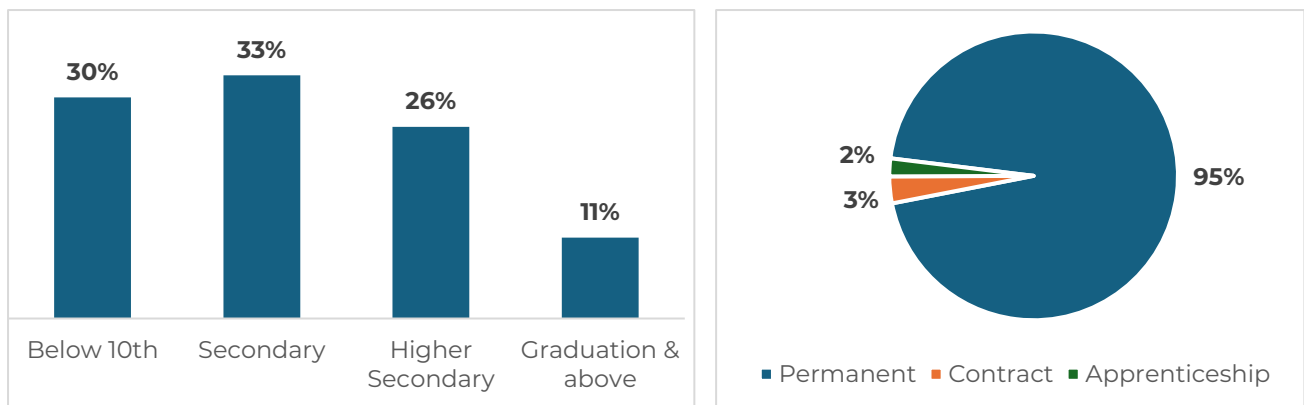
Workforce Characteristics, Mobility, and Skill Development

The sector's workforce is predominantly young, with 63% of workers aged up to 30 years, indicating a relatively youthful labour force. Women account for ~60% of total employment, highlighting the sector's role as a significant source of female employment, particularly in production-intensive functions.



Source: Primary Research Findings

Educational attainment is concentrated at the secondary and higher secondary levels (59%), while only 11% of workers possess graduate-level qualifications.



Source: Primary Research Findings

Employment is highly stable, with 95% of workers engaged in permanent positions. At the same time, workers report a total experience of 7.5 years compared with 1-1.5 years of average tenure with any factory, indicating that they largely remain within the industry while moving between employers in pursuit of better wages, improved working conditions, or career advancement opportunities.

Migration Patterns

Inter-state migration is a defining characteristic of the sector's workforce, with ~47% of workers employed outside their state of origin. Major source states such as Uttar Pradesh (28%) and Bihar (26%) supply a substantial share of the migrant workforce to key manufacturing hubs, reflecting the sector's dependence on labour mobility to meet production demand.

Origin State	Share %	Primary Destination
Uttar Pradesh	28%	Delhi NCR / Haryana
Bihar	26%	Delhi NCR / Gujarat
West Bengal	9%	Tamil Nadu/ Delhi NCR
Jharkhand	9%	Tamil Nadu/ Karnataka
Odisha	6%	Tamil Nadu/ Karnataka
Assam & Meghalaya	6%	Tamil Nadu
Himachal Pradesh	4%	Punjab
Madhya Pradesh	4%	Gujarat
Others (Chhattisgarh etc.)	~8%	Delhi NCR / Karnataka

Source: Primary Research Findings

The findings indicate that migration is driven by employment opportunities and wage differentials across regions, making workforce mobility an integral feature of the industry's labour market.

Task Difficulty Across Production Functions

Task difficulty data from the workforce reinforces the findings from the production floor. The three most commonly cited areas of difficulty are maintaining production speed, machine setup and changeovers, and handling style changes, each reported by 11% of respondents. These challenges reflect the increasing operational demands arising from shorter product cycles, technology adoption, and greater product variety. Department-specific challenges vary according to production processes, with line supervisors facing difficulties in following new production methods, quality inspectors adapting to different fabric types, and cutting and finishing workers responding to changing styles and production requirements.

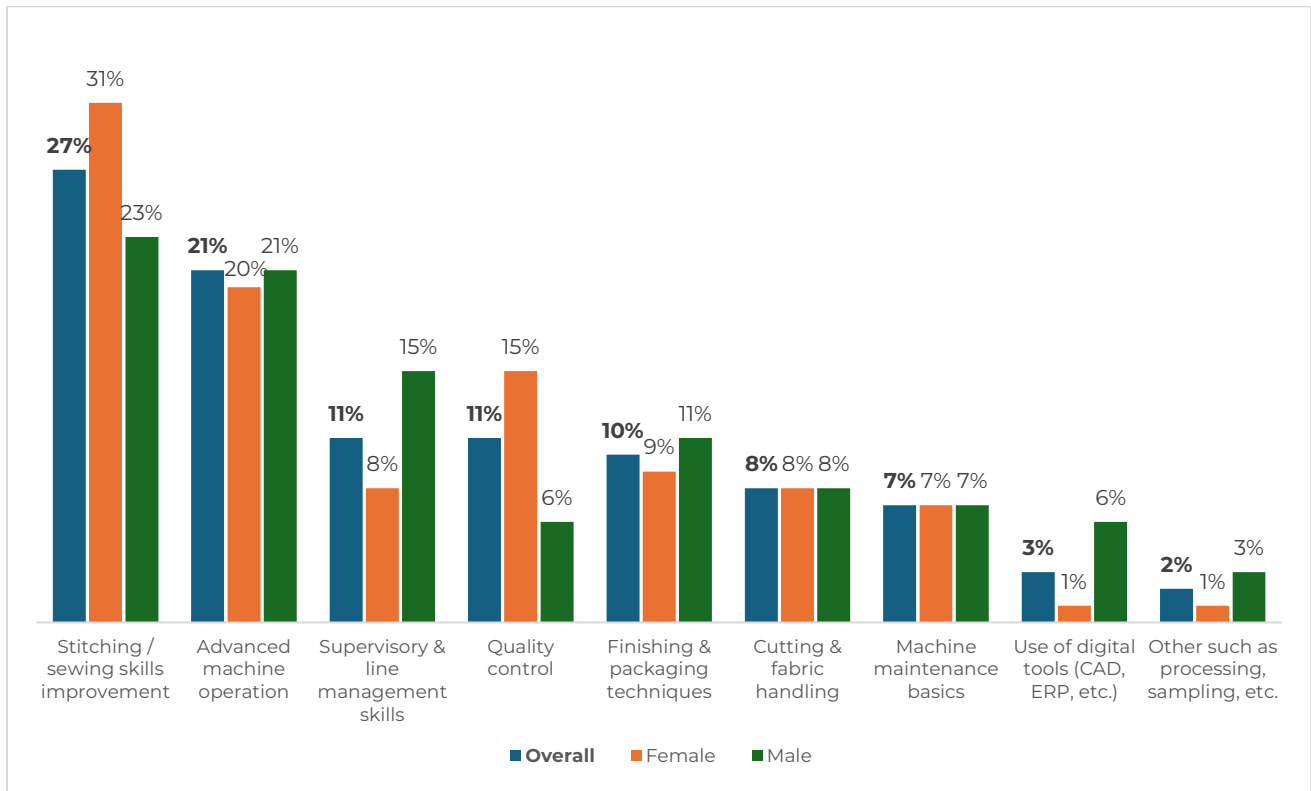
Process	Top Areas of Difficulty		
	Rank #1	Rank #2	Rank #3
Stitching	Maintaining production speed (16%)	Machine setup / changeover (13%)	Maintaining Quality Standards (12%)
Cutting	Following new methods (20%)	Handling style changes (14%)	Handling different fabric types (11%)
Finishing & Packing	Handling style changes (13%)	Following new methods (10%)	Understanding technical instructions (8%)
Quality Inspection	Handling different fabric types (20%)	Handling style changes (15%)	Meeting production targets (14%)
Line Supervision	Following new methods (31%)	Machine setup / changeover (21%)	Dealing with machine breakdowns (17%)
Embroidery	Meeting production targets (17%)	Machine setup / changeover (17%)	Understanding technical instructions (14%)
Overall	Maintaining production speed (11%)	Machine setup / changeover (11%)	Handling style changes (11%)

Source: Primary Research Findings

Overall, the findings suggest that the workforce is equipped for routine operations but requires continued upskilling to adapt to increasing product variation, process complexity, and evolving production practices.

Workforce Training Preferences

Workers show a consistent willingness to participate in skill development, with training preferences spread across different competency areas. Stitching and sewing skills improvement is the most preferred training area (27%), followed by advanced machine operation (21%) and supervisory and line management skills (11%). Training preferences are broadly similar across gender groups, indicating common priorities for strengthening both technical and supervisory capabilities. Interest in quality control (11%) and finishing and packaging techniques (10%) further reflects the sector's evolving production and quality requirements.



Source: Primary Research Findings

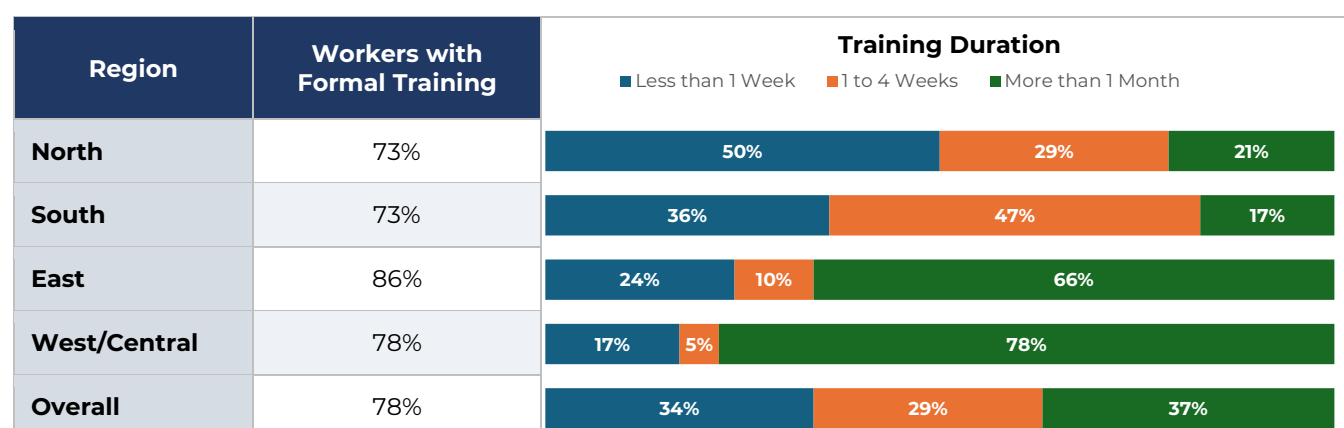
Emerging Workforce Requirements: Stakeholder Perspectives

Consultations with machinery manufacturers, industry associations, and training institutions present a consistent view of the sector's evolving skill requirements. Across stakeholder groups, automation, digital transformation, and the growing use of man-made fibres (MMF) are expected to reshape production processes and workforce requirements over the coming years. There is broad agreement that emerging demand will increasingly extend beyond shop-floor operations to include pre-production functions, digital manufacturing, sustainability, compliance, and data-enabled roles.

Stakeholders also indicate that the current training ecosystem will need to evolve to support these changing requirements. Priority areas include strengthening curriculum in automation, digital technologies, ESG, and advanced technical functions, while expanding industry-led training, trainer capability, and institutional partnerships.

Training Access and Delivery

Formal training reaches a majority of the workforce, with 78% of workers reporting having received structured training. However, access and training duration vary across regions. The East (86%) reports the highest training coverage, while the West/Central region is in line with the national average at 78%; both, however, show a larger share of workers trained for more than one month. In contrast, training in the North and South is more commonly of shorter duration.

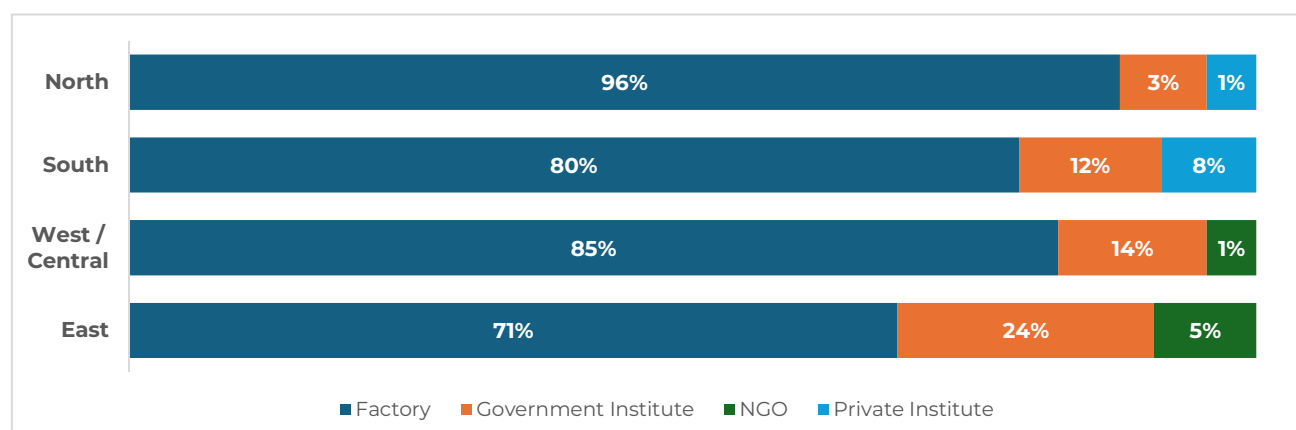


Source: Primary Research Findings

Overall, while formal training is widely available, strengthening the depth, duration, and consistency of training programmes across regions is essential to support long-term workforce capability and evolving industry requirements.

Training Provider Structure

Employers are the primary providers of workforce training, with 82% of trained workers receiving training directly from their factories. Factory-led training accounts for the majority of training across all regions, particularly in the North (96%) and West/Central (85%), while the contribution of government institutions, private providers, and NGOs remains comparatively limited.

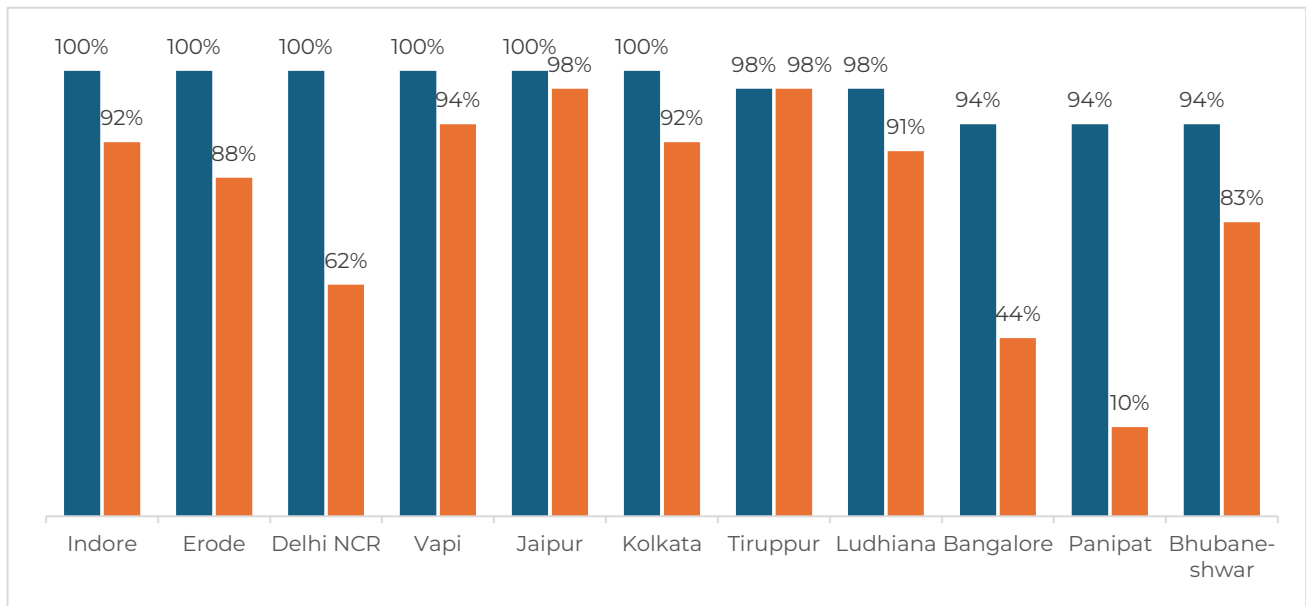


Source: Primary Research Findings

The findings indicate that the sector's training ecosystem is largely driven by immediate production requirements, with relatively limited institutional participation in workforce development. Strengthening partnerships between industry and external training institutions can help broaden training access, improve training depth, and support long-term capability building across the sector.

Training Aspiration and Access

Workers across all clusters show a consistently high aspiration to acquire new skills, with training aspirations ranging from 94% to 100%. However, access to training varies considerably across locations. Clusters such as Jaipur and Tiruppur exhibit a close alignment between aspiration and access, while others, particularly Bengaluru and Panipat report substantially lower training access despite similarly high aspirations.



Source: Primary Research Findings

These findings indicate that differences in training infrastructure and institutional capacity continue to influence access across clusters. Addressing these regional disparities will be important to ensure that training opportunities are aligned with worker demand and the evolving skill requirements of the sector.

Training of Trainers

Stakeholder consultations indicate that strengthening trainer capability will be essential to support the sector's evolving skill requirements. While existing training systems have established delivery mechanisms, trainer expertise in areas such as automation, digital production systems, MMF processing, ESG compliance, and emerging manufacturing technologies remains limited.

As production technologies continue to evolve, maintaining trainer capability will require regular exposure to current industry practices and technological developments. The findings suggest that enhancing Training of Trainers (ToT) programmes and strengthening collaboration between industry, equipment manufacturers, and training institutions will be important to ensure that curriculum delivery remains aligned with evolving production systems and workforce skill requirements.

Key Skill Gaps

The consolidated assessment maps key skill gaps across immediate, emerging and futuristic horizons:

Priority	Skill Gap Area	Key Demand Signal
Perennial High Demand	SMO & Multi-skilling Pipeline	43% employer citation; acute in most of the major clusters
	Supervisory & Mid-management Pipeline	41% employer citation; supervisors promoted without formal preparation in 94% of factories
Emerging High Demand	Quality Management Systems	70% employer citation — highest-ranked emerging need nationally
	Automated Machine Operation	65% employer citation; 84% of workers confirm automation introduction
	Compliance & AQL Documentation	Buyer audit complexity expanding beyond basic AQL to traceability and ESG
	CAD / Digital Pattern Making	CAD present in 63% of factories; manual pattern making still dominant in MSMEs
	IE / Production Planning	IE absent in most MSMEs; directly implicated in the productivity gap compared to large factories
	Digital Skills (MIS/ERP)	28% employer citation; 2% worker awareness — indicates a structural adoption lag
Futuristic Demand	MMF/Synthetic Fabric Handling	Only 55% high preparedness; weakest competency rating in the survey
	ESG / Sustainability Compliance	26% employer citation; projected significant growth over 5–7 years from buyer mandates
	AI-based Data Analysis	Growing adoption of digital production platforms generates structured factory data, that requires quick and real-time analytical capability

Source: Primary Research Findings

Market Growth and Manpower Demand Projections

Parameters	2025	Business As Usual 2030	Likely Expansion 2030	Optimistic 2030
Market Size² (USD Bn.)				
Apparel	131.0	202.4	220.8	240.0
Home Textiles³	18.0	22.6	29.8	37.0
Total	149.0	225.0	250.6	277.0
Additional Employment (Lakhs)				
Apparel	—	26.85	45.33	64.35
Home Textiles	—	0.18	1.36	2.53
Total	—	27.03	46.69	66.88

Key observations from the projections:

- The sector is projected to record sustained growth across all market scenarios through 2030. Under the Business-as-Usual scenario, the combined market size is expected to expand from USD 149.0 Bn. in 2025 to USD 225.0 Bn. by 2030. Under the Likely Expansion and Optimistic scenarios, the market could reach USD 250.6 Bn. and USD 277.0 Bn., respectively. Apparel is expected to account for the majority of this growth, while the home textiles segment is also projected to expand steadily.
- The projected market expansion is expected to generate a cumulative 27.03 lakh additional employment by 2030 under BAU, rising to 46.69 lakh under Likely Expansion and 66.88 lakh under Optimistic.
- These projections indicate that sustained investment in workforce development, technology adoption, and industry-aligned skilling will be essential to meet the sector's future manpower requirements and support continued growth.

² Market size pertains to apparel and home textiles only, excluding upstream textile segments

³ Home Textiles include Home Furnishing and Made-Ups

Projected Employment by Job Role Segment

The sector's employment base is projected to expand through 2030 across all growth scenarios, generating demand for both training for new entrants and upskilling of the existing workforce. This section maps that demand across major job role segments and identifies the corresponding upskilling priorities for workers.

Cumulative and Additional Employment — Scenario Overview

Scenario	Additional Employment (in Lakhs, 2030)	Implication for Training Capacity
Business As Usual	27.03	Sustains current training throughput with incremental expansion in core sewing and finishing roles
Likely Expansion	46.69	Requires significant ramp-up in institutional training capacity, especially for production, quality, and supervision roles
Optimistic	66.88	Demands a near-doubling of current annual training output; requires new institutional infrastructure in emerging clusters

Employment Distribution by Job Role Segment

Projected market growth is expected to increase workforce demand across all major job role segments by 2030. The scale of employment generation will vary across the Business-as-Usual, Likely Expansion, and Optimistic scenarios, reflecting different industry growth trajectories.

Segment	Key Roles	% of Total Workforce		Additional Employment (in Lakhs, 2030)			Primary Upskilling Needs
				Business As Usual	Likely Expansion	Optimistic	
Core Sewing Machine Operations	Sewing Machine Operator	33.0%	53.2%	14.38	24.84	35.58	• MMF and synthetic fabric handling module • Multi-machine and multi-style operation • Automated sewing machine operation
	Sewing Machine Operator (Knits)	11.0%					
	Specialized Sewing Machine Operator	3.6%					
	Automated Machine Operation	3.8%					
	Sampling Tailor	1.8%					
	Self-Employed Tailor	0.0%					
Finishing and Packing	Finisher & Packer	14.5%	18.5%	5.00	8.64	12.37	• Quality standards for finishing and pressing • Style-specific finishing methods
	Pressman (Stitched Items)	4.0%					
Middle Management	Production Supervisor (Sewing)	2.2%	9.7%	2.62	4.53	6.49	• Buyer audit preparation and AQL operation • Line balancing, SAM, and style changeover management • IE fundamentals for MSME supervisors • MIS/ERP dashboard reading and production reporting • 2D/3D CAD proficiency (Lectra, Tukatech) • Generative AI tools for design and colourway exploration • ESG and traceability documentation • Sustainability regulations in export documentation • Digital buyer communication and MIS reporting • Advanced Data Analyst
	QC Executive (Stitched Items)	2.2%					
	Industrial Engineer (IE)	0.8%					
	Cutting Supervisor	0.3%					
	Fashion Designer	0.3%					
	Assistant Designer	0.2%					
	Pattern Master	0.3%					
	Advance Pattern Maker (CAD/CAM)	0.2%					
	Factory Compliance Auditor	0.2%					
	Merchandiser	0.5%					
	Export Executive	0.1%					
	Export Manager	0.1%					
	Sourcing Manager	0.2%					
	Record Keeper	0.6%					
	Boutique Manager	0.0%					
	QMS Specialist	0.2%					

Segment	Key Roles	% of Total Workforce		Additional Employment (in Lakhs, 2030)			Primary Upskilling Needs
				Business As Usual	Likely Expansion	Optimistic	
	CAD-CAM / Pattern Room Technician	0.2%					
	ESG / Sustainability Compliance	0.3%					
	AI/Digital Experts	0.5%					
	MIS / Data Analyst (Mfg.)	0.3%					
Quality & Inspection	Inline Checker (Sewing)	7.5%	7.5%	2.03	3.50	5.02	- Quality Management Systems (QMS) - Statistical Process Control
Pre-Production and Cutting	Fabric Cutter	3.5%	5.2%	1.41	2.43	3.48	- MMF-specific cutting parameters - Fabric lay management
	Layerman (Fabric)	1.0%					
	Sampling Coordinator	0.7%					
Others	Helper	4.0%	5.9%	1.60	2.75	3.95	- Advanced embroidery machine programming and multi-head operation - Craft succession for artisanal techniques - Chemical handling and safe operation in washing /processing
	Embroidery Machine Operator	1.0%					
	Washing Machine Operator	0.5%					
	Hand Embroiderer (Addawala)	0.0%					
	Processing Supervisor	0.4%					
TOTAL	All Roles		~100%	27.03	46.69	66.88	-

Projected employment growth is expected to be concentrated in production-oriented roles across all growth scenarios. Core Sewing Operations, which accounts for 53.2% of the workforce by 2030, are projected to generate the largest share of additional employment, followed by Finishing and Packing, Middle Management, Quality and Inspection and Pre-Production and Cutting functions. While demand will continue across all job role segments, the projected workforce expansion also highlights increasing upskilling requirements in areas such as automated machine operation, MMF processing, digital production tools, quality management, and supervisory capabilities.

Overall, the findings indicate that future employment growth will require both expansion of the workforce and continuous upskilling of existing workers to meet evolving production and technology requirements.

B. Study Framework

B.1 Study Architecture and Research Completion

The section presents the research architecture, the primary instruments deployed across all clusters and their coverage, and the analytical progression from interim findings to the consolidated assessments and recommendations in this Final Report.

B.1.1 Deliverable Series

The scope and findings were developed and reported across four successive deliverables, each building on the previous, progressing from research design and field planning, through primary evidence at the cluster and national level, to consolidated skill gap assessment, forward projections, and policy recommendations.

Table 2: Report Deliverable Series Structure

Report	Primary Purpose	Scope of Contents
Inception Report	Study design, research planning, and field visit plan preparation across all identified clusters.	- Study objectives, scope, and research approach across the full value chain - Cluster identification criteria - Sampling strategy: firm size, market orientation, technology level, and sector type - Research coverage framework: factory, worker, and stakeholder levels - Data analysis framework and key outcomes - Field movement plan and project work plan
Cluster Assessment First Interim Report	Granular primary evidence across all 11 clusters; cross-cluster pattern identification.	- Cluster profiles: Ludhiana, Delhi NCR, Panipat, Jaipur, Vapi, Indore (incl. Dhar), Kolkata, Bengaluru, Tiruppur, Erode–Karur, Bhubaneswar - Cluster-level assessment: industrial structure, workforce, exports, value chain - Cross-cluster analysis: industrial archetypes, cross-cutting skill gaps, and training infrastructure
State and National Level Analysis Second Interim Report	State-differentiated national synthesis of completed primary research across all 11 clusters.	- Macro context: sector size, employment, trade position, and export distribution - Policy landscape: key schemes and sector growth targets - Sector and workforce structure: sub-sector, firm size, and employment concentration - Employer and worker findings: skill demand, attrition, training access, and aspiration data - Skill gap assessment; training ecosystem; automation readiness by state and region
Final Assessment Final Report	Consolidated cluster, state, and national findings, market projections to 2030, skill gap assessment, emerging job role framework, and strategic recommendations.	- Consolidated and validated skill gap assessment drawing on cluster, state, and national level findings - Emerging job role framework built from employer demand signals, worker aspiration data, and stakeholder inputs - Market growth and manpower demand projections to 2030 across three scenarios - Training capacity gap and requirements by state and cluster - Policy and strategic recommendations at the national, cluster, and institutional level

B.1.2 Primary Research Instruments and Coverage

Primary evidence was generated through three structured research instruments, administered across all 11 clusters.

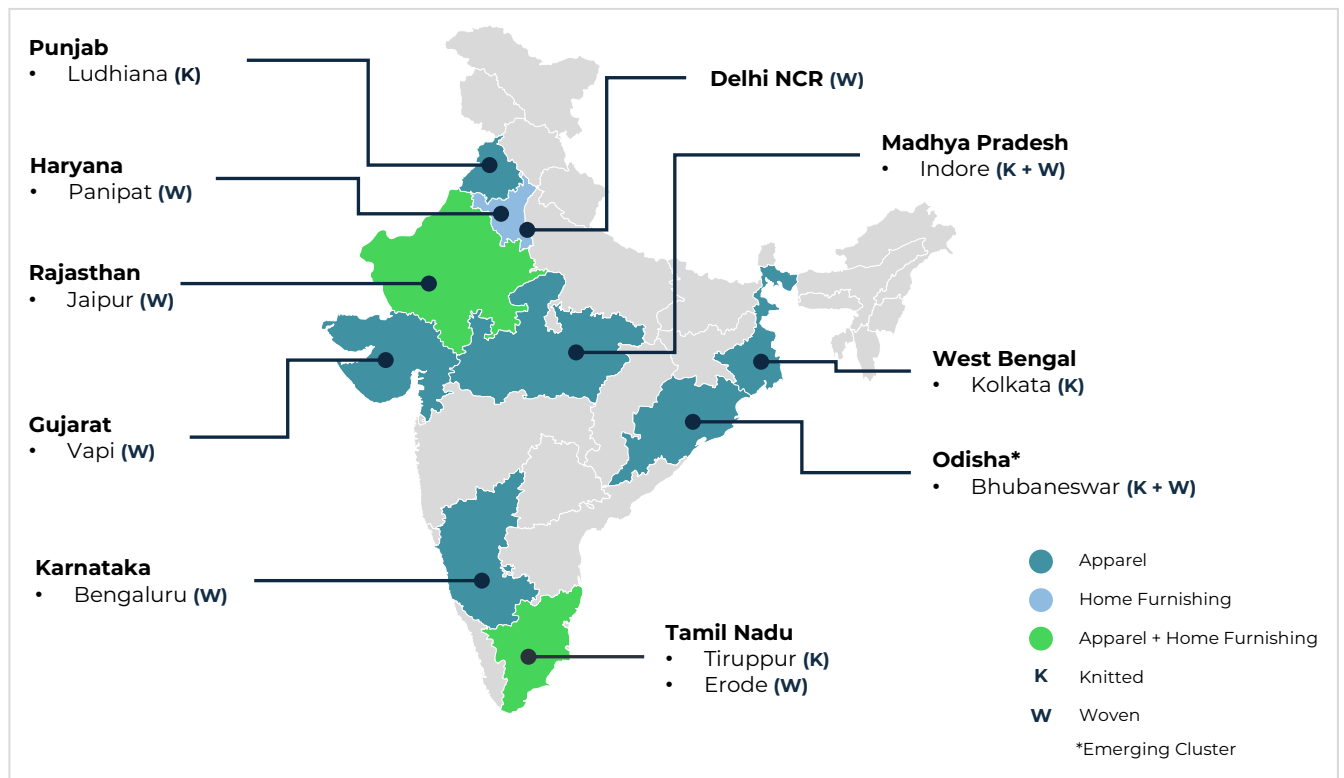
Table 3: Primary Research Coverage

Instrument & Respondents	Coverage
Instrument 1 Factory-Level Survey Respondents: Factory owners, production managers, and HR heads Data Collection Tool: Factory-Level Questionnaire (Refer Annexure 2)	Company profile, production operations, technology adoption, workforce composition, skill level, training provision, attrition, and emerging skill demand. Scope • Industry type, production segment, capacity, and processes covered • Machinery type across 12 production processes • Workforce size, gender ratio, age profile, local vs. migrant ratio, and education level • Deployment across specific job roles, from Sewing Machine Operator and Fabric Cutter to Industrial Engineer, Factory Compliance Auditor, and Merchandiser • Skill level ratings (Low / Medium / High) • Multi-skilling penetration and in-factory training provision • Monthly attrition rate, roles most affected, and primary attrition drivers • Emerging skill needs • Firm size stratified to include SSI, SME, and large units across organised and unorganised sector within each cluster • Market orientation covering export-oriented, domestic-market, and dual-market units within each cluster
Instrument 2 Worker-Level Survey Respondents: Individual workers, permanent, contractual, and apprentice, across all production departments Data Collection Tool: Worker-Level Questionnaire (Refer Annexure 2)	Worker demographics, employment and migration profile, task difficulty self-assessment, training access and duration, automation exposure and response, upskilling aspirations, and workplace challenges. Scope • Age, gender, education level, home state of origin, and current state of residence • Job role, department, and type of employment (permanent, contract, or apprenticeship) • Experience in the industry • Task difficulty including production speed, quality standards, style changes, fabric types, and advanced machine operation • Formal training received: provider, duration, and effectiveness • Awareness of and response to automation introduction at current factory • Upskilling aspiration and preferred training areas • Key workplace challenges including skill, wage, management, and personal dimensions

Instrument & Respondents	Coverage
Instrument 3 Stakeholder Consultations Respondents: Machinery manufacturers, industry associations, and training institutes conducted as structured qualitative discussions using separate guides for each stakeholder type. Data Collection Tool: Stakeholder Discussion Guides (Refer Annexure 2)	Technology evolution, automation and digitisation trends, workforce structure shifts, emerging and declining job roles, systemic skill gaps, training capacity and curriculum relevance, and five-year hiring and demand outlook. Scope • Machinery Manufacturers: Major innovations in last 5 years; processes likely to automate by 2030; fastest-adopted technologies; new and declining roles; digital skill gaps; curriculum gaps • Industry Associations: Current workforce structure and changes across operator, technician, supervisory, and management tiers; emerging roles in production, compliance, and sustainability; hardest roles to fill; clusters with highest employment growth potential • Training Institutes: Courses offered, annual capacity, and enrolment; curriculum update frequency; infrastructure and equipment; skills gaps among trainees; readiness for automated manufacturing; new courses required over the next 5–10 years

Research Coverage

Figure 1: Research Coverage



50

Factories Surveyed

Across 11 clusters, stratified by firm size and market orientation

500

Workers Surveyed

Permanent, contractual, and apprentice categories

4

Stakeholder Consultations

Machinery manufacturers, industry associations, and training institutions

Secondary Research Framework

Secondary research was conducted in parallel with field research, providing the structural and policy context within which primary findings are interpreted.

- **Export and trade data:** Government trade databases covering state-level and cluster-level T&A export profiles, trend analysis, and India's position in global textile and apparel trade.
- **Policy documentation:** Central government scheme documentation covering infrastructure development, production-linked incentives, technical textiles, skilling programmes, and export remission frameworks.
- **Training ecosystem documentation:** National vocational training syllabi, and state skill mission reports across key producing states.
- **Sector and workforce research:** Industry reports and institutional research on workforce demographics, migration patterns, productivity benchmarks, and T&A sector performance.

B.2 Scenario Development

All market projections and manpower demand estimates in this study are structured around three distinct scenarios. Rather than committing to a single forecast, the three-scenario framework is designed to bound the plausible range of outcomes for India's apparel and home textile sector between 2025 and 2030. Each scenario reflects a coherent and internally consistent view of how the key drivers of sectoral growth including domestic consumption, export performance, policy execution, and structural transformation, might evolve over the projection horizon (2026-2030).

The three scenarios are: Business As Usual (BAU), Likely Expansion (LE), and Optimistic.

B.2.1 The Three-Scenario Framework

Business As Usual (BAU)

The BAU scenario represents the trajectory of the sector if the conditions broadly prevailing currently persist through 2030, neither deteriorating nor experiencing meaningful structural acceleration. It is a no major change baseline in which growth continues at its recent organic pace, policy programmes remain operational but do not shift outcomes at scale, and India's competitive position in global trade does not structurally improve.

On the domestic side, the market grows proportionally with India's GDP, with no step-up in the sector's share of consumer expenditure. On the export side, incremental and organic growth continues along the recent trajectory, with India maintaining rather than expanding its share in global trade. PLI and PM MITRA schemes are in place, but uptake remains limited; China+1 opportunity capture is minimal; and technology upgradation proceeds at an incremental pace consistent with the historical norm.

Likely Expansion

The Likely Expansion scenario describes a future in which the sector makes real but limited progress, not locked into the status quo of BAU, but short of the conditions required for full policy ambition to materialise. It is the scenario of partial momentum: policy frameworks are operational and beginning to deliver, structural tailwinds are being captured, but execution gaps and systemic constraints moderate the pace of transformation.

Domestically, the market benefits from gradual formalisation, rising per-capita income, and expanding retail penetration, consistent with the direction of observed historical trends. On the export side, India advances its competitive position in global trade. PLI and PM MITRA see meaningful but moderate uptake, and technology and capacity investment accelerates at a measured pace.

Optimistic

The Optimistic scenario represents the upper bound of plausible outcomes, the trajectory that becomes possible if India's stated policy ambitions are fully realised, structural reforms deliver their intended scale effects, and the global environment remains conducive to rapid Indian export growth. It is not a speculative ceiling. It is anchored to specific, publicly stated Government of India export targets for 2030 and rests on a coherent set of enabling conditions, all of which are within the realm of policy action.

Domestically, the market reaches the upper end of its historically consistent trajectory, reflecting a combination of higher per-capita consumption, continued formalisation of the retail and manufacturing base, and the full dividend of infrastructure investment under PM MITRA and related programmes. On the export side, India captures a substantially larger share of global trade by fully executing PLI incentives, leveraging FTA-enabled market access, and benefiting decisively from the supply chain diversification away from China and Bangladesh that global buyers are actively pursuing.

B.2.2 Study Methodology

The market and manpower projections in this study are produced through a Market-Based Manpower Projection Framework that translates sectoral market growth into incremental workforce demand in a structured, step-by-step sequence. The full methodology is documented in Part E; this section provides a summary of the approach.

- **Market Segmentation:** The total market is disaggregated into two discrete projection streams: Domestic Market and Exports (Apparel & Home Textiles). Each stream follows a distinct growth pattern and is projected independently, given its different sensitivity to macroeconomic drivers.
- **Domestic Market Projections:** Domestic market size is projected using a Market-to-GDP ratio method, anchored to IMF's India GDP growth forecasts. The ratio is calibrated differently across the three scenarios; held flat at the 2025 level under Business As Usual, extended along the historical trendline under Likely expansion, and under Optimistic the 2030 endpoint is back-calculated such that Likely Expansion represents the arithmetic average of Business As Usual and Optimistic growth rates, with intervening years populated using the Y-o-Y changes implied by the same trendline.
- **Export Projections:** Export performance is estimated through an OLS regression model linking India's export performance to World GDP growth, run on historical data from 2012 to 2025. India's share of global trade is then projected separately for each scenario, ranging from organic incremental growth under BAU to the Government's stated 2030 export targets under Optimistic.
- **Inflation Adjustment:** In both domestic and export streams, growth attributable to inflation is stripped out to isolate real, demand-driven expansion. Domestic projections use relevant CPI indices (Clothing for Apparel; Furnishings and Household Equipment for Home Textiles); export projections use the Unit Value Realization (UVR) CAGR.
- **Value of Production (VoP):** The inflation-adjusted incremental market size is converted to Value of Production using a retail multiplier that adjusts for trade and retail margins, translating consumer-facing market value to manufacturing-level output value.
- **Employment Estimation:** Incremental VoP is split between organised and unorganised segments using a formalisation trajectory. The organised sector's share of production rises progressively from 40% to 45% in Apparel and 48% to 53% in Home Textiles by 2030. Segment-specific employment intensity norms are then applied: Apparel uses a machine-based model (machines per USD 1 Bn. VoP × Man-to-Machine Ratio); Home Textiles uses a direct VoP-per-employee model reflecting its more capital-intensive production structure. The resulting figures are summed up to produce cumulative employment for both sectors.

C. Cluster Profiling

The study covers the following eleven clusters, selected based on (a) scale of activity, (b) export orientation, (c) representation across the value chain (yarn, fabric, processing, garment manufacturing, home furnishing and made ups), and (d) geographic spread across northern, southern, eastern and western India:

Table 4: Clusters Covered in the Study

#	Cluster	State	Dominant Production Profile
1	Ludhiana	Punjab	Woollen & acrylic knitwear, hosiery, yarn
2	Delhi NCR	Delhi / Haryana / UP	Woven RMG, ladies' fashion, accessories
3	Panipat	Haryana	Home furnishing & made-ups, recycled-yarn
4	Jaipur	Rajasthan	Block-printed apparel (ethnic wear), home furnishing
5	Vapi	Gujarat / DNH&DD	Capital intensive garment and home furnishing
6	Indore (incl. Dhar)	Madhya Pradesh	Cotton garments, large investment-stage cluster
7	Kolkata	West Bengal	Hosiery, woven RMG, handloom
8	Bengaluru	Karnataka	Premium woven RMG export hub; outerwear, denim, silk
9	Tiruppur	Tamil Nadu	Knitwear capital — cotton T-shirts, innerwear, exports
10	Karur (with Erode)	Tamil Nadu	Home furnishing, made ups
11	Bhubaneswar	Odisha	Emerging investment-stage cluster — innerwear, activewear, woven RMG

C.1 Ludhiana (Punjab)

Diversified Textile & Industrial Cluster — Knitwear, Hosiery & Woollen

C.1.1 Cluster Overview

Ludhiana is one of India's most diversified industrial clusters outside major metropolitan regions. The cluster operates within a broader industrial ecosystem comprising engineering goods, bicycles, and auto components, all supported by a common MSME base.

Table 5: Ludhiana Cluster Profile

Cluster Name	Ludhiana
State	Punjab
Constituent District(s)	Ludhiana District
Dominant T&A Segment	Woollen & Acrylic Knitwear; Cotton Hosiery; RMG (Sweaters, Jackets, T-shirts, Sportswear); Yarn Spinning
Other Major Industries	Bicycles & auto parts, engineering goods, hand tools, machine tools (non-T&A)
Cluster Type	Tier 1 Diversified Industrial City — T&A is a major but not exclusive sector
Primary T&A Export Category	Woollen/Acrylic Knitwear (Sweaters, Pullovers, Cardigans, Jackets); Cotton Hosiery; Yarn
Key Industry Bodies	Ludhiana Hosiery Manufacturers Association; Knitwear Club; Northern India Textile Mills' Association (NITMA); FICCI Punjab Chapter

Ludhiana's T&A base is anchored by woollen and acrylic knitwear, cotton hosiery, and yarn spinning, structured across two layers — a large-enterprise anchor tier comprising Vardhman Group, Monte Carlo, and Nahar Group, and a broad MSME ecosystem of approximately 14,000 hosiery manufacturers, dye houses, and job-workers. A decentralised power loom base of approximately 15,000 units enables flexible small-batch production across established industrial zones including Focal Point Industrial Estate and Dhandari Kalan. The cluster is undergoing a structural transition toward export orientation and branded retail, supported by Punjab Textile and Apparel Policy incentives including machinery subsidies and tax benefits.

C.1.2 Demographics & Workforce

Population Profile

Table 6: Ludhiana Cluster Population Profile

(in Lakhs; unless specified)

Indicator	Total	Male	Female
Total Population	34.99	18.68	16.31
Working-Age Population (15–59)	22.91	12.18	10.73
Young Population (15–34)	13.04	7.03	6.01
Sex Ratio (per 1,000 males)	873	—	—

Source: Census of India 2011

Workforce in T&A Sector

Ludhiana's T&A sector employs ~3–4 lakh workers directly and indirectly. The workforce is predominantly male, reflecting the hosiery and knitwear industry's reliance on male migrant workers from other states. The cluster has a large informal and unregistered MSME workforce, making precise enumeration difficult.

Table 7: Workforce in Ludhiana's T&A sector

Workforce Indicator	Estimates
Total T&A workforce (direct + indirect)	~3 - 4 lakh
Total industrial workforce (all sectors)	~10 lakh
Female share of T&A workforce	~20-25%
Migrant worker share	~50–60% of industrial workforce (UP, Bihar, Rajasthan migrants)
Registered knitwear/hosiery units	~10,000 hosiery/knit units; ~14,000 MSMEs across T&A

Source: Industry Publications

Female Workforce Participation

Overall female workforce participation rate in Ludhiana district is estimated at ~20-25% well below the national average. Within T&A, women are more represented in sewing and finishing operations in RMG units, but the hosiery and woollen knitwear segments are historically male dominated. Punjab has introduced labour reforms and facilitation measures to support workforce participation, with the Punjab Textile and Apparel Policy 2026 providing measures to enhance women's employment in the sector.

C.1.3 Export Profile

Table 8: Ludhiana Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Exports (USD Mn.)	2,430	2,433	~ 2,700
T&A Exports (USD Mn.)	881 (36%)	839 (34%)	~ 790 (29%)
Share in India's Total T&A Exports	2%	2%	2%
Primary T&A Product Exported	Men's shirts, T-shirts/vests, jerseys/pullovers/cardigans, synthetic & cotton yarn		
Primary Export Destinations	Europe (Germany, UK, France), USA, Middle East, Africa, Australia		
Key Global Buyer Brands	GAP, H&M, Target, NEXT, Tom Tailor		

Source: DGCI&S

C.1.4 Skill & Training Infrastructure

Key Occupational Categories

Table 9: Key Occupational Categories in Ludhiana Cluster

Occupational Category	Role Examples	Demand Level
Knitting Machine Operation	Flat Knitting Machine Operator, Circular Knit Operator, V-Bed Machine Operator	Very High
Garment Sewing & Assembly	Sewing Machine Operator, Linking Machine Operator, Mending Worker	High
Quality Assurance	Inline Inspector, Lab Technician (colour fastness), AQL Auditor	Medium-High
Industrial Engineering	IE Executive, Line Supervisor, Production Planner	Medium-High
Merchandising & Design	Junior Merchandiser, Knitwear Designer, Product Development Executive	Medium
Machinery Maintenance	Knitting Machine Mechanic, Fitter (textile machinery), Electrical maintenance	Medium — critical gap in specialised flat-knit machinery

Training Infrastructure

Table 10: Training Infrastructure in Ludhiana

Institution	Type / Programmes	Remarks
ATDC Centre, Ludhiana	B. Voc (AME & FDR); Diploma courses (AMT, FDT); short-term SMO & hosiery operator courses; RPL under PMKVY	Est. 1996; strong industry tie-ups with Monte Carlo, KG Exports, Space Fashion
NSTI (National Skill Training Institute) Ludhiana	Crafts Instructor Training; CITS; Advanced Vocational Training; engineering and textile trades	Govt. of India (MoLE/DGT); established 1963; ISO 29990:2010 certified; focus on instructor training
Govt. Institute of Textile Chemistry & Knitting Technology	Diploma in textile chemistry, knitting technology, dyeing	State government institution; serves the cluster's dyeing and knitting machinery needs
ITIs (Government & Private)	Sewing Technology, Weaving, Textile Design trades; fitter, electrician trades for machinery maintenance	Multiple ITIs in Ludhiana district;
In-factory / OJT	On-the-job training by large firms (Vardhman, Monte Carlo); informal apprenticeship in hosiery units	Dominant mode of skill transfer; majority of workers trained informally; RPL programmes being used for certification

C.1.5 Value Chain Penetration

Fibre / Yarn	Weaving	Knitting	Processing / Dyeing	Garment Manufacturing	Made-Ups / Home Furnishing
✓ Cotton, wool & synthetic yarn; Vardhman Group is India's largest yarn producer	✓ ~15,000 power looms; dress material, suiting & shirting	✓ Core activity; ~10,000 hosiery/knit units; weft & warp knitting; flat knitting (winterwear); circular knit (cotton hosiery)	✓ Major activity; Disperse (polyester), Reactive, Acid & Basic dyes; multiple dye houses in Focal Point	✓ Significant; sweaters, jackets, t-shirts, sportswear, men's shirts	– Not a significant segment (few large blanket and throw manufacturers are present)

C.1.6 Top Product Categories

Table 11: Top Product Categories for Ludhiana Cluster

#	Product Category	Details
1	Woollen & Acrylic Knitwear	Sweaters, pullovers, cardigans, jackets, mufflers, gloves; domestic + export
2	Cotton Hosiery & Innerwear	Banians, vests, briefs, socks, thermals; major domestic market supply for North India
3	Cotton & Synthetic Yarn	Vardhman Group is India's largest yarn producer; cotton, acrylic, synthetic yarn exported globally
4	Woven Dress Material / Suiting	Power looms producing polyester-cotton blended dress material, shirting
5	RMG — Casual & Sportswear	T-shirts, sweatshirts, tracksuits; growing segment for domestic brands (Monte Carlo) and exports

C.2 Delhi NCR

Delhi – Gurugram – Noida | Metro Apparel Export Cluster

C.2.1 Cluster Overview

Delhi NCR is treated as a single metro cluster spanning four administrative jurisdictions. The four nodes have distinct specialisations within the overall apparel value chain:

Table 12: Node Profiling for Delhi NCR

Node	Specialisation	Anchor Units
Gurgaon (Gurugram)	Fashion apparel, premium wovens, export houses HQ, compliance offices	Orient Craft, Pearl Global, Matrix Clothing, Richa Global, Modelama
Noida / Greater Noida	Woven & knit RMG, hosiery, knitting units, large integrated exporters	Shahi Exports (HQ Delhi/Faridabad), Sahu Exports, Paragon Apparel, New Delhi Export House
Faridabad	Woven garments, hosiery, lingerie, innerwear; one of the largest export houses anchored here	Shahi Exports (corporate HQ), Pee Empo, ATM Exports, Richa Industries
Delhi (Okhla, Rohini, Narela, Wazirpur)	SME/MSME garment units, embellishment, embroidery, job work for export houses	Multiple MSME export units; OGTC

Delhi NCR houses the most complex and stratified garment industry structure in India. It combines globally competitive mega-exporters such as Shahi, Orient Craft, and Pearl Global with a large base of small and medium export houses, supported by an extensive informal subcontracting ecosystem.

The cluster's primary competitive advantage lies in its product diversity and value-addition capability, with manufacturers handling a wide range of fabrics, styles, and finishes. NCR is particularly strong in woven garments, fashion-led products, and embellished categories, enabling it to cater to high-mix, low-volume orders with elevated design complexity. This positions the cluster strongly in mid- to high-value export segments but also creates dependence on these relatively volatile and demand-sensitive categories.

Table 13: Delhi NCR Cluster Profiling

Cluster Type	Tier 1 Metro Export Cluster — one of India's largest RMG export regions by value
Dominant T&A Segment	RMG — Woven Garments (shirts, trousers, dresses, outerwear, ladies' fashion, kids wear); value-added and embellished garments
Secondary T&A Segments	Knit RMG (Noida hosiery cluster); home furnishing & made ups (Ghaziabad); embroidery & embellishments (Okhla, Wazirpur)
Key Industry Body	AEPC (National HQ at Apparel House, Gurgaon); Noida Apparel Exporter Cluster (NAEC); Faridabad Industries Association
Infrastructure	NOIDA Special Economic Zone (NSEZ); Apparel House, Gurgaon (AEPC); proposed 200-acre Apparel Park (NAEC–Yamuna Expressway Authority MoU)

Key manufacturing hubs driving this diversified production system include Udyog Vihar (Gurgaon), Okhla Industrial Area (Delhi), NSEZ and Noida Hosiery Complex, DLF Industrial Area (Faridabad), Wazirpur (Delhi), and IMT Manesar — collectively supporting the full value chain from large export units to MSME-led ancillary operations.

Table 14: Node-wise Breakdown of Manufacturing Units

Noida + Greater Noida	>2,500 units; Noida Hosiery Complex (Ph II), NSEZ; integrated knit + woven exporters; NAEC cluster
Gurgaon (Gurugram)	~500 export houses; concentrated in Udyog Vihar (5 phases), Pace City, IMT Manesar, Sohna Road belt; premium fashion and woven apparel
Faridabad	~300 units; DLF Industrial Area Phase 1 & 2, Mathura Road belt, Sector 28 & 37; strong knit and woven garment base; Shahi's HQ and largest NCR factories here (SIDBI Faridabad Cluster DPR)
Delhi	~1,000 garment/embellishment MSME units; Okhla Industrial Area Phase I & II (densest); Wazirpur (embroidery/printing); Narela (mid-size RMG); large informal home-based embellishment workforce
Total NCR Cluster	~3,500–4,000+ manufacturing units across all four nodes; significantly higher if informal/unregistered units included
Global buyer sourcing offices (unique to NCR)	India's largest buyer-office concentration: GAP (Delhi), H&M (Okhla/Gurgaon), M&S (Gurgaon), Walmart (Gurgaon), Li & Fung (Gurgaon), Impulse (Gurgaon), Triburg (Gurgaon), William E. Connor (Gurgaon)

C.2.2 Demographics & Workforce

Population Profile (Constituent Districts)

Table 15: Delhi NCR Cluster Population Profile

(in Lakhs; unless specified)

Indicator	Total	Male	Female
Total Population	217.60	116.60 (54%)	101.00 (46%)
Delhi (UT)	167.88	89.87 (54%)	78.01 (46%)
Gurgaon (Haryana)	15.14	8.17 (54%)	6.98 (46%)
Faridabad (Haryana)	18.10	9.66 (53%)	8.44 (47%)
Gautam Buddha Nagar / Noida (UP)	16.48	8.90 (54%)	7.58 (46%)
Total Working Age Population (15-59)	141.45	75.97	65.49
Delhi (UT)	110.58	59.42	51.16
Gurgaon (Haryana)	9.74	5.25	4.48
Faridabad (Haryana)	11.38	6.03	5.35
Gautam Buddha Nagar / Noida (UP)	9.75	5.26	4.49
Total Young Population (15-34)	84.22	45.23	38.99
Delhi (UT)	65.34	35.12	30.22
Gurgaon (Haryana)	5.91	3.20	2.71
Faridabad (Haryana)	6.86	3.61	3.24
Gautam Buddha Nagar / Noida (UP)	6.10	3.29	2.81

Source: Census of India 2011. Total is sum of four constituent districts.

Note: Actual NCR apparel cluster extends to parts of Sonipat, Ghaziabad and Greater Noida not captured here

Workforce in T&A Sector

Delhi NCR is home to one of India's largest concentrations of apparel export houses by value. The cluster employs an estimated ~5–6 lakh workers directly in garment manufacturing, with a significantly larger informal sub-contracting workforce.

A defining characteristic of the NCR T&A workforce is the male-dominance of the factory floor, driven by a heavily migrant workforce from UP, Bihar and Rajasthan. Women's participation is concentrated in sewing, embroidery and finishing, but overall sector-level female WFP remains structurally lower than southern clusters.

The cluster's strength in product diversity and value addition requires a more skilled and adaptable workforce compared to volume-driven clusters, increasing dependence on both skilled labour and subcontracting networks.

Table 16: Workforce in Delhi NCR T&A Sector

Workforce Indicator	Estimates
Direct employment in T&A — NCR cluster	~5–6 lakh
Female share of direct workforce	~30–40%
Migrant worker composition	~60–70% of factory floor workers are interstate migrants (UP, Bihar, Rajasthan)
Total units in the NCR Cluster	>3,500 units

Source: Industry Publications

Female Workforce Participation

Female workforce participation in Delhi NCR's apparel sector is estimated at 30–40%, well below the national sector average and significantly below southern clusters such as Tiruppur and Bengaluru. The lower participation is structurally driven by migration constraints for women into NCR, higher cost of living relative to wages, limited availability of worker housing & hostel infrastructure and concentration of women in informal/home-based roles rather than formal factory employment.

C.2.3 Export Profile

Table 17: Delhi NCR Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Cluster Exports (USD Bn.)	26.14	29.23	32.55
Cluster's T&A Exports (USD Bn.)	5.36 (21%)	4.94 (17%)	5.47 (17%)
Gautam Buddha Nagar / Noida (UP)	2.15	1.96	2.17
Gurgaon (Haryana)	1.56	1.48	1.72
Delhi (UT)	1.03	0.93	0.95
Faridabad (Haryana)	0.62	0.56	0.62
Share in India's Total T&A Exports	15%	14%	15%
Primary T&A Product Exported	Woven RMG: ladies fashion wear, shirts, trousers, dresses, kids wear; embellished/embroidered garments; knit garments		
Primary Export Destinations	USA, Europe (UK, Germany, France, Spain), Canada, Australia		
Key Global Buyer Brands	H&M, Zara (Inditex), Gap, Walmart, Uniqlo, Calvin Klein, PVH, Columbia, Marks & Spencer, JCPenney, Kohl's, C&A, Next, Primark, Ann Taylor		

Source: DGCI&S

C.2.4 Value Chain Penetration

Fibre / Yarn	Weaving / Fabric	Knitting	Processing / Dyeing	Garment Manufacturing	Value-Addition	Made-Ups / Home Furnishing
– Not significant in NCR; raw materials sourced from other clusters (Punjab, Gujarat, South India)	– Limited integrated fabric capacity; some captive mills	✓ Noida Hosiery Complex: ~3,500 units mix of knit garment exporters and fabricators	✓ Washing, dyeing, printing in Faridabad; embroidery hubs in Okhla, Wazirpur; decentralised processing	✓ Dominant activity: NCR is a leading hub for woven RMG exports in India;	✓ Major differentiator: hand embroidery, zari, sequins concentrated in Okhla, Wazirpur and home-based networks	✓ Ghaziabad (home furnishing); smaller compared to specialised clusters like Panipat

C.2.5 Top Product Categories

Table 18: Top Product Categories for Delhi NCR Cluster

#	Product Category	Details
1	Ladies' Fashion Wear (Woven)	Dresses, tops, blouses, skirts — Gurgaon's primary strength; high fashion quotient for H&M, Zara, Primark, Gap
2	Menswear — Shirts, Trousers, Outerwear	Volume woven; formal and casual; key buyers: PVH, Calvin Klein, Columbia, JCPenney; Orient Craft, Matrix, Modelama
3	Children's Wear	Growing segment; both woven and knit; Carter's, M&S, Next sourcing from Noida and Faridabad units
4	Embellished / Embroidered Garments	NCR's unique differentiator — hand embroidery, zari work, sequin embellishments; value-added exports to Europe and US
5	Knit Garments & Hosiery	Noida Hosiery Complex; T-shirts, polo shirts, innerwear; complements the woven dominant cluster

C.2.6 Skill & Training Infrastructure

Key Occupational Categories

Table 19: Key Occupational Categories in Delhi NCR Cluster

Occupational Category	Role Examples	Demand Level
Production / Sewing	Sewing Machine Operator, Cutting Master, Pattern Cutter	Very High — chronic shortage despite migrant inflows
Embellishment / Value-Addition	Hand Embroiderer, Sequin / Bead Artisan, Smocking Operator, Digital Embroidery Technician	High — unique to NCR; critical for Value-added exports
Quality Assurance & Compliance	Inline Inspector, Final Inspector, Technical Compliance Officer, Social Audit Coordinator	Very High — large buyers (H&M, Inditex, M&S) require rigorous compliance; growing demand
Merchandising	Junior/Senior Merchandiser, Product Developer, Sourcing Coordinator	High — largest concentration of buyer offices and sourcing desks in India; strong demand
Industrial Engineering	IE Executive, Time & Motion Analyst, Efficiency Planner	High — large export houses have structured IE functions; MSME units severely lacking
Washing & Processing	Garment Washing Technician, Dye House Supervisor, Finishing Expert	Medium-High
Fashion Design / CAD	CAD Operator (Lectra/Gerber), Sample Maker, Pattern Grader	Medium — concentrated in Gurgaon premium export houses
Logistics & Compliance	Export Documentation Executive, Customs & DGFT Compliance, ESG/Sustainability Coordinator	Growing — ESG compliance increasingly buyer-mandated

Training Infrastructure

Delhi NCR has one of the highest concentrations of apparel training infrastructure in India, anchored by ATDC's National Headquarters in Gurgaon, along with NIFT Delhi and multiple AEPC-supported institutions.

Table 20: Training Infrastructure in Delhi NCR

Institution	Type / Programmes	Remarks
ATDC National HQ + 7 NCR Centres	B. Voc (AME, FDR); Diploma (AMT, FDT); Certificate (SMO, Merchandiser, Pattern Maker); short-term PMKVY courses; RPL	Centres at: Gurgaon (NHQ), Okhla, Noida Sector 24, Faridabad, Rohini, Dilshad Garden, Dwarka. Delhi Govt. sponsors free courses/yr via DSFDC
NIFT Delhi (National Institute of Fashion Technology)	B. Des, M. Des, M. F. Tech, B. F. Tech; fashion design, garment technology, fashion management	Directly feeds NCR's export houses and brands with design and technical talent
AEPC Apparel House, Gurgaon	Industry support, buyer facilitation, compliance training, ISDS scheme administration	AEPC national headquarters; operates compliance and ethics training programmes for member exporters in NCR
ITIs (Govt. — Delhi, Haryana, UP)	Sewing Technology, Fashion Design Technology, Embroidery & Needlework trades	Multiple ITIs across NCR; Narela, Wazirpur, Faridabad, Noida;
In-factory Training (Large Exporters)	Structured OJT at large export houses (Shahi, Orient Craft, Pearl Global); training in compliance, IE and quality systems	Large exporters maintain formal training systems; majority of MSME workforce continues to rely on informal skill acquisition

C.3 Panipat (Haryana)

Specialised Home Furnishing & Recycled Textile Cluster

C.3.1 Cluster Overview

Table 21: Panipat Cluster Profile

Cluster Name	Panipat
State	Haryana
Constituent District(s)	Panipat District
Key Towns / Areas	Panipat city; industrial areas Sector 25 (I & II), Sector 29 (I & II); HUDA industrial area; Kharkhoda; Samalkha
Dominant T&A Segment	Home Furnishing & Made-Ups (blankets, carpets, durries, curtains, bed covers, bathmats, rugs, terry towels); Shoddy/Recycled Yarn Spinning
Secondary Segments	Handloom woven products; power loom dress material & upholstery; floor coverings (tufted carpets)
Cluster Type	Tier 2 Specialised Export Cluster — India's single largest home furnishing / made-ups production hub
Key Industry Bodies	Handloom Export Promotion Council (HEPC) — 400+ registered member exporters in Panipat; All India Woollen & Shoddy Mills Association
Unique Identifier	One of the world's largest recycled textiles / shoddy yarn hubs; they process nearly 4,000 TPD textile waste having major portion of imported textile waste, sourced primarily from European, Asian and North American countries

Panipat is one of India's most concentrated clusters for home furnishings and recycled textiles, with an industrial base almost entirely oriented towards home furnishing and made ups.

The cluster operates through a tightly interlinked ecosystem comprising handlooms, carpets, power loom weaving, and downstream processing units. Among these, the power loom segment dominates in terms of scale, employment, and output, forming the backbone of mass production for home textile categories such as blankets, rugs, and furnishings.

Historically, Panipat's competitive identity has been anchored in its shoddy and recycled yarn segment, which enabled cost competitiveness and circularity-led production. However, this segment has witnessed a structural decline due to increasing global competition, quality limitations, and shifting buyer preferences. Despite this, it retains strategic relevance in the context of sustainability-driven demand and circular textile value chains, particularly in export markets.

The industrial structure is predominantly micro and small enterprise-led, with a layer of mid-sized export houses driving international market access and product development. Notable exporters

include Mahajan Overseas, Masper Overseas, Paliwal Group, SPJ Textiles, Raj Overseas, Handfab Home, Rivera Home Furnishings, Golden Terry Towels, Devgiri Group, and Javi Homes. However, the absence of large, anchor corporates limit the cluster's ability to drive technology upgradation, branding, and large-scale compliance standardization.

Overall, Panipat's strength lies in its deep specialization in home furnishing and cost-efficient, integrated production ecosystem, but this is counterbalanced by fragmentation, limited scale at the enterprise level.

C.3.2 Demographics & Workforce

Population Profile

Table 22: Panipat Cluster Population Profile

(in Lakhs; unless specified)

Indicator	Total	Male	Female
Total Population (2011 Census)	12.05	6.47 (54%)	5.59 (46%)
Working-Age Population (15–59)	7.40	3.95	3.45
Young Population (15–34)	4.54	2.44	2.10
Sex Ratio (per 1,000 males)	864	—	—

Source: Census of India 2011

Workforce in T&A Sector

The Panipat textile cluster is the dominant employer in the district, with an estimated ~4-5 lakh workers engaged directly and indirectly across weaving, recycling, dyeing, finishing and home furnishing production — significantly exceeding the district's own resident workforce, reflecting the large inflow of migrant labour.

Table 23: Workforce in Panipat T&A Sector

Workforce Indicator	Estimates
Total T&A workforce (direct + indirect)	~4-5 lakh
Female share of T&A workforce	~30–40% overall; women dominant in textile sorting (recycling) and handloom weaving segments
Migrant worker share	~50–60% of industrial workforce; primarily from UP, Bihar, Rajasthan
Industry Units	>5,000 units (inc. production, spinning, sorting, grading, processing)

Source: Industry Publications

Female Workforce Participation

Overall female workforce participation in Panipat district is ~30-40% and is most visible in two roles: (a) sorting and grading of imported second-hand clothing in the recycled textile segment — labour-intensive, low-skill, piece-rate work that employs a large number of women migrants; and (b) handloom weaving, a traditional activity where women weavers from local communities participate.

C.3.3 Export Profile

Table 24: Panipat Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Cluster Exports (USD Bn.)	1.53	1.57	1.73
Cluster's T&A Exports (USD Bn.)	1.10 (72%)	1.14 (73%)	1.25 (72%)
Share in India's Total T&A Exports	3%	3%	3%
Share in India's Total Home Furnishing and Made-ups Exports	14%	14%	14%
Primary T&A Product Exported	Blankets & quilts, carpets & durries, curtains & draperies, bed covers, bathmats, rugs, floor coverings, terry towels, furnishing fabrics, shoddy/recycled yarn		
Primary Export Destinations	USA, Europe (UK, Germany), Japan, Australia, Africa, Middle East		
Key Global Buyer Brands	Walmart, IKEA, JCPenney, Sears, Springs, Lafayette, Target; EU home textile retailers		

Source: DGCIS

C.3.4 Value Chain Penetration

Fibre / Yarn	Weaving	Knitting	Dyeing & Processing	Garment Manufacturing	Made-Ups & Home Furnishing
✓ Shoddy/recycled yarn spinning — among the largest globally; also uses virgin polyester, acrylic, polypropylene	✓ Dominant activity: Power loom; Handloom (durries, carpets); shuttle and rapier looms for furnishing fabrics	— Not significant — cluster is weaving-dominated	✓ ~150 dyeing & printing units; ~35 finishing units; largely MSME-based; environmental compliance remains a constraint	— Negligible RMG — cluster is entirely home furnishing / made-ups focused	✓ Core strength — blankets, curtains, carpets, durries, bed covers, bathmats, rugs, cushion covers, terry towels

C.3.5 Top Product Categories

Table 25: Top Product Categories for Panipat Cluster

#	Product Category	Details
1	Blankets & Quilts	Majority of India's blanket production; shoddy/recycled wool & fleece blankets; military/relief & retail; transitioning to polyester fleece. mink & polar blanket
2	Carpets & Floor Coverings	Hand-tufted carpets (top position in India); handloom durries ('Panja durries' — global heritage product); ~200+ carpet/floor covering MSME units; wool sourced from Bikaner & J&K
3	Curtains & Draperies	Jacquard power loom curtains, printed curtains — Panipat is India's leading curtain production hub
4	Bed Covers & Linen	Printed/woven bed sheets, pillow covers, duvet covers; sourced by Walmart, IKEA, Target; growing segment post-COVID (home aesthetics trend)
5	Bath Products & Terry Towels	Terry towels, bathmats, kitchen linen — complementary to the cluster's woven home furnishing base; Samalkha area specialisation

C.3.6 Skill & Training Infrastructure

Key Occupational Categories

Table 26: Key Occupational Categories in Panipat Cluster

Occupational Category	Role Examples	Demand Level
Carpet & Tufting	Hand-Tufting Operator, Carpet Finishing Worker, Backing & Latex Applicator	High — export-critical segment; skills concentrated among experienced older workers
Recycled Textile Processing	Sorting Worker, Shredding Machine Operator, Carding & Spinning Operator (shoddy)	Medium — declining segment but strategic for sustainability; workers largely informal
Quality Control	Fabric Inspector, Carpet Quality Checker, Made-Up Product Inspector, AQL Auditor	Medium-High — buyers increasingly demanding rigorous QC; shortage of trained staff
Product Design & Development	Home Textile Designer, CAD Operator (textile design), Colour Stylist	Medium — critical gap; most design done by buyers; Panipat units lack design capability
Compliance & Sustainability	OEKO-TEX Compliance Coordinator, Chemical Manager, ETP Operator, Social Audit Coordinator	Growing — IKEA, Walmart, EU buyers mandating compliance; almost no trained staff in MSMEs

Training Infrastructure

Panipat has a significant training infrastructure gap — it is one of the few major textile clusters without the presence of ATDC or NIFT institutions. The Textile Value Chain (2020) highlighted this gap, and it continues to persist.

Table 27: Training Infrastructure in Panipat

Institution	Type / Programmes	Remarks
ATDC — No centre in Panipat	No ATDC vocational institute or SMART centre present	Critical gap; nearest ATDC centres are in Gurgaon and Faridabad, Haryana. Panipat is the only major textile cluster in North India without ATDC presence
NIFT — No campus in Panipat	No NIFT campus present	Nearest NIFT campuses: Delhi and Patna. Absence limits design and product development capability in the cluster
ITIs (Government — Panipat district)	Weaving, Textile Design, Sewing Technology trades	Multiple ITIs in district; primary vocational training source for weaving operators
SVPITM (Swami Vivekanand Polytechnic Institute)	Textile technology diploma; craft-based training programmes	Panipat-based; limited capacity relative to cluster size
Haryana Skill Development Mission (HSDM)	Short-term skill courses under PMKVY, DDU-GKY in textile trades	State-level skill delivery
In-factory / OJT	Informal on-the-job training by units; no structured programmes at MSME level	Dominant mode of skill transfer; largely experience-based with no formal certification pathways

C.4 Jaipur (Rajasthan)

Craft-Anchored Apparel & Home Furnishing Cluster

C.4.1 Cluster Overview

Table 28: Jaipur Cluster Profile

Cluster Name	Jaipur (and surrounding artisan belt)
State	Rajasthan
Constituent Areas	Jaipur city; Sitapura Industrial Area (EPIP/RIICO); Sanganer (~16 km); Bagru (~35 km); Jagatpura Apparel Park; Malviya Industrial Area; Vishwakarma Industrial Area (VKI)
Dominant T&A Segment	Apparel (hand block-printed ethnic wear, women's fashion, bohemian/resort wear); Home Furnishing (block-printed bed linen, quilts, cushion covers, curtains)
Secondary Segments	Handicraft textiles; Synthetic / woven dress material; embroidered garments; tie-dye (Bandhani, Leheriya); gems & jewellery (non-T&A but closely linked sector)
Cluster Type	Tier 2 Craft-Heritage Export Cluster — unique combination of artisan-scale cottage industry (Sanganer, Bagru) and organised export units (Sitapura EPIP)
Key Industry Bodies	Garment Exporters Association of Rajasthan (GEAR); Association of Garment Exporters Sitapura (AGES); Export Promotion Council for Handicrafts (EPCH); Handloom Export Promotion Council (HEPC); RIICO
GI Tags (Textiles)	Sanganeri Hand Block Print (GI tag 2010); Bagru Hand Block Print; Kota Doria fabric; Rajasthani Durrie; Rajasthani Quilts — multiple GI-protected craft textiles in the cluster's orbit
Key Infrastructure	EPIP Sitapura (RIICO, 3 phases — Garment Zone, Textile Zone, Gems Zone); Jaipur Integrated Texcraft Park (SITP scheme); Jagatpura Apparel Park (RIICO); Jaipur International Airport (air cargo)

Jaipur's textile and apparel cluster operates through a distinct dual-tier "craft-to-commerce" model, where an organised export manufacturing base coexists with a large, informal artisan ecosystem. These two tiers are functionally interlinked but structurally different in terms of scale, formalisation, and market access.

The organised segment, concentrated in Sitapura EPIP (Phases I–III) and Jagatpura Apparel Park, comprises small to medium export-oriented units with formal employment structures and direct buyer linkages. These units undertake garment manufacturing, finishing, and export operations, acting as the primary interface with global markets.

In contrast, the artisan tier spread across Sanganer, Bagru, and surrounding regions consists of micro and household-based units engaged in traditional block printing, dyeing, and handcrafted textile production. This segment operates largely on a piece-rate model with limited direct market access, supplying semi-processed or finished fabrics to exporters and intermediaries.

The industrial ecosystem is predominantly micro and small enterprise-driven, with a layer of mid-sized exporters such as Alacrity Exports, Aman Exports, Manglam Arts, VCI Exports, Cheer Sagar, and M.K. Exim anchoring export linkages. However, the absence of large-scale anchor corporates limits investment in technology, standardisation, and global brand building.

While rising global demand for artisan, sustainable, and traceable products presents a strong growth opportunity, the cluster's ability to capitalize on this trend is constrained by low formalisation of the artisan base, fragmented production, inconsistent quality standards, and limited design and product development capabilities at the grassroots level.

Overall, Jaipur's strength lies in its unique integration of traditional craftsmanship with export-oriented manufacturing, but its long-term competitiveness will depend on how effectively it can bridge the gap between informal artisan production and formal market access systems.

C.4.2 Demographics & Workforce

Population Profile

Table 29: Jaipur Cluster Population Profile

(in Lakhs; unless specified)

Indicator	Total	Male	Female
Total Population	66.26	34.69 (52%)	31.58 (48%)
Working-Age Population (15–59)	40.43	21.10	19.34
Young Population (15–34)	24.67	12.88	11.79
Sex Ratio (per 1,000 males)	910	—	—

Source: Census of India 2011

Workforce in T&A Sector

Employing an estimated 2 lakh workers directly and indirectly, Jaipur's T&A workforce spans two distinct segments: (a) the organised export manufacturing sector at Sitapura EPIP, with garment and home textile units; and (b) the artisan / cottage industry belt of Sanganer and Bagru, and a broader network of informal block printers, dyers, and embroiderers across the district. The Rajasthan handicraft sector as a whole is estimated to employ ~25 lakh+ artisans, with Jaipur representing the largest concentration.

Table 30: Workforce in Jaipur T&A Sector

Workforce Indicator	Estimates
Organised T&A manufacturing (Sitapura EPIP + parks)	~ 200,000 workers
Rajasthan handicraft sector workforce (state total)	~25 lakh+ artisans (Rising Rajasthan / EPCH); Jaipur is the largest concentration
Female share of T&A workforce	~30-40% in organised garment manufacturing (Sitapura); women dominant in embroidery and finishing
Registered exporters (GEAR, AGES, EPCH)	400+ units

Source: Industry Publications

Female Workforce Participation

Female workforce participation in Jaipur's T&A sector stands at around 30–40%, concentrated in sewing, embroidery, and finishing roles. In the artisan segment, women lead quilting, appliqué, and finishing operations, while men traditionally dominate block printing and dyeing.

C.4.3 Export Profile

Table 31: Jaipur Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Cluster Exports (USD Mn.)	3,385	3,564	4,373
Cluster's T&A Exports (USD Mn.)	524 (15%)	493 (14%)	493 (11%)
Share in India's Total T&A Exports	1%	1%	1%
Primary T&A Product Exported	Quilts, bed linen, cushion covers; hand-embroidered garments		
Primary Export Destinations	USA, Europe (UK, Germany, France, Italy), Australia, Japan, Middle East; Strong US market for home furnishing		
Key Global Buyer Brands	Zara Home, IKEA, Anthropologie, Free People, Urban Outfitters, online marketplaces (Amazon Handmade, Etsy), European boutique brands		

Source: DGCIS

C.4.4 Value Chain Penetration

Fibre / Yarn	Weaving / Fabric	Block Printing & Dyeing	Embroidery / Value Addition	Garment Manufacturing	Made-Ups / Home Furnishing
– Dependent on external supply; cotton sourced from Gujarat/Tamil Nadu; synthetic from Surat; wool from state	✓ Kota Doria weaving; power loom dress material; fabric largely sourced externally with value-addition done in Jaipur	✓ Core craft strength - Sanganeri and Bagru block printing; mix of hand block and screen printing	✓ Hand embroidery, appliqué, mirrorwork, zari; Barmer embroidery cluster provides additional input	✓ Organised garment manufacturing at Sitapura; women's wear, ethnic garments; growing knit segment	✓ Block-printed quilts, bed covers, cushion covers, curtains and table linen; significant export segment

C.4.5 Top Product Categories

Table 32: Top Product Categories for Jaipur Cluster

#	Product Category	Details
1	Block-Printed Women's Apparel	Resort wear, bohemian fashion, kurtis, dresses, tops; Sanganer and Bagru prints applied to garments manufactured; key buyers: Anthropologie, ZARA Home, European boutiques
2	Block-Printed Home Furnishing	Quilts; bed sheets, cushion covers, curtains — significant export volume; key buyers: IKEA, Amazon Handmade, Etsy, European home brands
3	Hand-Embroidered Garments	Embellished ethnic wear, mirrorwork garments, Barmer-embroidery applied to export garments; high value-addition; sourced by fashion labels and boutique retailers
4	Bandhani / Leheriya / Tie-Dye Fabric & Garments	Traditional Rajasthani tie-dye textiles (GI-tagged Rajasthani durrie and handicraft); growing global demand for artisan/sustainable fashion segment
5	Ethnic Wear	Cotton and silk ethnic wear with Sanganeri print or embroidery; both export and strong domestic market through Fabindia, Anokhi, etc.

C.4.6 Skill & Training Infrastructure

Key Occupational Categories

Table 33: Key Occupational Categories in Jaipur Cluster

Occupational Category	Role Examples	Demand Level
Sewing Machine Operation (Organised)	SMO (woven & knit), Embroider, Hand-Finisher	Very High — shortage at garment units
Hand Block Printing	Block Carver, Block Printer, Natural Dye Specialist, Dabu Mud-Resist Artisan	High — heritage skill; ageing artisan workforce; declining participation from younger generation; critical succession gap
Embroidery & Surface Decoration	Hand Embroiderer (zari, mirrorwork, appliqué), Embellishment Supervisor	High — key differentiator of Jaipur exports; skill increasingly hard to source and retain
Fashion Design & Product Development	Fashion Designer (women's ethnic wear), Home Textile Designer, Surface Print Designer	High — IICD and NIFT Jodhpur produce design talent though output remains limited relative to evolving cluster requirements; gaps at MSME level
Quality Control & Compliance	AQL Inspector, OEKO-TEX Compliance Coordinator, Social Audit Support	Medium-High — growing buyer demands for compliance in the export garment tier
Digital & E-commerce Skills	Product Photography (handicraft), Digital Marketing, Etsy/Amazon Handmade Listing Manager	Medium — high potential for artisan revenue enhancement; almost no artisan has these skills currently
Merchandising & Buyer Communication	Export Merchandiser, Documentation Executive, Sample Room Coordinator	Medium — shortage at MSME exporter level in organised manufacturing

Training Infrastructure

Table 34: Training Infrastructure in Jaipur

Institution	Type / Programmes	Remarks
ATDC Centre, Jaipur	B. Voc (AME, FDR); Diploma (AMT, FDT); short-term SMO and garment courses; PMKVY courses	Est. 1996 (AEPC/ATDC); Active training centre; garment and SMO training programmes; MoU with AGES to support Sitapura workforce
IICD — Indian Institute of Crafts & Design, Jaipur	B. Des, M. Des in Craft and Design; programmes in textile design, surface decoration, product design for artisan crafts	Premier institution for craft-based design education; directly feeds Jaipur's artisan and export fashion sector; unique national resource for block print design talent
NIFT Jodhpur (~350 km)	B. Des, M. Des, B. F. Tech — fashion design and garment technology	Nearest NIFT campus; some talent flows back to Jaipur cluster; NIFT campus in Jaipur itself is absent
Weavers Service Centre (Ministry of Textiles)	Design training, dyeing and block printing techniques; marketing assistance for artisans	Located in Jaipur; serves Sanganer and Bagru artisans with design and dyeing training; limited scale
ITIs (Govt. — Jaipur district)	Sewing Technology, Fashion Design Technology, Embroidery trades	Multiple ITIs in Jaipur; capacity data to be verified via DIC Jaipur; key supply source for SMO for Sitapura garment units
Rajasthan Skill Development (RSLDC)	PMKVY, DDU-GKY skill programmes in apparel and textile trades; artisan upskilling	State-level delivery; Rajasthan Handicraft Policy 2022 allocated INR 25 Cr. for training in 25 clusters

C.5 Vapi (Gujarat)

Dadra & Nagar Haveli / Daman (UT) | Integrated Fabric & Home Textile Cluster

C.5.1 Cluster Overview

The Vapi cluster is defined here as the contiguous industrial corridor spanning Vapi (Valsad district, Gujarat), Silvassa (Dadra & Nagar Haveli UT) and Daman (UT). The three jurisdictions share a near-seamless industrial geography along a 21-km stretch, with cross-border manufacturing common.

The cluster is characterised by large-mill, capital-intensive textile manufacturing — primarily fabric production, processing, home furnishing and technical textile. Vapi uniquely succeeds in garment manufacturing within Gujarat, with around 15 significant garment units operating alongside the dominant fabric and processing base.

Table 35: Vapi Cluster Profile

Cluster Name	Vapi–Silvassa–Daman Corridor
States / UTs	Valsad district, Gujarat; Dadra & Nagar Haveli (UT); Daman (UT)
Key Industrial Locations	GIDC Vapi (est. 1967; 11.4 sq. km; 1,400+ industries); GIDC Sarigam; GIDC Bhilad; GIDC Umbergaon; Silvassa industrial estates (Rakholi, Saily, Masat, Dadra); Daman industrial belt
Dominant T&A Segment	Fabric processing & home furnishing (terry towels, bed linen); worsted suiting fabric; integrated polyester/cotton yarn; RMG (modest but growing)
Secondary T&A Segments	Denim fabric; technical textiles; embroidery fabrics; knitted fabrics; garment job work
Cluster Character	Large-mill dominated; capital-intensive; export-oriented; chemical/textile overlap cluster (chemicals ~70–80% of units; textiles a significant secondary sector)
Key Industry Bodies	Vapi Industrial Association; GIDC Gujarat; SRTEPC (synthetic & rayon textiles); Vapi Waste & Effluent Management Co. (CETP)
Key Infrastructure	One of Asia's largest Common Effluent Treatment Plants (CETP) in Vapi; NH-48 (Golden Quadrilateral) connectivity; proximity to JNPT (Mumbai) and Hazira port (Surat); Western Railway line through Vapi station

Vapi cluster is anchored by a limited number of large, vertically integrated manufacturing complexes, with textiles operating within a broader chemicals-led industrial ecosystem. A critical enabler of the cluster's textile processing capabilities is its advanced environmental infrastructure, particularly one of Asia's largest Common Effluent Treatment Plants (CETPs) in Vapi. This infrastructure is essential for supporting large-scale dyeing and processing operations in a regulatory-compliant manner, especially given the environmental intensity of both textile and chemical industries in the region.

Despite strong capabilities in upstream and midstream segments, garment manufacturing remains underdeveloped relative to the cluster's industrial capacity. This reflects both structural factors, including the dominance of processing-led operations, and capability gaps in labour-intensive, flexible manufacturing systems required for apparel production.

C.5.2 Demographics & Workforce

Population Profile

Table 36: Vapi Cluster Population Profile

(in Lakhs; unless specified)

Indicator	Total	Male	Female
Valsad District total (2011 Census)	17.06	8.87 (52%)	8.18 (48%)
Working-age population (15–59)	10.82	5.69	5.14
Young population (15–34)	6.03	3.19	2.84
Sex ratio (per 1,000 males)	922	—	—
Dadra & Nagar Haveli UT (2011 Census)	3.44	1.94 (56%)	1.50 (44%)
Daman UT (2011 Census)	1.91	1.25 (65%)	0.67 (35%)

Source: Census of India 2011

Workforce in T&A Sector

Valsad district's textile sector was a major employer during the industrial build-up phase (1988–97). The cluster's current workforce is migratory workers dominated, with inflows from UP, Bihar, Rajasthan, Odisha and Madhya Pradesh. Alok Industries alone employs over 10,000 workers across its Vapi–Silvassa–Daman plants.

Table 37: Workforce in Vapi T&A Sector

Workforce Indicator	Estimates
T&A sector employment (direct and indirect)	~40,000 to 45,000 workers
Female share of T&A workforce	Low overall (~20–25%); migrant male-dominant factory workforce; women in packaging, finishing;
Total SMEs in Valsad district (all sectors)	~10,000 SMEs

Source: Industry Publications

Female Workforce Participation

Female workforce participation in Vapi's T&A manufacturing remains low, estimated at 20-25%, largely reflecting the cluster's large-mill, capital-intensive character and a workforce historically dominated by male migrants with limited women in production roles. While Vapi's garment units show greater openness to hiring migrant workers compared to Ahmedabad and Surat, these workers are predominantly male. Meaningfully improving female participation remains a systemic challenge, closely tied to the availability of women's accommodation and transport infrastructure in an industrial-zone town where social infrastructure remains underdeveloped.

C.5.3 Export Profile

Table 38: Vapi Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Cluster Exports (USD Mn.)	4,434	4,483	4,299
Cluster's T&A Exports (USD Mn.)	533 (12%)	621 (14%)	722 (17%)
Share in India's Total T&A Exports	1%	2%	2%
Primary T&A Product Exported	Terry towels & bath products (Welspun); home furnishing, garments (Alok); worsted fabric, garments (Banswara)		
Primary Export Destinations	USA, Europe (UK, Germany), Japan, Australia		
Key Global Buyer/Brands	Zara, H&M, IKEA, Walmart, Costco, Marks & Spencer		

Source: DGCI&S

C.5.4 Value Chain Penetration

Fibre / Yarn	Weaving / Fabric	Knitting	Processing / Dyeing	Garment Manufacturing	Home Furnishing / Made-Ups
✓ Strong — integrated fibre-to-yarn production (Alok, Banswara); polyester and blended yarns	✓ Dominant activity — worsted suiting, woven fabrics, home textile fabrics	— Limited presence — knitting operations (primarily Alok Industries)	✓ Significant — ~150+ processing units; integrated processing in large units	— Limited presence — organised garment units; not a dominant segment	✓ Strong — terry towels, bed linen and bath products (historically anchored in Vapi)

C.5.5 Top Product Categories

Table 39: Top Product Categories for Vapi Cluster

#	Product Category	Details
1	Terry Towels & Bath Textiles	Welspun Living Vapi plant (est. 1993) — India's founding premium terry towel export hub; Key Buyers: Walmart, Costco, Target, JCPenney
2	Worsted Suiting Fabric	Raymond Lifestyle Vapi plant — ~25 Mn metres/yr capacity; premium wool, poly-wool, silk blends; supplies domestic brands (Raymond, Park Avenue) and global markets
3	Polyester & Blended Yarn, Apparel Fabric	Alok Industries (now Reliance subsidiary) — integrated polyester chips to garments; apparel fabrics for domestic and export RMG manufacturers
4	RMG — Basic Garments	Significant garment units in Vapi including KKCL and VIP Clothing; basic garments for domestic market and global retailers
5	Worsted / Blended Garments (Daman)	Banswara Syntex garment units in Daman — trousers, jackets, formal wear; fire retardant and technical fabrics

C.5.6 Skill & Training Infrastructure

Key Occupational Categories

Table 40: Key Occupational Categories in Vapi Cluster

Occupational Category	Role Examples	Demand Level
Garment Production (SMO)	Sewing Machine Operator — basic woven; industrial garment finishing; packing operator	Very High — garment units in Vapi face chronic SMO shortage;
Industrial Engineering	IE Executive, Work Study Analyst, Efficiency Planner	High — almost entirely absent in SME tier
Mid-Level Management	Production Manager, Quality Manager, Merchandiser, Export Documentation Executive	Critical — primary constraint on garment growth in Vapi
ETP / Environmental Operations	ETP Operator, Effluent Monitoring Technician, Environmental Compliance Officer	Medium-High — given the CETP infrastructure and compliance obligations in the chemicals-intensive cluster

Training Infrastructure

Table 41: Training Infrastructure in Vapi

Institution	Type / Programmes	Remarks
ATDC	No ATDC vocational institute present in the corridor	Significant gap — no dedicated apparel training institute in the cluster. Nearest ATDC centres are in Surat and Ahmedabad
NIFT Gandhinagar	B. Des, B. F. Tech (Apparel Production), M.F.Tech; Garment Production Technology continuing education	~150 km from Vapi; limited alignment of output with Vapi cluster requirements; placement linkage remains weak
ITIs (Government — Valsad district)	Sewing technology, weaving, textile design trades	Multiple ITIs in Valsad district; primary source of operator-level training for the cluster
In-factory training (large corporates)	Structured OJT at Raymond (ISO-certified plant), Welspun, Alok Industries; informal training at MSME tier	Large corporates have structured internal training; not scalable at cluster level
Industry associations / CSR training	Vapi Industrial Association; occasional CSR-led skilling initiatives	Fragmented; no systematic cluster-level training infrastructure

C.6 Indore (Madhya Pradesh)

Emerging Integrated Textile & Garment Cluster

C.6.1 Cluster Overview

Indore is Madhya Pradesh's commercial capital and the anchor of the state's emerging textile and apparel manufacturing ecosystem. The cluster encompasses Indore city, the Pithampur Special Economic Zone (45 km), Dewas, and the broader central MP textile cluster.

The cluster is characterised by a combination of:

- vertically integrated organic cotton-based knitwear manufacturing (anchored by Pratibha Syntex)
- a diversified RMG base with over 1,200 enterprises
- and large upstream investments from Trident, Raymond, Vardhman, and Aditya Birla

The Indore cluster consists of a large MSME garment base alongside a smaller number of integrated textile manufacturers. The MSME segment is primarily domestic-market oriented, while export-oriented activity is concentrated in a limited number of firms and the Indore SEZ.

The cluster is currently in a transition phase, driven by large-scale announced investments under PLI Scheme and PM MITRA, which are expected to significantly expand capacity over the medium term. This also indicates a potential structural shift toward a more integrated and export-oriented cluster.

The designation of Dhar (110 km from Indore) as the PM MITRA Park site (foundation stone September 2025) represents the most significant forward policy commitment to textile manufacturing in central India, with the potential to structurally reposition the cluster over the next 3–5 years.

Table 42: Indore Cluster Profile

Cluster Name	Indore (Indore–Pithampur–Dewas corridor)
State	Madhya Pradesh
Key Industrial Areas	Indore city (RMG, apparel exports); Pithampur SEZ & Industrial Area (45 km); Dewas textile units; Maheshwar (handloom); Dhar (PM MITRA Park site); Bhopal; Ujjain; Burhanpur (power loom textiles)
Dominant T&A Segment	RMG — knitted garments (innerwear, sleepwear, activewear, loungewear); organic cotton-based apparel; woven garments; industrial garments; home furnishing (terry towels at nearby large mills)
Secondary Segments	Handloom — Maheshwari and Chanderi weaves (GI-tagged heritage textiles); power loom dress material (Burhanpur, Ujjain); spinning and yarn (large mills at Pithampur, Dewas)

Cluster Type	Tier 2 Emerging Export Cluster — transitioning from domestic-focused to export-oriented; large-scale investment wave underway
Key Industry Bodies	AEPC (Indore); Indore Chamber of Commerce & Industry; MP Industrial Development Corporation (MPIDC); ATDC Indore
Key Infrastructure	Indore SEZ (Special Economic Zone with Apparel Designing Centre); Pithampur Industrial Area (one of India's largest industrial areas); PM MITRA Park, Dhar (2,158 acres; foundation stone September 2025); Indore International Airport; Delhi–Mumbai Expressway access
Unique Identifier	MP is 43% of India's and 24% of world's organic cotton production; Pratibha Syntex is India's largest sustainable vertically integrated knitwear manufacturer, headquartered in Pithampur near Indore

C.6.2 Demographics & Workforce

Population Profile

Table 43: Indore Cluster Population Profile

(in Lakhs; unless specified)			
Indicator	Total	Male	Female
Indore District			
Total Population	32.77	17.00 (52%)	15.77 (48%)
Working-Age Population (15–59)	20.76	10.78	9.98
Young Population (15–34)	12.17	6.31	5.86
Sex Ratio (per 1,000 males)	928	—	—
Dhar District			
Total Population	21.86	11.13 (51%)	10.73 (49%)
Working-Age Population (15–59)	12.52	6.40	6.12
Young Population (15–34)	7.45	3.80	3.65
Sex Ratio (per 1,000 males)	964	—	—

Source: Census of India 2011

Workforce in T&A Sector

MP's textile sector directly employs over 1 lakh workers in organised units, with additional employment expected from proposed investments. Indore's RMG cluster hosts 1,200+ enterprises with Pratibha Syntex, the cluster's flagship integrated exporter, employing ~10,000 workers and linked to 35,000 organic cotton farmers.

The PM MITRA Park at Dhar is projected to generate ~55,000 direct jobs, with planned investments from large textile players such as Trident, Bhilosa Industries, and Vardhman Textiles.

Table 44: Workforce in Indore T&A Sector

Workforce Indicator	Estimates
RMG units in Indore cluster	~1,200 enterprises
MP textile sector direct employment	1-1.2 lakh in organised mills
PM MITRA Park Dhar — projected employment	55,000+ direct jobs projected from investor proposals worth INR 21,500 Cr.
Female share of T&A workforce	~40–50% at large integrated units; lower at traditional mill/domestic units

Source: Industry Publications

Female Workforce Participation

Female workforce participation in Indore's T&A sector is estimated at ~40–50% in integrated export-oriented units with lower estimates in the MSME garment segment. This variation is structurally driven by presence of formal HR systems and stable employment in large units and lack of organised infrastructure (transport, hostels, workplace systems) in MSMEs.

C.6.3 Export Profile

Table 45: Indore Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Cluster Exports (USD Mn.)	4,018	4,259	4,156
Cluster's T&A Exports (USD Mn.)	796 (20%)	831 (20%)	850 (20%)
Share in India's Total T&A Exports	2%	2%	2%
Primary T&A Product Exported	Organic cotton knitwear (innerwear, thermals, sleepwear, loungewear, activewear) – Pratibha Syntex; woven RMG		
Primary Export Destinations	USA, Europe (UK, Germany, France, Spain), Japan, Australia		
Key Global Buyer/Brands	Zara, Patagonia, Nike, H&M		

Source: DGCI&S

C.6.4 Value Chain Penetration

Fibre / Organic Cotton	Yarn / Spinning	Knitting / Weaving	Processing / Dyeing	Garment Manufacturing	Home Furnishing
✓ MP is a major organic cotton producer	✓ Presence of large spinning operations (Trident, Vardhman, others); Pratibha Syntex integrated yarn production	✓ Knitting strong at integrated units; power loom clusters (Burhanpur, Ujjain) primarily domestic-focused	— Limited cluster-wide processing ecosystem; present majorly at integrated units	✓ Core growth segment; mix of domestic and export-oriented units	✓ Home to the 'one of the world's largest standalone terry towel manufacturing units; heritage home furnishing: Maheshwari (bed covers)

C.6.5 Top Product Categories

Table 46: Top Product Categories for Indore Cluster

#	Product Category	Details
1	Organic Cotton Knit Garments	Pratibha Syntex — One of India's largest sustainable vertically integrated knitwear manufacturer; innerwear, thermals, sleepwear, loungewear, activewear; Farm to Fashion supply chain with GOTS/Fairtrade/organic certification; 35,000 farmers connected
2	Woven RMG (Indore garment cluster)	Domestic and export-oriented units at Indore SEZ; women's ethnic wear, kids wear, formal garments; Indore SEZ has dedicated Apparel Designing Centre
3	Maheshwari Handloom Fabrics	GI-tagged heritage textiles; Maheshwari (Maheshwar town, ~90 km from Indore) — silk-cotton sarees, home furnishing; boutique export and premium domestic market
4	Home Furnishing (Large Mills)	MP hosts 'world's largest standalone terry towel manufacturing unit' (Trident)

C.6.6 Skill & Training Infrastructure

Key Occupational Categories

Table 47: Key Occupational Categories in Indore Cluster

Occupational Category	Role Examples	Demand Level
Sewing Machine Operators (Knit & Woven)	SMO; SMO Knits, Advanced SMO (MMF and technical garments)	Very High — Chronic SMO shortage
Sustainable Textile Skills	GOTS/Fairtrade Certification Coordinator, Organic Cotton Supply Chain Tracer, Natural Dye Practitioner, Chemical Compliance (ZDHC) Officer	High — unique to the Indore cluster's organic cotton positioning; Pratibha Syntex requires sustainability-credentialed supply chain staff
Industrial Engineering	IE Executive, Lean Manufacturing Facilitator, Efficiency Planner	High — almost entirely absent in the 1,200+ MSME tier; PM MITRA will require large numbers of trained IE professionals
Sustainability & ESG Compliance	ESG Coordinator, Carbon Footprint Auditor, Social Audit Coordinator, ETP Operator	Growing — Pratibha Syntex is already ESG-advanced; as PM MITRA attracts global brands, compliance skills will become critical

Training Infrastructure

Table 48: Training Infrastructure in Indore

Institution	Type / Programmes	Remarks
ATDC Indore (Active Centre)	Short-term SMO / checker / helper training under ISDS/PMKVY; Diploma in AMT; certificate programmes	ATDC Indore is an active centre; Combined MP ATDC network has trained 2.5 lakh+ candidates
ATDC Chhindwara	Hub centre for central MP; covers Chhindwara, Amarwara, Parasia, Tamia, Jabalpur, Mandla, Narsinghpur, Maheshwar, Hoshangabad, Sehore, Dewas, Khandwa, Ratlam and others (ATDC / chhindwara.nic.in)	Chhindwara is a major ATDC hub for MP; Raymond's Chhindwara plant creates local demand for trained workers
NIFT Bhopal	B. Des, B. F. Tech, M. Des; fashion design and garment technology	~190 km from Indore; geographic distance limits effective talent flow into the Indore cluster
Madhya Pradesh Skill Development Mission (MPSDM)	PMKVY, DDU-GKY skill programmes in apparel and textile trades; state-funded	State-level delivery; scaled programmes across MP;
PM MITRA Park — Planned Skill Development Hub	State-of-the-art plug-and-play skill training facilities planned within the park	Includes on-site training facilities, design studios, testing labs; not yet operational

C.7 Kolkata (West Bengal)

India's Hosiery Birthplace

C.7.1 Cluster Overview

Kolkata is the birthplace of India's hosiery industry — the first hosiery factory was established at Kidderpore over a century ago. West Bengal's ~17,000 hosiery units remain the cluster's industrial backbone, anchored by nationally dominant brands Rupa & Company, Lux Industries and Dollar Industries.

However, the cluster's defining structural challenge is the widening gap between its large domestic-market hosiery base and its relatively modest export profile given the cluster's size, proximity to Kolkata port, and the enormous informal domestic garment industry.

Table 49: Kolkata Cluster Profile

Cluster Name	Kolkata (and West Bengal garment cluster)
State	West Bengal
Key Industrial Areas	Kolkata city (Garden Reach, Metiabruz, Howrah, Beliaghata — Paridhan Garment Park); South 24 Parganas (Mahestala, Nungi); Dankuni (Lux hosiery plant); Jagatpura/Jagdishpur near Howrah (Hosiery Park); Barasat (Garment & Apparel Park)
Dominant T&A Segment	Hosiery — innerwear, knit undergarments, thermal wear, casual knitwear (primarily domestic market); kids wear (domestic + Middle East export); workwear (export-oriented); intricate hand embroidery (export — high value)
Secondary Segments	Jute and jute textiles; handloom weaving (Murshidabad silk, Shantipur cotton, Bishnupur baluchari); Zari embroidery (Howrah); export scarves and shawls
Cluster Type	Tier 2 Domestic-Dominant Cluster; proximity to Bangladesh creates both competition and opportunity
Key Industry Bodies	West Bengal Hosiery Association; WBIDC; AEPC West Bengal; EEPC India (East Regional Office, Kolkata); WBTPO
Key Infrastructure	Paridhan Garment Park, Beliaghata (WBIDC; 8.78 acres; Phase I & II); West Bengal Hosiery Park, Jagdishpur (125 acres; India's first hosiery park); Kolkata Port (Haldia + KDS — gateway for import of cotton yarn and export); Kolkata Airport; proposed apparel hub at Nungi, Mahestala

Kolkata's textile and apparel cluster is the most internally fragmented and operates through a pronounced bimodal structure, where a few nationally dominant hosiery brands coexist with a vast, largely informal ecosystem of domestic garment manufacturing and embroidery units.

While the organised segment is concentrated in innerwear and hosiery with established scale and brand presence, the broader cluster is heavily skewed towards informal, domestic-market-oriented production, limiting its integration into formal export value chains.

The industrial ecosystem is supported by emerging infrastructure such as the Paridhan Garment Park and the West Bengal Hosiery Park, however, the development of formal buying house and export facilitation infrastructure remains limited, constraining the cluster's ability to scale international business.

Kolkata possesses several latent competitive advantages, including proximity to Bangladesh's manufacturing ecosystem, port connectivity, access to a large domestic market in East and Northeast India, and strong heritage capabilities in embroidery and handloom.

C.7.2 Demographics & Workforce

Population Profile

Table 50: Kolkata Cluster Population Profile

(in Lakhs; unless specified)

Indicator	Total	Male	Female
Total Population	93.47	48.58 (52%)	44.89 (48%)
Working-Age Population (15–59)	63.07	32.92	30.15
Young Population (15–34)	33.38	17.07	16.31
Sex Ratio (per 1,000 males)	924	—	—

Source: Census of India 2011.

Note: Population numbers include Kolkata and Howrah

Workforce in T&A Sector

West Bengal's T&A sector employs a large workforce, estimated at ~1.5 Mn. employment across textiles. The hosiery sector alone employs majority of the workforce, forming the backbone of the cluster's organised base. The broader informal garment ecosystem particularly includes Metiabruz, Garden Reach, and South 24 Parganas.

Kolkata's garment industry feeds predominantly into the domestic market with limited formal export. The workwear segment is the most export-oriented formal segment, and intricate hand embroidery (karchobi, zari, chikankari-style embroidery panels) is exported to high-end global fashion houses.

Table 51: Workforce in Kolkata T&A Sector

Workforce Indicator	Estimates
West Bengal's T&A workforce	~1.5 Mn.
Hosiery units	~17,000 units in and around Kolkata
Female share of T&A workforce	~30–35% in formal factories; higher in handloom and embroidery; lower in hosiery mills
Key anchor companies (hosiery / innerwear)	Lux Industries; Rupa & Company; Dollar Industries

Source: Industry Publications

Female Workforce Participation

Female workforce participation in Kolkata's formal T&A sector is estimated at 30–35% on an average. The share is higher in handloom and embroidery (where women are the primary artisans) and lower in hosiery knitting mills (where machine operations are male-dominant). A large share of women is engaged in informal, home-based sewing or embroidery on a piece-rate basis.

C.7.3 Export Profile

Table 52: Kolkata Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Cluster Exports (USD Mn.)	6,828	6,536	6,966
Cluster's T&A Exports (USD Mn.)	890 (13%)	798 (12%)	794 (11%)
Share in India's Total T&A Exports	2%	2%	2%
Primary T&A Product Exported	Hosiery and Knitwear (innerwear, thermals, sleepwear, kids wear)		
Primary Export Destinations	USA, Europe (UK, Germany, France, Spain), UAE, Saudi Arabia		
Key Global Buyer/Brands	Zara, H&M, Gap, Global luxury brands		

Source: DGCI&S

C.7.4 Value Chain Penetration

Fibre / Yarn	Knitting (Hosiery)	Weaving (Handloom)	Embroidery & Surface Decoration	Garment Manufacturing	Home Furnishing (Jute Products)
— Cotton yarn sourced externally (Tiruppur, Gujarat); jute & silk locally	✓ Core strength — large hosiery base; circular knitting for innerwear, thermal wear, casual knitwear; mix of organised and unorganised production	✓ Strong heritage handloom presence; largely separate from garment export value chain	✓ Significant capability; largely informal; intricate embroidery panels for global fashion houses	✓ Large domestic-oriented garment production; limited formal export segment	✓ Hooghly River belt — India's major jute textile cluster; primarily sacking, hessian, carpet backing

C.7.5 Top Product Categories

Table 53: Top Product Categories for Kolkata Cluster

#	Product Category	Details
1	Hosiery / Innerwear (Domestic)	Dominant segment — Kolkata-headquartered national brands; primarily domestic market with some Middle East and Africa exports
2	Kids wear (Domestic + Middle East Export)	One of India's major kids wear production cluster; formal exports to Middle East
3	Workwear (Export-Oriented)	Industrial and corporate workwear for Europe and Middle East
4	Hand Embroidery / Embroidered Garments (Export)	High-value intricate embroidery panels and garments; supplied to luxury brands; largely unorganised; Zari Hub at Howrah

C.7.6 Skill & Training Infrastructure

Key Occupational Categories

Table 54: Key Occupational Categories in Kolkata Cluster

Occupational Category	Role Examples	Demand Level
Garment Sewing (Workwear & Kids wear)	Woven/Knit SMO, Industrial Stitcher, Seam Operator	High — workwear export units face chronic shortage
Hand Embroidery & Zari Work	Hand Embroiderer (karchobi, gota, zari), Machine Embroidery Operator, Panel Worker	High — ageing artisan workforce; succession risk
Quality Control & Compliance	AQL Inspector, Compliance Coordinator, Social Audit Support	Medium-High — EU workwear buyers demand compliance; shortage of trained QC staff in MSME tier
Merchandising & Export Documentation	Export Merchandiser, Documentation Executive, Buying Agent Coordinator	Medium-High — Limited merchandising talent; buying house infrastructure underdeveloped
Industrial Engineering	IE Executive, Productivity Analyst	Medium — almost entirely absent in informal/MSME tier; critical for formalising the domestic garment cluster

Training Infrastructure

Table 55: Training Infrastructure in Kolkata

Institution	Type / Programmes	Remarks
NIFT Kolkata	B. Des (Fashion Design, Knitwear Design, Leather Design, Accessory Design), B. F. Tech (Apparel Production), M. Des, M. F. Tech	One of India's key NIFT campuses; specifically has a Knitwear Design programme — directly aligned with Kolkata's hosiery strength; Leather Design aligns with the leather glove export cluster
ATDC Kolkata (Multiple Centres)	B. Voc, Diploma AMT/FDT, Certificate SMO / Merchandiser / Pattern Maker; PMKVY, RPL courses	Active centres in Kolkata; primary formal training provider
WB Directorate of Textiles	Handloom weaving training; jacquard design; dyeing & printing for handloom sector	WB MSME & T Dept is nodal agency; training through Weavers Service Centres
ATDC Chhindwara	Short-term PMKVY courses in apparel trades	Regional network of ATDC
Weavers Service Centres (WSC)	Handloom design, natural dyeing, product development training for handloom weavers	Multiple WSCs in WB under Ministry of Textiles; covers Shantipur, Murshidabad, Bishnupur, Nadia handloom belts

C.8 Bengaluru (Karnataka)

Woven RMG, Formal Wear & Outerwear Export Hub

C.8.1 Cluster Overview

Bengaluru is one of India's largest RMG export clusters by volume and number of factories. Karnataka, with Bengaluru as its hub, accounts for ~20% of India's garment production and is among the country's largest textile employers. The cluster is renowned for structured woven garments, including formal shirts, trousers, suits, blazers, outerwear, and formal jackets and is the preferred source for global buyers requiring high-quality, compliance-driven manufacturing. Bengaluru's cluster extends outward to Doddaballapur (Apparel Park), Mysuru, Hassan, and other industrial areas under the KIADB and Karnataka state textile parks programme.

Table 56: Bengaluru Cluster Profile

Cluster Name	Bengaluru (and Karnataka garment cluster)
State	Karnataka
Key Industrial Nodes	Bengaluru city (Peenya, Yeshwantpur, Industrial Suburb, Rajajinagar); Doddaballapur KIADB Apparel Park; Hassan SEZ; Mysuru; Shivamogga; Chamarajanagar
Dominant T&A Segment	RMG — Structured Woven Garments (formal shirts, trousers, suits, blazers, outerwear, jackets, denim wear); casualwear, sportswear and activewear
Secondary Segments	Raw silk & silk garments (Karnataka produces 65% of India's raw silk); knitted garments; home furnishing (Himatsingka); technical textiles (emerging)
Cluster Type	Tier 1 Metro Garment Export Cluster — high compliance, large corporate anchors; globally preferred for structured woven garments
Key Industry Bodies	AEPC; Karnataka Department of Handlooms & Textiles (DHT); KIADB (apparel parks); KSSIDC; Karnataka Garment Manufacturers Association
Key Infrastructure	KIADB Apparel Park, Doddaballapur; Hassan SEZ (233 ha textile SEZ); Shiggaon Textile Park; Bengaluru International Airport (air cargo hub); proximity to Chennai port (land connection)

Bengaluru's garment cluster is structurally bimodal, comprising large, export-oriented manufacturers with strong buyer integration and compliance capabilities, alongside a broad base of MSMEs and subcontracting units. This dual structure enables scale and flexibility but also results in uneven capability distribution across the value chain.

The cluster is driven by leading export houses such as Gokaldas Exports, Shahi Exports, Texport Industries, and units of Raymond supported by a dense network of smaller vendors and job-work units. Industrial infrastructure such as the KIADB Doddaballapur Apparel Park further anchors organised manufacturing activity.

Major Bengaluru's manufacturers are dependent on external fabric sourcing. A key strength of the cluster is its relatively deep pool of skilled middle management, industrial engineering, and quality control capabilities, particularly within large firms. However, these capabilities are not uniformly diffused across the MSME segment, creating productivity and quality variability.

C.8.2 Demographics & Workforce

Population Profile

Table 57: Bengaluru Cluster Population Profile

(in Lakhs; unless specified)

Indicator	Total	Male	Female
Bengaluru Urban District			
Total Population	96.22	50.23 (52%)	45.99 (48%)
Working-Age Population (15–59)	66.80	35.15	31.65
Young Population (15–34)	40.24	21.00	19.24
Sex Ratio (per 1,000 males)	916		
Bengaluru Rural District			
Total Population	9.91	5.06 (51%)	4.82 (49%)
Working-Age Population (15–59)	6.49	3.35	3.14
Young Population (15–34)	3.75	1.94	1.81
Sex Ratio (per 1,000 males)	946	—	—

Source: Census of India 2011

Workforce in T&A Sector

Bengaluru is one of India's largest garment employer cities by workforce concentration. There are an estimated ~5–6 lakh workers in the garment sector within Bengaluru.

The workforce is dominantly female being ~75–80% of the total workforce and consists of first-generation industrial workers migrating from rural southern Karnataka.

Table 58: Workforce in Bengaluru T&A Sector

Workforce Indicator	Estimates
Total garment workers	~5–6 lakh
Estimated Garment factories	>1,200 factories (inc. MSMEs)
Female share of garment workforce	~60–80%
Worker origin	Predominantly rural southern Karnataka (Tumkur, Kolar, Hassan, Mandya, Mysuru districts); also Andhra Pradesh and Tamil Nadu migrants

Source: Industry Publications

Female Workforce Participation

Bengaluru's garment sector has significant female workforce participation (~60–80%). This is structurally enabled by:

- relatively higher social acceptance of women working in factories compared to North India
- proximity of factories to working-class residential clusters

C.8.3 Export Profile

Table 59: Bengaluru Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Cluster Exports (USD Bn.)	11.35	11.84	13.25
Cluster's T&A Exports (USD Bn.)	2.54 (22%)	2.32 (20%)	2.42 (18%)
Share in India's Total T&A Exports	7%	7%	7%
Primary T&A Product Exported	Formal shirts, trousers, suits, blazers, jackets, outerwear; denim wear; sportswear and activewear; casualwear; silk garments		
Primary Export Destinations	USA, Europe (UK, Germany, France, Spain), Japan, Australia, Canada		
Key Global Buyer/Brands	H&M, Gap, Tommy Hilfiger, Calvin Klein, PVH, Columbia Sportswear, Adidas, Primark, Next, Marks & Spencer, Walmart, Target, C&A, Uniqlo		

Source: DGCIS

C.8.4 Value Chain Penetration

Fibre / Yarn	Weaving / Fabric	Processing / Washing / Dyeing	Knitting / Knitwear	Garment Manufacturing	Home Furnishing / Made-Ups
— Cotton and polyester yarn largely sourced from other states; Karnataka is a major raw silk producer (~65% of India)	— Limited fabric production; majority of garment fabric sourced externally; silk weaving	✓ In-house washing, finishing and processing at export units; limited standalone processing base;	— Limited presence; knitwear not the cluster's primary strength	✓ Core activity — Bengaluru is India's premier structured woven RMG manufacturing hub; high compliance export units	✓ Himatsingka Seide — premium upholstery, drapery, bed linen; globally known home textile manufacturer

C.8.5 Top Product Categories

Table 60: Top Product Categories for Bengaluru Cluster

#	Product Category	Details
1	Formal & Semi-Formal Woven Garments	Shirts, trousers, suits, blazers — Bengaluru's core competence; preferred globally for quality, precision and compliance; Key buyers: PVH (Calvin Klein, Tommy Hilfiger), H&M, Gap, M&S, Primark
2	Outerwear & Jackets	Gokaldas Exports specialises in outerwear, jackets, coats — high value-addition; buyers: North Face, Columbia Sportswear, premium European labels; one of India's very few clusters with significant outerwear capability
3	Denim Wear	Bengaluru has significant denim garment manufacturing (Everblue Apparel at DB Pura Apparel Park — Raymond Group; Jeans Knit); washing and finishing facilities present
4	Sportswear & Activewear	Growing segment at KIADB Apparel Park and city units; synthetic/stretch fabric garments for global sportswear brands; requires MMF processing skills
5	Silk & Luxury Garments	Karnataka produces 65% of India's raw silk; Mysuru and Bengaluru known for silk sarees, silk garments; boutique and luxury export segment

C.8.6 Skill & Training Infrastructure

Key Occupational Categories

Table 61: Key Occupational Categories in Bengaluru Cluster

Occupational Category	Role Examples	Demand Level
Sewing Machine Operators (Woven)	Woven fabric SMO, multi-machine operator, specialised SMO (collars, cuffs, pockets)	Very High — single largest employment category; Bengaluru's attractiveness for buyers depends on maintaining high-skill SMO base; attrition is the primary problem
Quality Assurance & Compliance	Inline QC, AQL Final Inspector, Technical Compliance Officer, Social Audit Coordinator, ESG/Sustainability Manager	Very High — global buyers (H&M, PVH, Columbia) have stringent compliance requirements; shortage of skilled QA staff especially for sustainability and chemical compliance
Industrial Engineering	IE Executive, Time & Motion Analyst, Lean Manufacturing Facilitator, Efficiency Planner	High — Bengaluru has India's most developed IE function at garment cluster level; shortfall in trained IE staff at MSME tier
Middle Management	Production Manager, Floor Manager, Merchandiser, Sourcing Coordinator	High — Bengaluru has India's deepest talent pool for garment middle management; still insufficient relative to cluster size
Pattern Making & CAD	CAD Pattern Maker, Grader, Sampling Coordinator, Designer	High — concentrated in Bengaluru's large export houses; shortage at MSME level
Garment Washing & Denim Processing	Garment Washing Supervisor, Denim Wash Technician, Chemical Process Operator	Medium-High — denim wear and sportswear finishing require specialist skills
Knitting & Technical Textiles	Technical Fabric Technologist, MMF/Stretch Fabric Specialist, Sportswear Technical SMO	Medium — growing segment; MMF skills gap is explicit (Bengaluru units handling activewear struggle with technical fabric skills)

Training Infrastructure

Bengaluru has the most comprehensive apparel training infrastructure of any cluster in this study, anchored by NIFT Bengaluru and multiple ATDC centres. Karnataka runs 144 skilled development centres and 168 private training centres under the DHT (karnatakadht.org). The cluster also benefits from very large in-factory training programmes at Gokaldas Exports, Shahi Exports, some of which are among India's most sophisticated garment worker training systems.

Table 62: Training Infrastructure in Bengaluru

Institution	Type / Programmes	Remarks
NIFT Bengaluru	B. Des, M. Des, B. F. Tech, M.F.Tech; fashion design, apparel production technology, knitwear design	One of India's oldest NIFT campuses; directly feeds Bengaluru's export houses with design and technology talent; hosts industry collaborations with Gokaldas, Shahi etc.
ATDC Bengaluru (Multiple Centres)	B. Voc (AME, FDR); Diploma (AMT, FDT); Certificate (SMO, Merchandiser); PMKVY, RPL	ATDC has multiple centres in Bengaluru / Karnataka; Yeshwantpur and other locations;
Karnataka DHT — 144 Skill Centres	Garment production trades, weaving technology, tailoring; state-funded vocational training across 168 private centres + 144 government centres	Largest state-level T&A skill development network in South India; supports both garment export cluster and traditional silk/handloom sector
KSSIDC (Karnataka Small Scale Ind. Dev. Corp.)	Infrastructure and training support for MSME garment units; cluster development	Operates KSSIDC garment parks and common facility centres across Karnataka
In-factory Training (Large Exporters)	Gokaldas Exports: structured OJT, multi-machine training, compliance modules; Shahi Exports: P.A.C.E. (Gap Inc.) programme, internal skill certification	Bengaluru's large export houses have among India's most developed in-factory training systems; Good Business Lab (incubated by Shahi) focuses on worker welfare and skill development
NTTF (National Tooling & Training Foundation)	Technical training relevant to garment technology, precision manufacturing	Bengaluru-headquartered; has courses in relevant disciplines

C.9 Tiruppur (Tamil Nadu)

Specialized Knitwear Export Cluster

C.9.1 Cluster Overview

Table 63: Tiruppur Cluster Profile

Cluster Name	Tiruppur
State	Tamil Nadu
Constituent District(s)	Tiruppur District (carved out of Coimbatore & Erode districts in 2009)
Key Towns / Areas	Tiruppur city, Avinashi, Palladam, Somanur
Dominant Segment	Knitwear RMG (Cotton Hosiery & Garments); Processing / Dyeing; Knitting
Cluster Type	Tier 2 Specialised Export Cluster
Primary Export Category	Apparel — Cotton Knitwear (T-shirts, Sportswear, Innerwear, Children's Wear)
Key Industry Body	Tiruppur Exporters' Association (TEA) — 1,360 member exporting units (2026)

Tiruppur operates as a highly integrated, MSME-dominated cluster characterized by a deeply fragmented and specialized production ecosystem. The value chain is distributed across thousands of micro and small enterprises, with distinct processes such as knitting, dyeing, compacting, sewing, printing, and finishing typically undertaken by independent job-work units.

These small units function as production backbones for larger export houses. The concentration of such enterprises is supported by dedicated industrial ecosystems, including the Apparel Export Park, SIPCOT Industrial Park, and multiple SIDCO estates, which collectively anchor a significant share of manufacturing activity.

This specialisation enables flexibility and scale but creates structural vulnerabilities — MSME units are highly exposed to export demand volatility, operate on thin margins, and have limited direct buyer access. The cluster's resilience is supported by collective infrastructure such as Zero Liquid Discharge (ZLD) systems and renewable energy capacity (~1,900 MW installed vs. ~300 MW demand), which functions as a competitive advantage in sustainability-sensitive export markets.

C.9.2 Demographics & Workforce

Population Profile

Table 64: Tiruppur Cluster Population Profile

(in Lakhs; unless specified)

Indicator	Total	Male	Female
Total Population (2011 Census)	24.79	12.46 (50%)	12.33 (50%)
Working-Age Population (15–59)	16.77	8.39	8.38
Young Population (15–34)	8.57	4.21	4.36
Sex Ratio (per 1,000 males)	990	—	—

Source: Census of India 2011

Workforce in T&A Sector

Tiruppur's textile and knitwear industry is the dominant employer in the district, with an estimated ~8-8.5 lakh workers engaged directly and indirectly in the cluster as of 2024. Of the ~5.5–6.5 lakh directly employed workers, primarily semi-literate workers migrating from rural Tamil Nadu and neighbouring states.

Table 65: Workforce in Tiruppur T&A Sector

Workforce Indicator	Estimates
Direct employment in T&A	~5.5–6.5 lakh
Female share of direct workforce	~60–80%
Registered knitwear exporting units (TEA)	~1,360 units (2026)
Total industrial units (incl. MSME job-workers)	>20,000 units

Source: Industry Publications

Female Workforce Participation

Female workforce participation in Tiruppur is significantly high, accounting for around 60–80% of the direct manufacturing workforce. The workforce is predominantly composed of rural migrant women from Tamil Nadu, Karnataka and Andhra Pradesh.

C.9.3 Export Profile

Table 66: Tiruppur Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Cluster Exports (USD Bn.)	4.55	3.99 (-12% due to demand slowdown)	4.68
Cluster's T&A Exports (USD Bn.)	4.30 (95%)	3.77 (94%)	4.42 (94%)
Share in India's Total Knitwear Exports	51%	51%	53%
Share in India's Total T&A Exports	12%	11%	12%
Primary T&A Product Exported	Cotton Knitwear — T-shirts, Sportswear, Innerwear, Children's Wear		
Primary Export Destinations	Europe (~35%), USA (~30%), Middle East and Canada (~10%)		
Key Global Buyer Brands	H&M, Primark, Zara (Inditex), Walmart, Target, Gap, M&S, Next, Tesco, Decathlon, Hanes		

Source: DGCI&S

C.9.4 Value Chain Penetration

Fibre / Yarn	Knitting	Weaving	Processing / Dyeing	Embroidery / Printing	Garment Manufacturing	Made-Ups / Home Furnishing
— Cotton yarn sourced from Coimbatore	✓ Core activity; weft knitting; circular knit fabric dominant	— Not significant	✓ Full ZLD-compliant dyeing & bleaching; CETP + IETP	✓ Screen printing, digital printing & embroidery	✓ Dominant activity; knitted RMG	— Not a focus (see Karur cluster)

C.9.5 Top Product Categories

Table 67: Top Product Categories for Tiruppur Cluster

#	Product Category	Details
1	Cotton T-Shirts & Polo Shirts	Largest volume product; exported to all major markets; bulk orders from Primark, Walmart, H&M
2	Sportswear & Activewear	Growing segment; Fila, Decathlon, etc. sourcing from Tiruppur
3	Innerwear / Hosiery	Briefs & vests; Fruit of Loom, Hanes major buyers
4	Children's Wear	Significant share post-COVID; Carter's, Mothercare, NEXT
5	Casual / Fashion Knits	Cardigans, jerseys, pullovers, dresses; growing MMF push

C.9.6 Skill & Training Infrastructure

Key Occupational Categories

Table 68: Key Occupational Categories in Tiruppur Cluster

Occupational Category	Representative Job Roles	Demand Level
Production / Shop Floor	Sewing Machine Operator, Knitting Machine Operator, Cutting Helper	Very High
Quality Control	Inline Inspector, Final Auditor, AQL Checker	High
Industrial Engineering	IE Executive, Line Balancing Supervisor, Production Planner	Medium-High
Merchandising & Sampling	Junior Merchandiser, Sampling Coordinator, Trim Manager	Medium
Sustainability / Compliance	ETP Operator, ZLD Technician, Compliance Auditor	Growing
Design & Product Development	Knitwear Designer, CAD Operator, Pattern Maker	Medium
MMF / Technical Knitting	MMF Knitting Technician, Seamless Knitting Operator	Emerging — critical gap

Training Infrastructure

Table 69: Training Infrastructure in Tiruppur

Institution	Type / Programmes	Remarks
ATDC Centre of Excellence, Tiruppur	B. Voc (3 yr); Diploma courses; Short-term SMO training; KTM (Knitwear Technology Mission)	Strong industry tie-ups; focus on MMF and knitwear innovation
NIFT-TEA College of Knitwear Fashion	Degree & Diploma in Knitwear Fashion; B. Des; M. Des	Set up by TEA + Govt. + FIs; premier knitwear design institute in India
AMHSSC Training Partners	Short-term skill training (SMO, Merchandising) under PMKVY	1,000 youth trained in 2023 under AMHSSC-TNSDC partnership
ITIs (Government)	Sewing Technology, Weaving, Textile Design trades	Multiple ITIs in Tiruppur district
In-factory Training	OJT by export houses; large units run internal training programmes	Predominantly informal; industry estimates indicate ~60–70% of workers are trained through on-the-job mechanisms rather than formal institutions

C.10 Karur (Tamil Nadu)

Home Textile Export Cluster

C.10.1 Cluster Overview

The Karur and Erode cluster represents an integrated supply chain axis that powers one of India's most concentrated home textile export ecosystems. Karur, located ~60 km east of Erode on the Amaravathi River, is the downstream finished home furnishing capital and supplying to global retail chains including Walmart, Target, IKEA, Carrefour and JC Penney. Erode is the upstream grey fabric and dyeing engine — housing an estimated 1.5–3.0 lakh power looms and forming a major share of Tamil Nadu's fabric production base.

The Erode–Karur region in Tamil Nadu represents a significant textile ecosystem with complementary strengths across the value chain. Erode functions primarily as a fabric production and trading hub, while Karur has developed as a major centre for home textile manufacturing and exports. Together, the region supports both domestic and international markets through a combination of upstream and downstream activities.

Table 70: Karur Cluster Profile

Karur cluster Role in supply chain	Downstream home textile manufacturer and exporter — made-ups (bed linen, kitchen linen, toilet linen, table linen, wall hangings); terry towels
Distance relationship	~60 km east of Erode; ~2 hours from Tiruppur
Key sub-centres	Manalmedu (Karur Textile Park — KTPL, 110 acres), spread within 40 km radius of Karur town
Dominant product	Terry towels, bed linen, kitchen linen, table linen, toilet linen, wall hangings — all home textile made-ups
Power loom units	600–700 export-oriented SMEs within 40 km radius; also uses handlooms and autolooms
Key industry body	KTMEA (Karur Textile Manufacturers Exporters' Association) — 230+ members; HEPC (Handloom Export Promotion Council)
Key infrastructure	Karur Textile Park (KTPL — SITP; 110 acres; inaugurated 2011); Karur textile shandy
Primary buyers / markets	Walmart, Target, IKEA, JC Penney, Metro, Carrefour, Ahlens (Fibre2Fashion; OmSakthi Overseas)
Scale of employment	~1.5–3.0 lakh across sewing and allied activities

The Erode–Karur Supply Chain Axis

The supply chain runs in a clear directional sequence. Erode produces grey fabric and yarn-dyed fabric from its ~3,00,000 power looms, predominantly plain cotton, checks, and stripes. This fabric is then despatched to Karur's 600–700 SME exporters, who process it through weaving, dyeing, printing, cutting, sewing, and finishing into finished home textile made-ups. Karur then exports directly to global retail chains.

C.10.2 Demographics & Workforce

Population Profile

Table 71: Karur Cluster Population Profile

(in Lakhs; unless specified)

Indicator	Total	Male	Female
Total Population	10.64	5.28 (50%)	5.36 (50%)
Working-Age Population (15–59)	6.93	3.40	3.52
Young Population (15–34)	3.46	1.72	1.75
Sex Ratio (per 1,000 males)	1,015	-	-

Source: Census of India 2011

Workforce in T&A Sector

Table 72: Workforce in Karur T&A Sector

Indicator	Erode	Karur
Sector workforce	Employment ~2 lakh	~1.5 lakhs engaged in the production of home furnishing
Export Orientation	Erode along with Coimbatore and Tirupur, referred as 'Textile valley of India', constituting over 50% of India's total knitwear export	~3,000 units of home furnishing manufacturing; mix of domestic supply and exports
Female WFP	High in handloom (Chennimalai women weavers); comparatively moderate in power loom	High in made ups, sewing, and home textile export units
Key workforce challenge	Unskilled/semi-skilled labour shortage	Increasing shortage of Skilled labour

Source: Industry Publications

Export Profile

Table 73: Karur Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Cluster Exports (USD Mn.)	894	769	807
Cluster's T&A Exports (USD Mn.)	687 (77%)	565 (73%)	587 (73%)
Share in India's Total T&A Exports	2%	2%	2%
Primary T&A Product Exported	Bed linen, kitchen linen, toilet linen (terry towels), table linen, wall hangings		
Primary Export Destinations	USA, Europe (Germany, UK, France, Netherlands), Middle East, Australia		
Key Global Buyer Brands	Walmart, Target, IKEA, JC Penney, Ahlens, Metro, Carrefour		

Source: DGCI&S

C.10.3 Value Chain Penetration

The Erode–Karur axis collectively covers the full textile value chain from cotton ginning to finished export — but with responsibilities split geographically between the two nodes.

Cotton Ginning	Spinning / Yarn	Power loom Weaving (Grey/Yarn-Dyed Fabric)	Dyeing & Processing	Garment Manufacturing	Home Furnishing
✓ Gobichettipalayam (Erode district) — major cotton ginning centre; cleaned cotton supplied to local spinning mills and power loom sector. Karur also has ginning mills. Both districts draw from TN cotton production	— Yarn primarily from Coimbatore spinning mills (within 50 km of Erode); some local spinning. Karur cluster is dependent on low-count cotton yarn for terry towels	✓ Erode — ~3,00,000 power looms; grey cotton fabric, yarn-dyed fabric, checks, stripes at Vellakoil, Bhavani, Erode city. Karur — 600 to 700 SMEs with in-house weaving; Karur Textile Park (KTPL) weaving infrastructure	✓ Erode — significant dyeing cluster at Bhavani, Chennimalai, Erode city; large ETP-compliant units; Karur — in-house dyeing and processing at exporter SMEs; reactive dyeing, digital printing	— Not Present	✓ Karur — entire made-up manufacturing operation; cutting, sewing, embroidery, printing, quilting, finishing for export. Full value chain within KTPL campus. 500+ companies.

C.10.4 Top Product Categories

Table 74: Top Product Categories for Karur Cluster

#	Product	Details
1	Terry Towels (Export)	Leading cotton terry towel exporting cluster; bath, hand, face, kitchen towels; Walmart, Target, IKEA buyers
2	Bed Linen (Export)	Bed covers, duvet covers, pillow covers, sheets; high thread-count cotton; major European/US retail buyers; growing organic cotton segment
3	Kitchen & Table Linen (Export)	Kitchen towels, napkins, placemats, table runners, aprons, oven mitts; major share of Karur's export basket; jacquard and embroidered options

C.10.5 Skill & Training Infrastructure

Key Occupational Categories — Karur

Table 75: Key Occupational Categories in Karur Cluster

Occupation	Karur
CMT	Core skill — cutting, sewing, embroidery, quilting, folding, packing; shortage of skilled makers-up is the primary labour constraint cited by KTMEA CEO
Quality Control	AQL inspection for export batches; OEKO-TEX / GOTS compliance testing; buyer-specific quality protocols — trained QC staff in short supply
IE / Production Management	Present at larger units (Atlas Exports, Amaravathi); absent at majority of 600–700 SMEs
Design & Product Development	Growing need — losing ground to Panipat on value-added blends and designs; Karur exporters investing in design studios at larger units

Training Infrastructure

Table 76: Training Infrastructure in Karur

Institution	Type / Programmes	Remarks
ATDC (TN network)	Short-term PMKVY / ISDS courses in SMO, quality control, fabric grading; Diploma AMT/FDT	ATDC has signed MoU with TN government; Centre in Erode
SITRA (South India Textile Research Association)	Textile technology testing; weaving and processing technical training; quality testing labs; standards support	Based in Coimbatore (~40–50 km from Erode); critical institutional backbone for the entire TN textile cluster; indirect but high impact
TNSDC (TN Skill Development Corporation)	PMKVY delivery in apparel and textile trades; state-wide	Covers Erode and Karur districts; sector-specific courses include weaving, sewing, quality

C.11 Bhubaneswar (Odisha)

Rapidly Emerging Apparel Cluster

C.11.1 Cluster Overview

The Bhubaneswar Cluster is Odisha's emerging apparel and textile manufacturing corridor, centred on the Bhubaneswar–Cuttack urban agglomeration and extending to Ramdaspur (Cuttack), Bhuinpur/Chhatabar (Khordha), Malipada (near Bhubaneswar), and Bhadrak.

Unlike most clusters in this study, this is an investment-stage cluster transitioning into early operations. The April 2025 commissioning of Page Industries' Ramdaspur facility (INR 750 Cr.; 5,800 jobs) marks the first large-scale anchor investment becoming operational.

Odisha reflects a policy-led strategy to leverage reverse migration, targeting the large pool of Odia workers currently employed in garment clusters such as Bengaluru, Surat, Tiruppur, and NCR.

Table 77: Bhubaneswar Cluster Profile

Cluster Name	Bhubaneswar (Bhubaneswar–Cuttack–Khordha–Bhadrak corridor, Odisha)
State	Odisha
Key Industrial Nodes	Ramdaspur Industrial Area, Cuttack (Page Industries, INR 750 Cr.); Khordha (Page Industries 2nd unit, MAS India Clothing); Kalibati & Bhuinpur Garment Manufacturing Parks (GoO)
Dominant T&A Segment	RMG — innerwear and activewear (Page Industries / Jockey); woven and knit garments (Shahi Exports, ABFRL); technical textiles (Bhadrak Park); heritage handloom (Sambalpuri ikat, Berhampur silk, Kotpad tribal textiles)
Secondary Segments	Sambalpuri ikat sarees and dress material; Berhampur (Berhampur silk); Kotpad natural dye tribal textiles; technical textiles (emerging under Bhadrak Park)
Cluster Type	Stage 1 Investment-Stage Cluster transitioning to operational — brand-anchored, government-driven
Key Industry Bodies	IPICOL (Industrial Promotion and Investment Corporation of Odisha); Odisha Handloom, Textiles & Handicrafts Department; AEPC; Government of Odisha
Key Infrastructure	Bhubaneswar Airport (growing air cargo); Paradip and Dhamra ports (sea export); Delhi–Kolkata highway connectivity; Bhubaneswar Smart City infrastructure
Policy Framework	Odisha Apparel and Technical Textiles Policy 2022 (OATTP 2022) — includes capital investment subsidy, employment cost subsidy (INR 6,000/month male; INR 7,000/month female), market development initiative; Industrial Policy Resolution 2022

The cluster is currently large-corporate led, with early investments from players such as Page Industries, Shahi Exports, and ABFRL, alongside upcoming projects from MAS India and KPR Mill. This has created a top-down industrialisation model, where ecosystem development is expected to follow anchor unit establishment, rather than evolve organically through MSMEs as seen in traditional clusters.

A key structural differentiator is the state's focus on plug-and-play industrial infrastructure, with multiple textile and apparel parks operational across Cuttack, Khordha, and Bhadrak, and additional parks under development. These are designed to attract both large manufacturers and MSMEs, although the MSME garment base remains limited at present.

Odisha benefits from strong enabling conditions, including competitive land and labour costs, a sizeable semi-skilled workforce supported by reverse migration trends, and port connectivity through Paradip and Dhamra. In parallel, the state has a well-established handloom and artisan base (Sambalpuri ikat, Berhampuri silk, Kotpad), though this remains largely disconnected from the emerging industrial apparel ecosystem.

Overall, the cluster is characterised by high readiness but low maturity, with infrastructure and policy frameworks ahead of actual industrial depth. Its future trajectory will depend on the pace at which MSME ecosystems, supplier networks, and workforce capabilities develop around anchor investments, enabling a transition from isolated large units to a more integrated manufacturing cluster.

C.11.2 Demographics & Workforce

Population Profile

Table 78: Bhubaneswar Cluster Population Profile

(in Lakhs; unless specified)

Indicator	Total	Male	Female
Total Population	63.82	32.80 (51%)	31.02 (48%)
Working-Age Population (15–59)	41.16	21.07	20.09
Young Population (15–34)	23.05	11.62	11.43
Sex Ratio (per 1,000 males)	946	—	—

Source: Census of India 2011; Population numbers include Bhadrak, Cuttack and Khordha districts

Workforce in T&A Sector

Odisha's T&A workforce is characterised by a large latent labour pool rather than an established industrial base. The state has historically been a major source of migrant garment workers, many of whom possess prior factory experience but lack local employment opportunities.

Current formal T&A employment in Odisha is modest but growing rapidly: Page Industries alone has hired 5,800 workers at Ramdasapur as of April 2025, with 3,500 more planned. Across 33 MoU signatories at Odisha TEX 2025 (July 2025), 53,300 jobs were pledged.

Table 79: Workforce in Bhubaneswar T&A Sector

Workforce Indicator	Estimates
Page Industries Ramdasapur (Cuttack)	5,800 direct jobs created; inaugurated in 2025
Page Industries 2nd unit (Chhatabar, Khordha)	Estimated employment potential of 3,500; foundation stone April 2025; investment INR 258 Cr.
Shahi Exports — Bhubaneswar	Active since Dec 2016; Bhubaneswar unit; 2,500+ direct jobs
Government T&A employment target	1 lakh T&A jobs by 2030, while expanding new textile clusters in Bolangir, Keonjhar, Sambalpur, Jatsinghpur, Ganjam, and Cuttack.
Female share of T&A workforce (target/actual)	Primary target workforce — OATTP 2022 provides higher employment subsidy for female workers (INR 7,000 vs INR 6,000/month); female workforce participation in the sector is 60–80%; Introduction of modern Workers' Hostels
Reverse migration pool (Odia garment workers elsewhere)	Odisha is one of India's largest sources of inter-state migrant garment workers; Mn.s working in Surat and Tiruppur.

Source: Industry Publications

Female Workforce Participation

The female workforce participation is 60-80%. Odisha's garment sector has explicitly targeted female employment as its primary social outcome. Odisha Apparel and Technical Textiles Policy 2022 provide a higher employment subsidy for female workers (INR 7,000/month vs INR 6,000/month for male workers). Worker hostels for women were inaugurated at the Odisha TEX 2025 parks (July 2025), addressing a key barrier to female industrial employment in Odisha's semi-urban and rural areas.

C.11.3 Export Profile

Table 80: Bhubaneswar Cluster Export Profile

Metric	FY 2022-23	FY 2023-24	FY 2024-25
Total Cluster Exports (USD Mn.)	775	741	733
Cluster's T&A Exports (USD Mn.)	37 (4%)	29 (4%)	32 (5%)
Share in India's Total T&A Exports	0.1%	0.1%	0.1%
Primary Products — current/near-term	Innerwear, activewear, woven RMG, Technical Textile (emerging)		
Primary Export Destinations	USA, Europe		

Source: DGCI&S

C.11.4 Value Chain Penetration

Fibre / Yarn	Weaving (Heritage Handloom)	Processing / Dyeing	Garment Manufacturing	Technical Textiles	Home Furnishing / Made ups
✓ Indian Oil polyester fibre plant (300 KTPA) planned near Bhubaneswar — will create upstream raw material base. Currently limited; cotton and polyester yarn sourced from external clusters.	✓ Sambalpuri ikat (GI-tagged) — produced across Sambalpur, Bargarh, Bolangir, Sonepur districts; Berhampur silk; Kotpad natural dye textiles (GI-tagged tribal craft, Koraput district); Nuapatna (Ikat sarees, GI-tagged); Bomkai sarees	— Limited — no significant garment washing or textile dyeing cluster established yet; required for scale-up of the industrial garment sector; Bhadrak technical textile park may incorporate processing	✓ Page Industries Ramdaspur — men's innerwear, socks, elastics; MAS India Clothing (activewear, sportswear); Shahi Exports Bhubaneswar	✓ Bhadrak Technical Textile Park; Odisha's policy explicitly targets technical textiles under OATTP 2022; KPR Mill and Sportking investments at Odisha TEX 2025 include technical textile components	— Not present

Top Product Categories

Table 81: Top Product Categories for Bhubaneswar Cluster

#	Product Category	Details
1	Innerwear & Socks	Page Industries / Jockey – men's innerwear, socks, elastics; commercial production commenced May 2025
2	Activewear & Sportswear	MAS India Clothing — Sri Lanka-headquartered global activewear manufacturer; foundation stone April 2025; KPR Mill, Sportking — MoUs at Odisha TEX 2025 for yarn and activewear
3	Export Woven Garments	Shahi Exports Bhubaneswar — women's garments, men's garments for global brands (H&M, Gap etc.); ABFRL Madura unit — formal and semi-formal wear for domestic and export markets
4	Technical Textiles (Emerging)	Bhadrak Technical Textile Park; OATTP 2022 explicitly covers technical textiles; emerging segment with growing investor interest (KPR Mill, Hindalco at Odisha TEX 2025)

C.11.5 Skill & Training Infrastructure

Key Occupational Categories

Table 82: Key Occupational Categories in Bhubaneswar Cluster

Occupational Category	Role Examples	Demand Level
Sewing Machine Operators (Knit — Innerwear)	SMO for knit innerwear, socks manufacturing, elastic operations	Very High
Sewing Machine Operators (Woven — Export)	Woven fabric SMO	High — quality standards for global buyers
Activewear & Technical Garment Manufacturing	Technical fabric SMO, performance garment assembler, sportswear finishing operator	High — synthetic/stretch fabric handling
Quality Control & Compliance	Inline Inspector, AQL Final Inspector, Social Audit Coordinator	High — global brands have strict compliance requirements; shortage of trained QC staff in Odisha
Industrial Engineering	IE Executive, Work Study Analyst, Lean Manufacturing Facilitator	High — as the cluster scales, IE capability will be essential; currently absent except in anchor firms
Middle Management	Production Manager, Merchandiser, Line Supervisor, HR Officer	High — anchor firms will need rapidly scaling middle-management talent;

Training Infrastructure

Table 83: Training Infrastructure in Bhubaneswar

Institution	Type / Programmes	Remarks
NIFT Bhubaneswar	B. Des (Fashion Design, Knitwear Design), B. F. Tech, M. Des; apparel production technology	Present in Bhubaneswar; directly relevant to the cluster's needs; knitwear design programme aligns with emerging production
ATDC (State-wide network)	Short-term PMKVY / ISDS courses; Diploma and B. Voc in apparel manufacturing and design	ATDC has signed MoU with Odisha state government
72 ITIs (Odisha state-wide)	Sewing Technology and Apparel trades; 72 NCVT-affiliated institutions covering all 30 districts	12 new ITIs added in 2023-24; all 30 districts now covered
Odisha Skill Development Authority (OSDA)	State skill programmes; DDU-GKY, PMKVY delivery	Invest India confirms several new courses in textile technology and apparel introduced
In-factory Training (Anchor Units)	Page Industries: in-house OJT and skill training at Ramdasapur (the 650,000 sq. ft. facility is designed with training infrastructure); Shahi Exports: P.A.C.E. programme	Page Industries, ABFRL and Shahi Exports have structured in-factory training as standard; Odisha TEX 2025 MoUs included skill development commitments
Odisha TEX Skill Development MoUs	Skill development MoUs signed at Odisha TEX 2025 for automated garment manufacturing, textile machinery and wearable technology	Indian Textile Magazine (July 2025); specific partner institutions to be confirmed via primary research

D. State and National Level Assessment

D.1 Textile and Apparel Sector in India

Economic Footprint, Global Trade Position & State-wise Export Distribution

D.1.1 The Sector Landscape

The T&A sector is a crucial pillar of the country's economy, with a combined domestic and export market valued at ~USD 194 Bn. in 2025. The domestic market accounts for nearly four-fifths of the sector's value, while exports contribute the remaining one-fifth. The Government of India has set a target of expanding the sector to USD 350 Bn. by 2030, including USD 100 Bn. in exports, reflecting the sector's strategic importance for manufacturing growth, employment generation, and export competitiveness.

Table 84: India's T&A Market Size

Indicator	Market Size (US\$ Bn, 2025)
India Domestic T&A Market	157
T&A Exports	37
Total Market size (Domestic + Exports)	194

Source: DGCI&S, Ministry of Textiles

- The sector contributes around 2% of GDP today and its share of manufacturing GVA is 11%, and T&A exports contribute to ~8.6% of India's overall exports.
- India's integrated value chain, spanning fibre production to finished garments, provides a competitive advantage over several major exporting countries that rely more heavily on imported raw materials.

Sub-sector Breakdown – Apparel & Home Textiles

Apparel dominates the sector, accounting for a market size of ~USD 131 Bn., while home textiles contribute around USD 18 Bn. The apparel segment is primarily driven by domestic consumption, supported by rising incomes, urbanisation, and changing consumer preferences. Home textiles, although smaller in market size, are relatively more export-oriented, reflecting India's established position in global home furnishing markets. The differing market profiles of the two sub-sectors indicate distinct growth drivers and corresponding skill requirements.

Table 85: Apparel and Home Textiles Market Size

(Values in USD Bn., 2025-2026)

Sub-sector	Domestic Market	Exports	Total Sector Size	Key Demand Drivers
Apparel	115	16	131	Income growth, rapid urbanisation, female labour force expansion, organised retail expansion
Home Textiles*	12	6	18	Home ownership, premiumisation, hospitality, e-commerce
Others (inc. Technical Textiles)	30	15	45	Industrial and infrastructure demand, MMF transition, export growth, PLI and NTTM stimulus
Total T&A Sector	157	37	194	—

Source: DGC&S

Employment Significance

The T&A sector is one of India's largest sources of employment after agriculture, supporting ~45 Mn. direct jobs and an estimated 100 Mn. indirect and allied livelihoods across the value chain. Employment spans organised factories, household-based production, and a wide range of occupations from entry-level production roles to technical and managerial functions. Women account for more than 60% of the workforce, highlighting the sector's significant contribution to female employment, while migrant workers constitute nearly half of the workforce, reflecting the sector's dependence on labour mobility across major manufacturing clusters.

Table 86: Employment Footprint of India's T&A Sector

Dimension	Estimate	Remarks
Direct employment	~45 Mn.	Second-largest employer after agriculture
Indirect / allied employment	~100 Mn.	Covers cotton farming, ginning, spinning, logistics, retail, and ancillary services across the value chain
Female workforce participation	More than 60%	Highest concentration in Bengaluru, Erode-Karur, and Bhubaneswar garment clusters
Migrant workforce share	~47%	Concentrated majorly in Delhi NCR, Haryana and Punjab

Source: CII, PIB Release, Indian Development review

*Home Textiles include Home Furnishing and Made-Ups

D.1.2 Benchmarking Against Competing Nations

A comparison of India with key competing nations - China, Vietnam, and Bangladesh, highlights both India's structural strengths and the areas where it continues to face competitive gaps.

Table 87: Benchmarking Against Competing Nations

Parameter	China	Vietnam	Bangladesh	India
Total T&A exports (USD Bn., 2025)	291	46	40	37
Apparel exports (USD Bn., 2025)	146	39	37	16
Apparel global share	28%	7%	7%	3%
Cotton self-sufficiency	Partial	Import-dependent	Import-dependent	Self-sufficient
MMF / synthetic capability	Global Leader; integrated upstream	Well-established; large polyester base	Nascent; import dependent	Global leader in fiber, downstream improving via PLA
Export Product Diversification	Full spectrum; garments, yarn, fabric, MMF, home textiles and technical textiles	Broad; MMF, sportswear and activewear specialisation	Narrow; concentrated in basic knitwear and woven apparel	Broad across cotton apparel and home textiles; narrower in MMF relative to China and Vietnam
Average garment worker wage (USD / month)	~161 – 357	~133-191	~101	~168
FTA access (key destinations)	Multiple (RCEP, ASEAN)	CPTPP, EVFTA	Duty-free EU/UK under LDC (transitional, graduation Nov 2026)	UAE, AU, EFTA operational; UK CETA; EU, NZ, Oman EIF pending
Total lead time to EU / US (weeks)	8-12	10-14	16-20	10-16

Source: BHRC (China), Femnet, BHRC (Vietnam)

India is one of the world's largest textile producers and a major exporter of textiles and apparel. However, despite its integrated manufacturing base, India accounts for only around 3% of global apparel exports, compared with 7% each for Bangladesh and Vietnam and 28% for China. This highlights a gap between India's production capabilities and its share in global apparel exports.

- On the input side, India is the only one among the four countries with a fully self-sufficient cotton base, providing a structural cost advantage of ~4–6% in cotton garment manufacturing. India is also broadly cost-competitive with Vietnam in terms of labour costs, although labour costs remain lower in Bangladesh. In addition, India's integrated value chain, spanning fibre production to finished garments, provides greater supply chain resilience than several competing export-oriented economies.
- However, India's competitive gaps lie in relatively lower MMF capabilities, and a narrower export product mix compared with China and Vietnam. As global demand continues to shift towards MMF-based products and higher-value manufacturing, strengthening MMF capabilities, technology adoption, product diversification, and workforce skills will be critical to improving India's global competitiveness.

D.1.3 State-wise Sector Overview

Share of T&A Exports

India's T&A exports are geographically concentrated. The top five states account for ~70% of India's T&A export value, with Tamil Nadu accounting for the largest share, surpassing Gujarat.

Table 88: State-wise Exports (Apparel & Home Textiles)

(Values in USD Mn., 2025-2026)

Rank	State	T&A Exports	Share of India's T&A Exports	Apparel Exports	Home Textiles Exports ⁴
1	Tamil Nadu	8,266	22.7%	5,415	1,009
2	Gujarat	5,956	16.3%	424	933
3	Haryana	3,929	10.6%	2,193	1,438
4	Maharashtra	3,859	10.8%	1,183	539
5	Uttar Pradesh	3,502	7.7%	2,239	892
6	Karnataka	2,792	9.6%	2,057	211
7	Rajasthan	1,616	4.4%	324	146
8	Punjab	1,374	3.8%	386	179
9	Madhya Pradesh	1,366	2.6%	39	306
10	West Bengal	1,122	3.1%	337	15
11	Delhi	958	3.7%	765	78
12	Odisha	89	0.2%	32	-
	Others	1,663	4.6%	580	271
	Total	36,493	100%	15,975	6,017

Source: Trade Intelligence and Analytics Portal, Department of Commerce

- The geographic concentration is high, eleven of India's twenty-eight states contribute meaningfully to T&A exports.
- Madhya Pradesh, and Odisha are among the fastest-growing states in recent years, where the new factories are coming up through PM MITRA, and state textile policy investments.

⁴ Home Textiles include Home Furnishing and Made-Ups

State × Sub-sector Concentration

Specialisation has emerged organically across states, shaped by raw material access, historical trade networks, labour availability, and infrastructure.

Table 89: State × Sub-sector Concentration: Apparel, Home Furnishing & Made-Ups

State (Cluster / Node)	Apparel (RMG)	Home Furnishing	Made-Ups	Dominant Product Specialisation
Tamil Nadu (Tiruppur, Erode, Karur)	Primary	Primary (Karur), Secondary (Erode)	Primary (Karur)	Knit RMG (Tiruppur); kitchen/bed linen, towels (Karur)
Karnataka (Bengaluru)	Primary	—	—	Woven RMG export hub; denim, outerwear, silk
Haryana (Panipat, Gurgaon, Faridabad)	Primary (Gurgaon)	Primary (Panipat)	Primary (Panipat)	Woven RMG (Gurgaon); home furnishing & recycled yarn (Panipat)
Punjab (Ludhiana)	Primary	Secondary	—	Woollen & acrylic knitwear, hosiery, yarn
Rajasthan (Jaipur, Bhilwara)	Primary	Secondary	—	Block-print apparel & ethnic wear, suiting fabrics
Madhya Pradesh (Indore / Dhar / Sehore)	Primary	—	Secondary	Cotton garments; greenfield capacity (incl. PM MITRA Dhar)
Gujarat / Dadra and Nagar Haveli (Vapi, Silvassa)	Primary	Secondary	Secondary	Capital-intensive garment, home furnishing & MMF processing
Odisha (Bhubaneswar)	Primary (emerging)	—	—	Knit innerwear & activewear, woven RMG (anchor-led)
West Bengal (Kolkata)	Primary	Secondary	—	Hosiery, woven RMG, handloom, embellished apparel
Delhi & UP (Noida)	Primary	—	Secondary	Women's woven RMG, fashion, ladies' wear
UP (Bhadohi)	—	Primary	—	Carpets, durries, rugs
Maharashtra (Solapur)	Secondary	Primary	Primary	Towels, bed linen, terry products

Apparel manufacturing is the most widely represented activity, present as a primary function across nearly all clusters. Home furnishing and made-ups specialisation is more concentrated in Karur, Panipat, Bhadohi, and Solapur. Several clusters operate across more than one category, reflecting the diversification strategies of anchor units and the depth of manufacturing ecosystems.

State-wise Minimum Wage Structure

Minimum wages vary significantly across major textile and apparel manufacturing states, reflecting differences in labour market conditions, cost of living, and state-level wage policies. The table below presents the statutory monthly minimum wages for unskilled, semi-skilled, and skilled workers across the key states covered in this assessment.

Table 90: State-wise Minimum Wage Structure

State	Minimum Wage (Rs./Month)		
	Unskilled	Semi-skilled	Skilled
Tamil Nadu	₹ 13,783	₹13,866	₹14,004
Uttar Pradesh	₹13,690	₹15,059	₹16,868
Haryana	₹15,220	₹ 16,780	₹ 18,500
Karnataka	₹19,319	₹21,251	₹23,376
Delhi	₹18,456	₹20,371	₹22,411
Gujarat	₹15,262	₹15,548	₹15,808
Punjab	₹13,486	₹14,383	₹15,414
West Bengal	₹9,760	₹10,733	₹11,807
Rajasthan	₹7,410	₹7,722	₹8,034
Madhya Pradesh	₹12,150	₹13,146	₹14,869
Odisha	₹12,272	₹13,572	₹14,872

Source: SGCMS Regulatory Updates, Labour Department, Delhi, Labour Department, Haryana, Labour Department, Uttar Pradesh, Department of Labour Madhya Pradesh, Labour Directorate, Odisha, Department of Labour Gujarat, Labour Department, Punjab, Labour Department, Government of Karnataka, Labour Commissionerate, West Bengal, Department of Labour, Rajasthan

Note- Wages for Karnataka and Gujarat are taken for higher zone category. Revised VDA rate (2026) for RMG employment is considered for Gujarat.

Karnataka and Delhi report the highest notified minimum wages across all skill categories, while Rajasthan and West Bengal record comparatively lower wage levels. Across all states, notified wages increase progressively from unskilled to skilled categories, reflecting the formal recognition of skill levels within the wage structure.

D.2 Employer Demand Signals

Workforce, Technology, and Skill Requirements in Apparel, Made-Ups & Home Furnishing units

Employer demand for skills is evolving as technology adoption increases, buyer requirements change, and production processes become more quality and compliance focused. This section examines employer perspectives on workforce composition, technology adoption, skill requirements, and the key areas where skill demand exceeds current workforce capabilities.

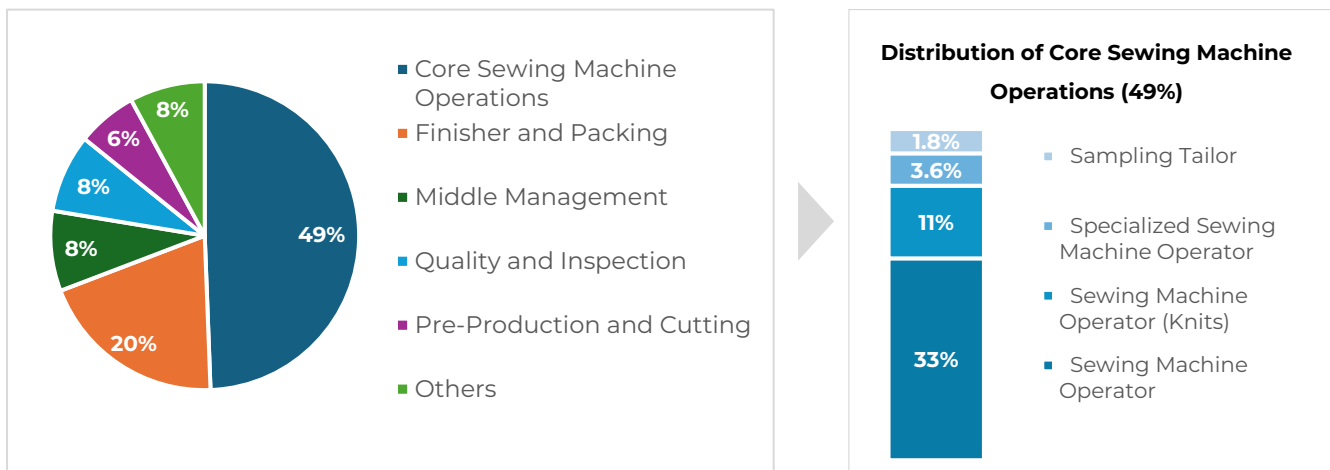
D.2.1 Role Composition Across the Surveyed Factory Base

The occupational structure of factories reflects the sector's labour-intensive manufacturing character, with direct production roles dominating employment across the value chain. Role composition varies by firm size and cluster type, with larger export-oriented units showing deeper deployment of specialist and technology-facing functions compared to MSME-tier factories.

Workforce Distribution

Core sewing machine operations account for 49% of total employment, while finishing & packing contribute a further 20%, together representing ~69% of the surveyed workforce. This indicates that employment is primarily concentrated in core assembly and post-assembly functions, making these the sector's dominant occupational groups.

Figure 2: Job Role Distribution Across Surveyed Factories



Source: Primary Research Findings

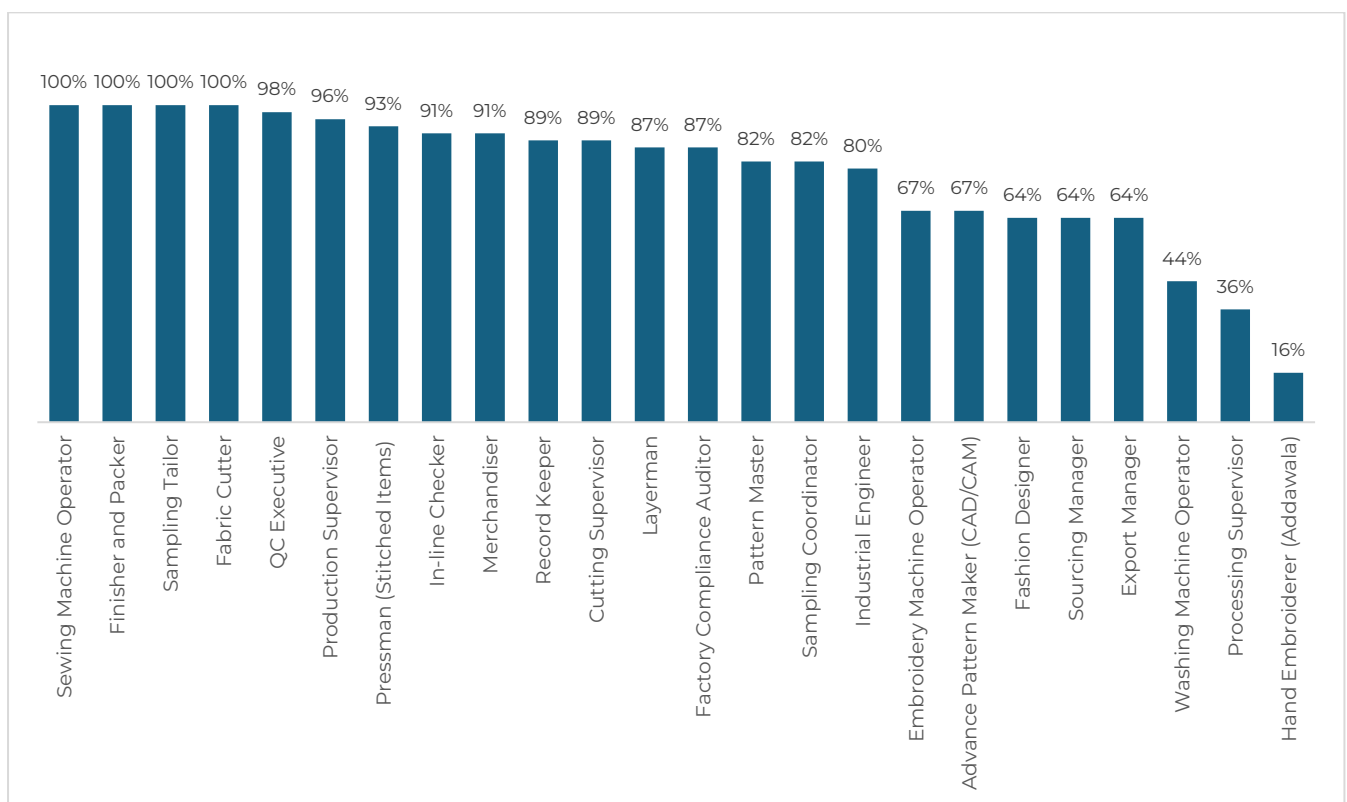
The remaining ~31% of the workforce is distributed across middle management (8%), quality & inspection (8%), pre-production & cutting (6%), and other support and specialised functions (8%), primarily comprising helpers, embroidery machine operators, washing machine operators, hand embroiderers, and processing supervisors.

Within core sewing operations, conventional sewing machine operators account for the largest share (33%), followed by knit sewing operators (11%), specialised sewing machine operators (4%), and sampling tailors (2%).

Factory Presence of Job Roles

Four roles including Sewing Machine Operator, Finisher and Packer, Sampling Tailor, and Fabric Cutter, are present in all surveyed factories, highlighting them as the core functions required across all manufacturing units, irrespective of size, product category, or production model.

Figure 3: Job Role Presence Across Surveyed Factories



Source: Primary Research Findings

Production Supervisors are present in 96% of factories, QC Executives in 98%, Pressmen in 93%, and In-line Checkers in 91%. The near-universal deployment of quality and supervisory functions reflects the growing formalisation of production processes in response to buyer expectations.

Layerman (Fabric) is present in 87% of factories, absent in units that have adopted automated spreading, as well as in factories producing made-up products such as rugs, blankets, and home furnishings. Similarly, Pressman (Stitched Items) is present in 93% of factories but is only absent in made-ups manufacturing where pressing is not part of the production process.

In contrast, specialised roles such as Industrial Engineers (82%), Factory Compliance Auditors (87%), Pattern Masters and Sampling Coordinators (82% each), and Advanced Pattern Makers (67%) are present in a smaller proportion of factories, with deployment generally increasing in larger and export-oriented units.

Cluster-Level Variation in Role Composition

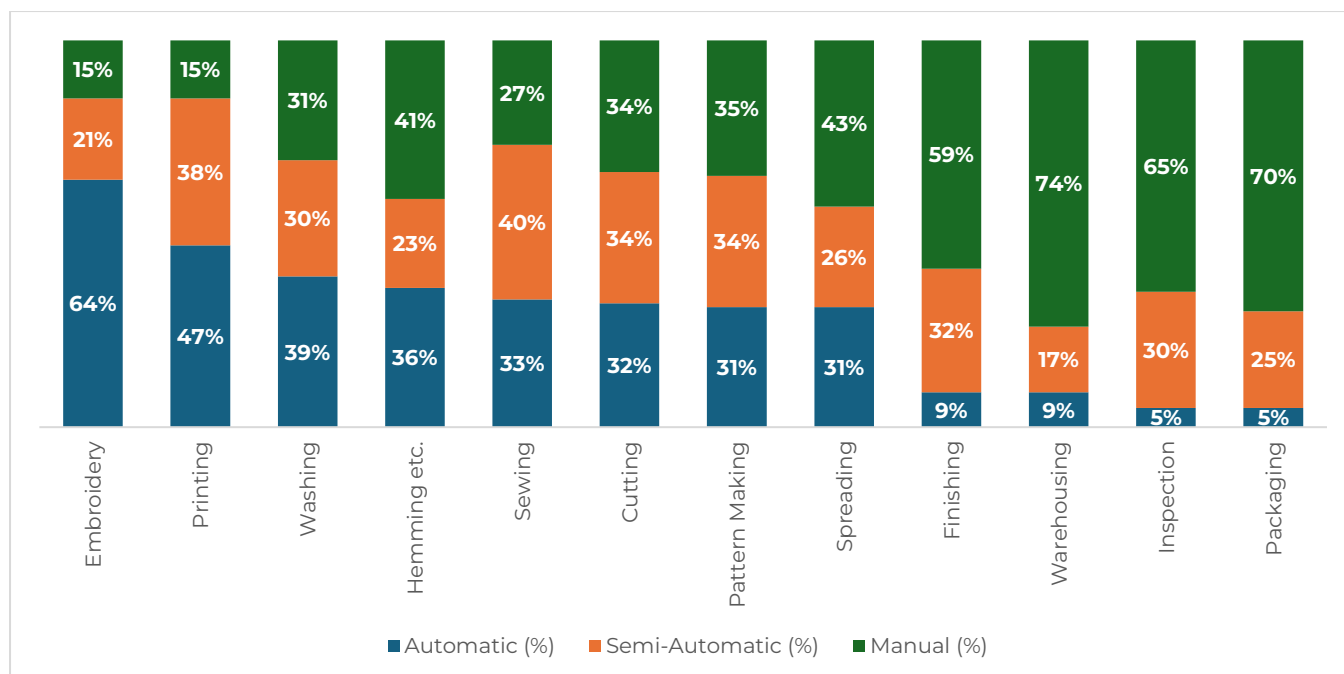
Role composition varies across clusters, reflecting differences in product specialisation and market orientation. Craft-intensive roles, such as Hand Embroiderers, remain concentrated in clusters like Jaipur and Kolkata, where artisanal production forms an important part of the manufacturing base. In contrast, advanced design, product development, and technical roles are more commonly found in larger export-oriented factories serving higher-value and design-intensive markets.

Overall, the findings indicate that while the sector remains centred on core sewing operations, factories are increasingly incorporating supervisory, quality, compliance, and technical functions to support more structured production processes. The presence of engineering, compliance, and digital roles is more pronounced in larger and export-oriented enterprises, reflecting the evolving skill requirements of modern manufacturing.

D.2.2 Technology Adoption by Production Process

Automation adoption varies considerably across production processes, reflecting differences in technological maturity and the complexity of operations.

Figure 4: Production Process Automation-level



Source: Primary Research Findings

Embroidery (64% automatic) and printing (47% automatic) exhibit the highest levels of automation, indicating greater technology adoption in precision and value-added processes.

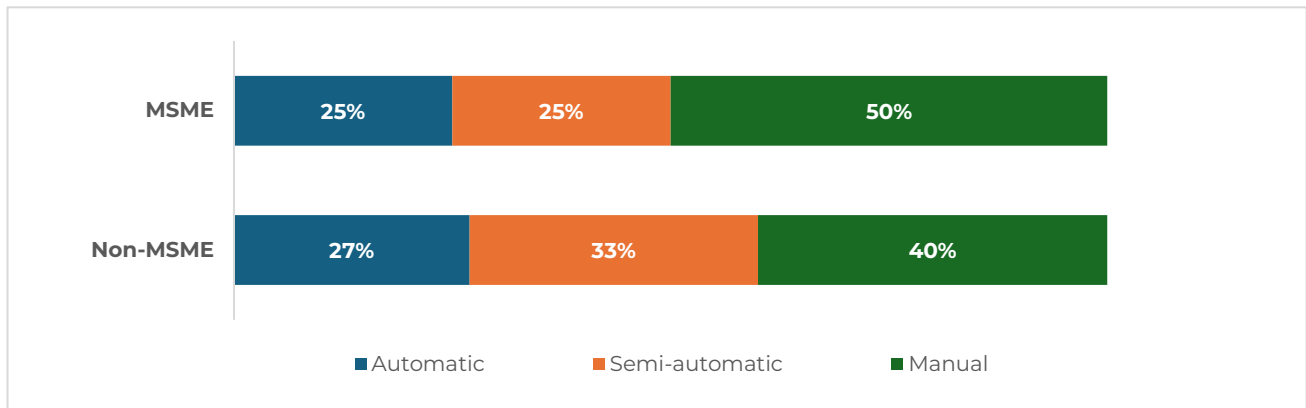
Core production functions such as sewing (33% automatic), cutting (32%), pattern making (31%), and spreading (31%) are characterised by a mix of automatic, semi-automatic, and manual operations, suggesting that these functions are currently undergoing gradual technology transition.

In contrast, downstream activities such as finishing (59% manual), warehousing (74%), inspection (65%), and packing (70%) remain predominantly manual, indicating relatively lower levels of mechanisation.

Overall, the findings suggest that automation is progressing unevenly across the manufacturing value chain, with adoption concentrated in selected production processes while downstream operations continue to rely primarily on manual work.

Firm-Size Effect on Automation Adoption

Figure 5: Automation level by Firm Type



Source: Primary Research Findings

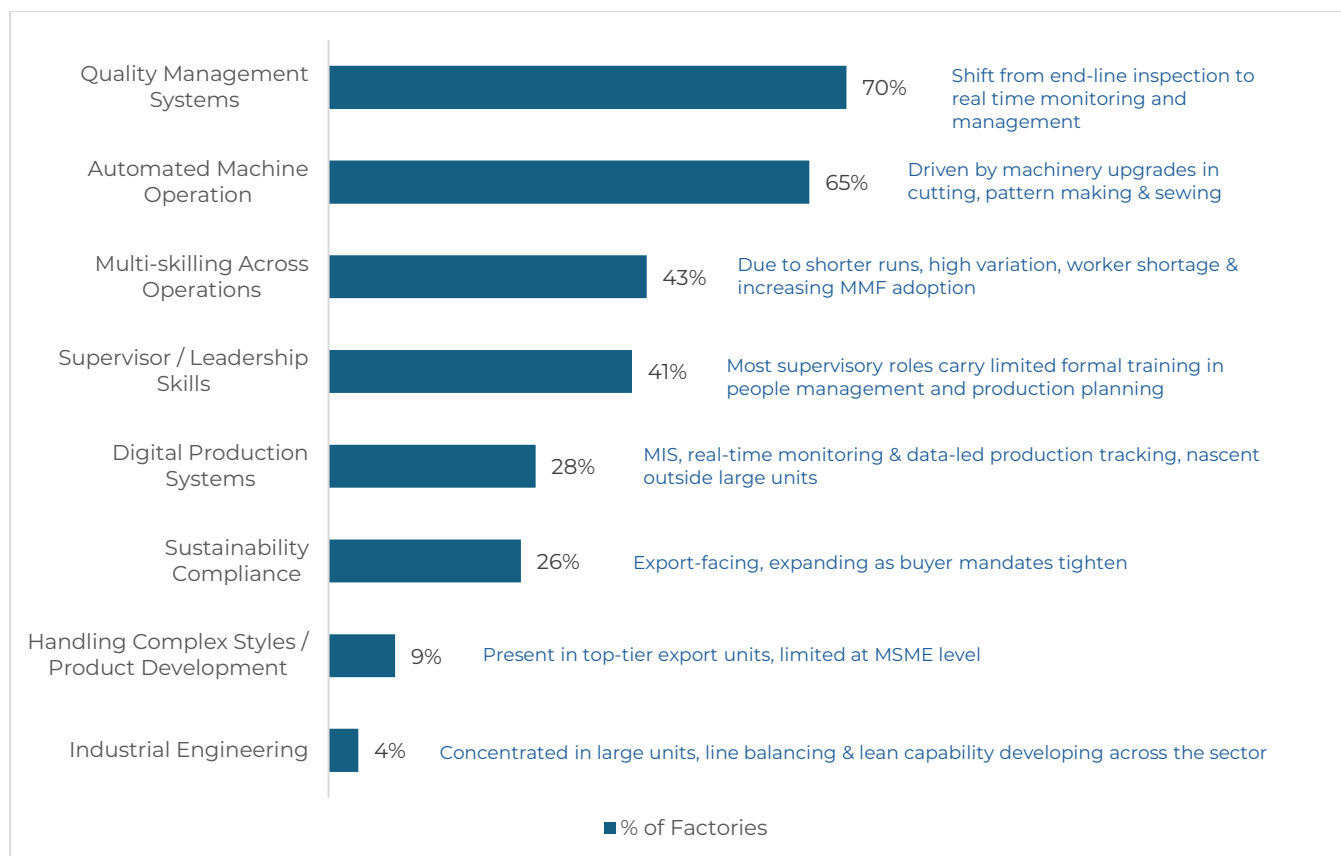
Automation levels also vary by enterprise size. Non-MSMEs report relatively higher adoption of automatic (27%) and semi-automatic (33%) systems than MSMEs (25% and 25%, respectively), while MSMEs continue to rely more heavily on manual operations (50%).

The findings indicate that larger enterprises are adopting automation at a relatively faster pace, supported by greater investment capacity and scale. At the same time, the widespread use of semi-automatic systems across both enterprise categories suggests that technology adoption is occurring incrementally rather than through complete replacement of manual production processes. This gradual transition underscores the need for continuous workforce upskilling to support evolving production technologies.

D.2.3 Emerging Skill Needs by Cluster and Firm Size

Employers indicate that future skill demand is increasingly centred on technology adoption, quality management, and operational flexibility rather than traditional production skills alone.

Figure 6: Emerging Skill Needs as Cited by Employers



Source: Primary Research Findings

Emerging Skill Requirements

The highest priority areas are Quality Management Systems (70%) and Automated Machine Operation (65%), followed by multi-skilling across operations (43%) and supervisory and leadership skills (41%). Demand for digital production systems (28%) and sustainability and compliance (26%) is also emerging, reflecting increasing digitalisation and buyer-driven compliance requirements.

Overall, the findings indicate that skill requirements are expanding beyond machine operation towards process management, technology adoption, and production oversight. This highlights the need for training programmes that combine technical competencies with supervisory, digital, and quality management capabilities to support evolving manufacturing practices.

Variation by Production Cluster

Emerging skill requirements vary across production clusters, reflecting differences in manufacturing focus, technology adoption, and product mix. Quality Management Systems and Automated Machine Operation emerge as the most widely cited priority skills across clusters, indicating a sector-wide emphasis on improving production quality and operational efficiency. Multi-skilling and supervisory capabilities are also frequently identified, particularly in clusters with diversified production and shorter production cycles.

Table 91: Emerging Skill Need by Cluster

Cluster	Quality Management System	Automated Machine Operation	Multi-skilling across Operations	Supervisor / Leadership Skills	Digital Production System	Sustainability Compliance	Handling Complex Styles / Product Dev.	Industrial Engineering
Ludhiana	Primary	Primary	Secondary		Primary	Secondary		
Delhi NCR	Primary	Primary	Primary	Secondary		Secondary		Secondary
Panipat				Primary	Secondary	Primary		
Jaipur	Primary	Primary	Secondary				Secondary	Secondary
Vapi	Secondary	Secondary	Secondary			Secondary		
Indore (incl. Dhar)	Secondary	Primary	Primary	Secondary	Secondary			
Kolkata	Primary						Secondary	
Bengaluru	Primary	Secondary	Primary	Primary		Secondary	Secondary	
Tiruppur	Primary	Primary	Primary	Primary	Secondary			
Erode-Karur	Secondary	Secondary	Secondary	Primary		Secondary	Primary	Primary
Bhubaneswar	Secondary	Primary		Secondary		Primary		Secondary

Primary = most frequently cited, Secondary = second most cited, Rest are either less frequent or not cited

Source: Primary Research Findings

At the cluster level, Tiruppur (Tamil Nadu) and Bengaluru (Karnataka) report broad-based demand spanning quality management, automation, multi-skilling, and supervisory capabilities, reflecting relatively advanced manufacturing operations. Ludhiana (Punjab) and Delhi NCR similarly prioritise automation and quality management, with additional emphasis on digital production systems and sustainability-related skills. In contrast, Erode-Karur (Tamil Nadu) places greater emphasis on supervisory capability, handling complex styles and product development, and

industrial engineering, reflecting the specialised nature of production in the cluster. Panipat (Haryana) highlights supervisory skills and sustainability compliance as key priorities, while Bhubaneswar (Odisha) and Jaipur (Rajasthan) exhibit more focused demand across selected technical skill areas.

Overall, while cluster-specific priorities vary, the findings indicate a common shift towards technology adoption, and quality management.

Variation by Firm Size

Differences by firm size indicate variations in capability requirements across manufacturing units. Non-MSME units report a broader mix of skill requirements, with relatively greater emphasis on multi-skilling, automated machine operation, and handling complex styles and product development. MSMEs, in contrast, place relatively greater emphasis on quality management systems, machine operation, and supervisory capabilities, reflecting their focus on strengthening core production processes.

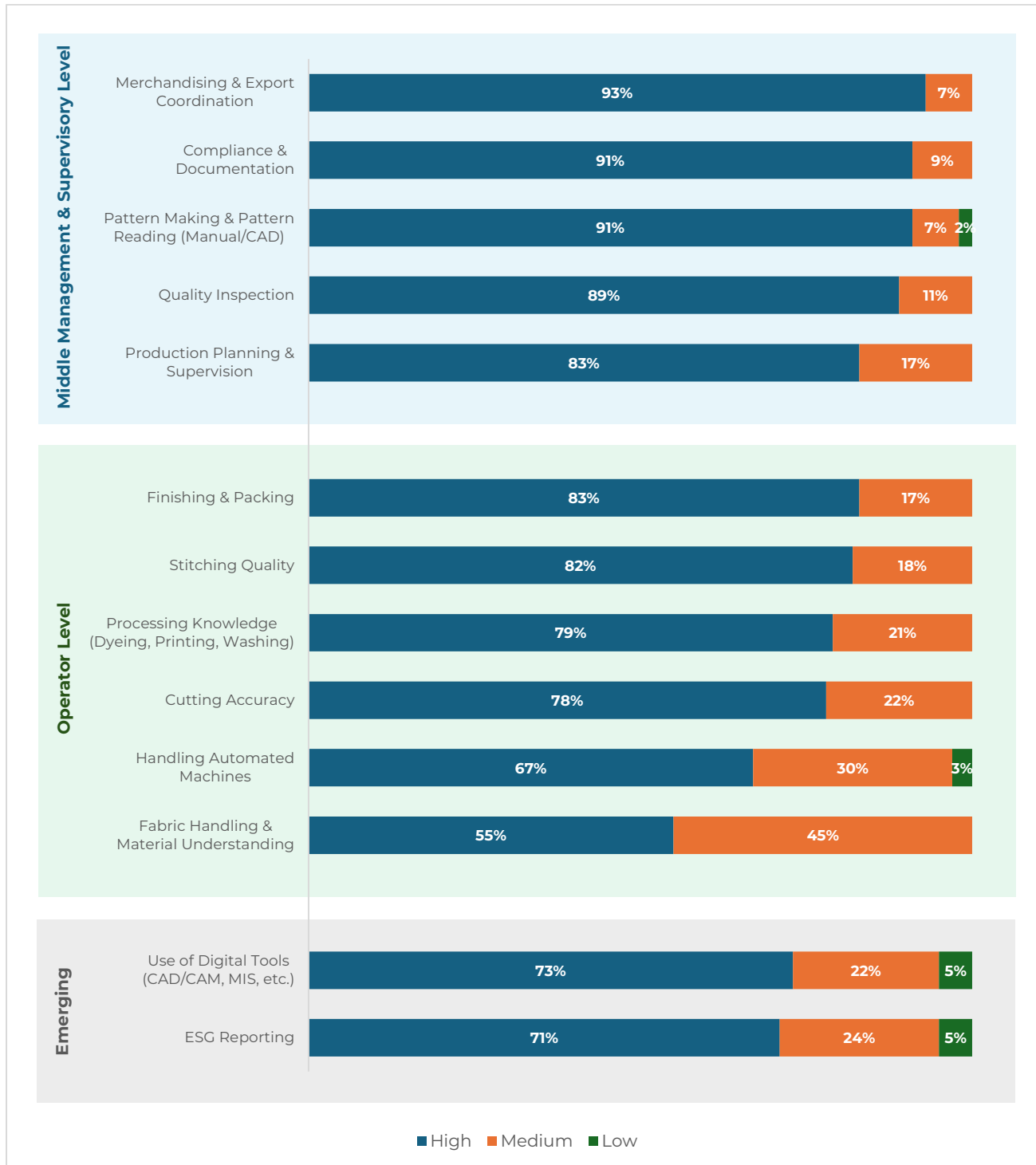
Emerging and Forward-Looking Capability Requirements

Digital production systems (28%), sustainability compliance (26%), handling complex styles and product development (9%), and industrial engineering (4%) currently attract lower levels of demand than the core operational categories. However, these capabilities are cited predominantly by larger and export-oriented enterprises, indicating the direction in which workforce requirements are evolving. They are associated with digital production management, buyer compliance, manufacturing efficiency, and process optimisation. The findings suggest that, alongside strengthening core production skills, the sector will increasingly require capabilities that support technology-enabled manufacturing and more sophisticated production systems.

D.2.4 Employer Assessment of Workforce Capability

Employers rated their workforce across multiple competency areas. The assessment distinguishes between established production competencies where readiness is high and emerging capability areas where the workforce skill is still developing.

Figure 7: Employer Assessment of Workforce Skill Level



Source: Primary Research Findings

Middle Management and Supervisory Level

Across the supervisory and middle management tier, proficiency ratings are high across the board. Merchandising and Export Coordination (93% high), Compliance and Documentation (91%), and Pattern Making and Pattern Reading (91%) represent the strongest capability band in the survey. Quality Inspection (89%) and Production Planning and Supervision (83%) round out this tier. These are functions built on buyer audit requirements, SOP-driven training, and sustained operational exposure accumulated over years, and the ratings reflect that stability.

Operator Level

Finishing and Packing (83%) and Stitching Quality (82%) remain relatively well-rated, reflecting the depth of workforce experience in core assembly functions. Processing Knowledge, covering dyeing, printing, and washing, records 79% high, though the 22% medium share points to uneven coverage across factory types.

The proficiency reduces as material and machine complexity increases. Cutting Accuracy records 76% high with 22% medium. Handling Automated Machines drops to 67% high, with 30% medium and 3% low. Fabric Handling and Material Understanding records the weakest rating in the entire survey at 55% high and 45% medium. The workforce is least proficient precisely where production systems are growing most demanding, i.e. varied fabric types and machines.

Emerging Functions

Use of Digital Tools (CAD, CAM, MIS) records 73% high with 22% medium and 5% low. ESG Reporting records 71% high with 24% medium and 5% low. The medium and low ratings here indicate existing capability that has not been operationalised across the workforce. Both functions are early-stage requirements today and fast-growing ones over the next five years.

Cluster-Level and Firm-Size Variation

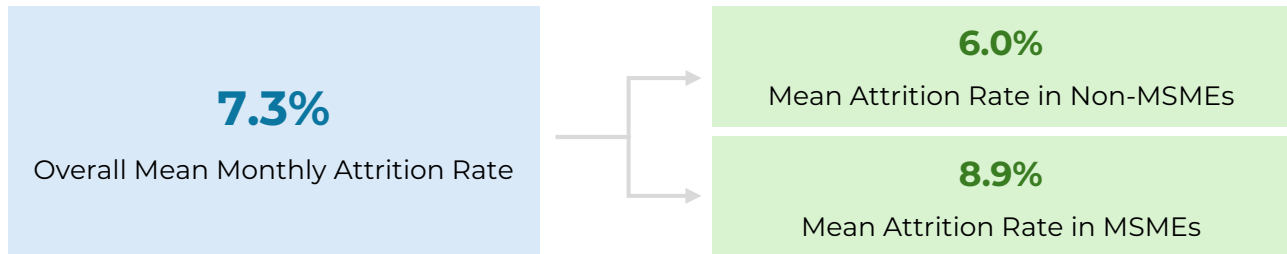
Kolkata stands at the weaker end of the skill spectrum, with notably low ratings in machine operation, handling of automated machines, digital tools, ESG reporting, and production planning. Panipat also records low skill levels in core material and machine-handling functions. By contrast, clusters including Vapi, Bhubaneswar, Jaipur, and Tiruppur demonstrate stronger readiness across a wider range of competencies. Bengaluru and NCR occupy an intermediate position, with broad capability coverage but a higher concentration of medium ratings in the areas that are evolving most rapidly from a technology standpoint. The gaps are largely pronounced in clusters where production systems are mixed, more labour-sensitive, or less digitally mature.

The pattern is consistent with firm-size dynamics as well. Larger, export-oriented units generally demonstrate stronger capability maturity in established functional areas but face more visible gaps in advanced competencies linked to automation, digital systems, and ESG compliance. Smaller factories remain more exposed in foundational operational areas such as machine operation and fabric handling. MSMEs are working to stabilise core production competencies, while larger units are increasingly contending with capability gaps created by technology adoption and compliance pressure.

The workforce skills are well-established in functions that have benefited from long-standing training systems, routine operational exposure, and audit-led discipline. The areas where adequacy weakens correspond directly to those where the sector is evolving most rapidly, particularly machine operation, material handling, automated machine handling, digital tools, and ESG reporting. The alignment between skill gaps and emerging skill priorities is a significant finding. The workforce is prepared for the older production model, but considerably less prepared for the more process-intensive and technology-enabled model that is now taking shape across the industry.

D.2.5 Attrition: Rates, Roles, and Structural Drivers

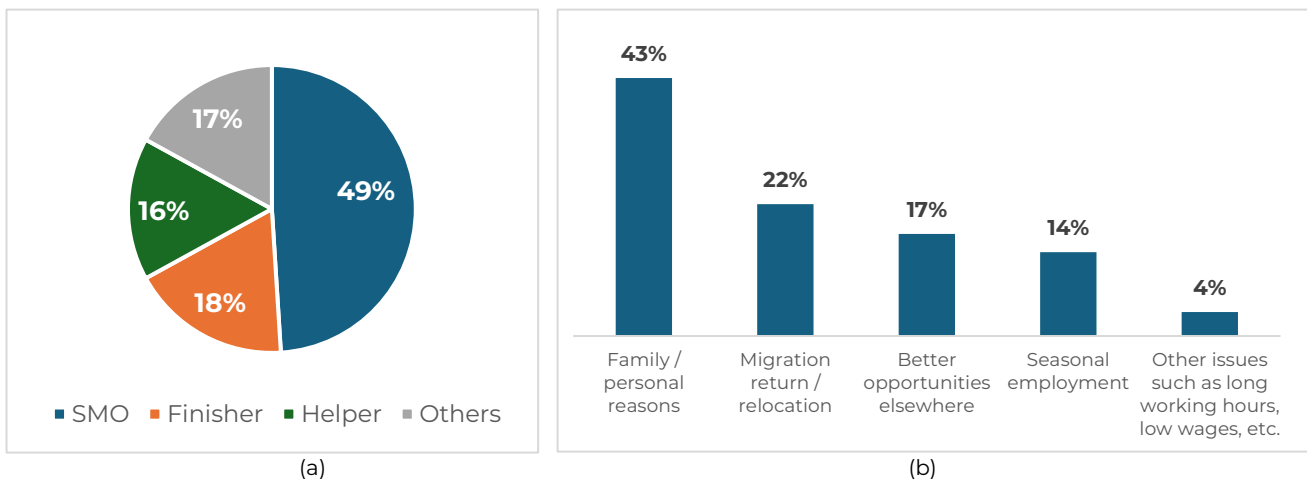
Attrition remains a structural feature of the sector, driven by migration, seasonality, wage competition, and personal mobility.



The mean monthly attrition rate of 7.3% indicates that workforce movement is a recurring operational characteristic of the sector. Nearly two-thirds of surveyed factories report monthly attrition within the 5–10% range, while rates exceeding 10% are comparatively less common.

MSMEs report a higher average monthly attrition rate (8.9%) than non-MSMEs (6.0%), indicating relatively greater workforce mobility among smaller enterprises. This may reflect differences in recruitment reach, employee retention practices, career progression opportunities, and workforce management capacity between smaller and larger manufacturing units. As a result, workforce replacement and skill retention are likely to present comparatively greater operational challenges for MSMEs.

Figure 8: (a) Attrition by Occupational Role, and (b) Primary Drivers for Attrition



Source: Primary Research Findings

Occupational Concentration of Attrition

Sewing Machine Operators account for 49% of all reported attrition, followed by finishers and helpers. While this partly reflects the occupational composition of the workforce, it also indicates the high transferability of production skills across employers. Operators can move between factories with limited retraining requirements, making inter-firm mobility a common feature of the sector's labour market. Consequently, attrition among these roles reflects both workforce mobility and firm-level retention challenges.

Reported Drivers and Mid-Level Attrition Dynamics

Family and personal reasons are cited by 43% of factories, making them the most frequently reported cause of workforce exits. Migration-related movement is reported by 22% of surveyed units, while seasonal employment patterns continue to influence workforce availability across several production clusters. A significant proportion of attrition originates outside the direct control of employers, with workforce mobility remaining closely tied to migration cycles, household considerations, and broader labour market dynamics.

A distinct mobility dynamic is observed at the supervisory and managerial levels. Merchandisers are reported to change organisations within 1 to 2 years on average, reflecting a considerably different mobility dynamic from that observed among production workers. At these levels, movement is closely associated with career advancement and compensation growth.

Attrition and Workforce Development

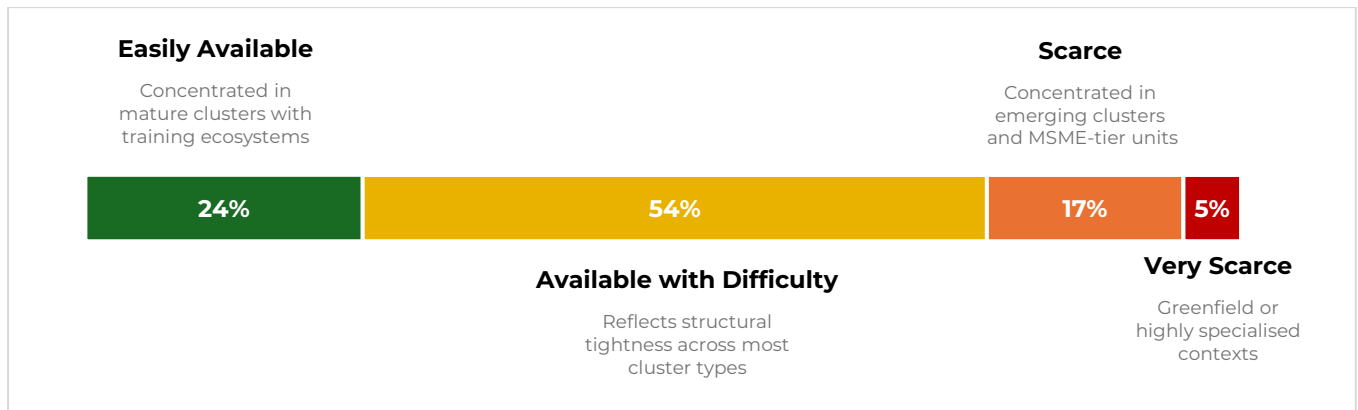
Average sector experience exceeds tenure within the current factory, indicating that workers commonly move between employers while remaining within the industry. This suggests that workforce mobility is largely intra-sectoral, enabling the retention of skills within the broader labour market while limiting the accumulation of firm-specific experience.

Overall, the findings indicate that workforce movement is influenced by a combination of personal factors, migration, labour market opportunities, and the transferability of production skills. Higher attrition among MSMEs and comparatively greater mobility at supervisory levels suggest that retention challenges vary across enterprise types and occupational groups. Strengthening career progression opportunities, workforce development, and employee retention practices will therefore remain important for improving workforce stability across the sector.

D.2.6 Skilled Workforce Availability Across Clusters

Availability of skilled workers varies significantly across clusters, depending on industrial maturity and the strength of local training ecosystems. The range of employer responses maps closely to where clusters sit on the industrial development continuum.

Figure 9: Employer Assessment of Skilled Workforce Availability



Source: Primary Research Findings

The binding constraint on skilled workforce availability is less the absolute presence of labour and more the ease with which workers can be deployed into production-ready roles. Across the sample, only 24% of factories report skilled workers as easily available, while 54% describe availability as difficult. A further 17% characterise skilled labour as scarce and 5% as very scarce. The distribution reflects a market that is generally tight rather than structurally broken, with most employers able to source labour but not without delay, effort, or compromise on workforce readiness.

Cluster-Level Variation in Availability

The cluster pattern aligns closely with industrial maturity. Tiruppur and Panipat stand out at the easier end of the spectrum, with all responding factories in those clusters reporting skilled labour as easily available. Ludhiana is also comparatively stronger, with the majority of responses falling in the easy category, though a meaningful minority continue to report scarcity. These clusters benefit from more established industrial ecosystems, deeper labour pools, and stronger informal training networks that support faster worker replacement and lower onboarding friction.

Easily Available • Tiruppur • Panipat	Available with Difficulty • Ludhiana • Bengaluru • Delhi NCR • Erode • Bhubaneswar	Scarce • Indore • Jaipur • Vapi	Very Scarce • Kolkata
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Several clusters remain structurally tighter. Bengaluru, Delhi NCR, Bhubaneswar, and Erode are dominated by responses indicating that skilled labour is available only with difficulty, suggesting that even relatively mature industrial centres are not insulated from supply constraints. Indore, Jaipur, and Vapi appear more stressed, with scarcity more prominently reported and, in the case of Kolkata, very scarce ratings emerging as a distinct concern. Availability weakens where production complexity is higher, local training ecosystems are thinner, or workforce circulation is less able to keep pace with factory demand.

Availability versus Deployability

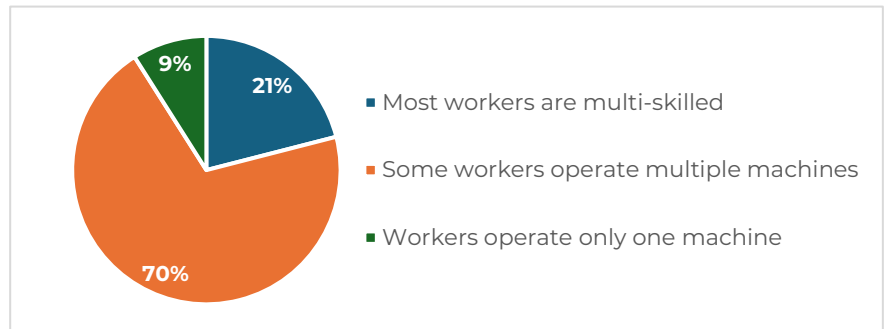
The findings also point to a distinction between availability and deployability. Employers are not only seeking workers who are present in the labour market. They are seeking workers capable of entering production with shorter onboarding periods, greater functional flexibility, and the readiness to absorb line pressure with limited preparation time. In several clusters, labour may be physically accessible, but the time and effort required to bring workers to production-ready standard remains considerable. This is particularly relevant in emerging clusters, where manufacturing capacity has expanded faster than the development of a locally available, production-ready workforce.

Skilled labour supply is unevenly distributed across the cluster landscape and remains closely tied to the maturity of local industrial ecosystems. Mature clusters are better positioned to source workers with lower friction, but availability is not frictionless even there. In less established or more specialised clusters, employers face a narrower talent base and greater onboarding effort. The primary constraint is therefore not labour scarcity in absolute terms, but the lag between production capacity expansion and the availability of workers who can be deployed into roles with minimal preparation.

D.2.7 Multi-Skilling Penetration and In-Factory Training

Multi-skilling and in-factory training are the sector's primary mechanisms for building production-level workforce capability. Both are progressing, with meaningful differences in depth and coverage across firm sizes and cluster types.

Figure 10: Multi-Skilling Penetration Across Factories



Source: Primary Research Findings

Current Multi-Skilling Penetration

Around 70% of factories report that some workers operate across multiple machines, while only 21% have reached a stage where most of the workforce is multi-skilled. The 9% of factories where workers remain confined to a single machine are exclusively within the MSME tier, reflecting the more constrained training environments and narrower operational scope.

Factories where only some workers are multi-skilled typically depend on a smaller group of flexible workers to manage line balancing and style changes, while the majority of workers continue to perform specialised roles. In contrast, factories with broader multi-skilling adoption are generally better positioned to support production flexibility, manage workforce absences, and accommodate changing product requirements. Overall, multi-skilling adoption remains at an intermediate stage across the sector.

Variation by Firm Size and Cluster

The extent of multi-skilling differs across firm sizes. Among non-MSME units, 28% report that most workers are multi-skilled, compared to 14% among MSMEs. Larger and export-oriented units are more likely to have institutionalised multi-skilling through structured rotation programmes and formal training frameworks.

The cluster-level pattern also reflects differences in production models. Mature manufacturing clusters with larger factory footprints tend to demonstrate broader adoption of structured multi-skilling practices, while emerging clusters rely more heavily on informal skill transfer and on-the-job learning. The workforce flexibility develops alongside industrial maturity, becoming progressively more formalised as factories scale.

D.3 Worker Demand Signals

Aspirations, Constraints, and Access Gaps within Apparel, Made-Ups & Home Furnishing units

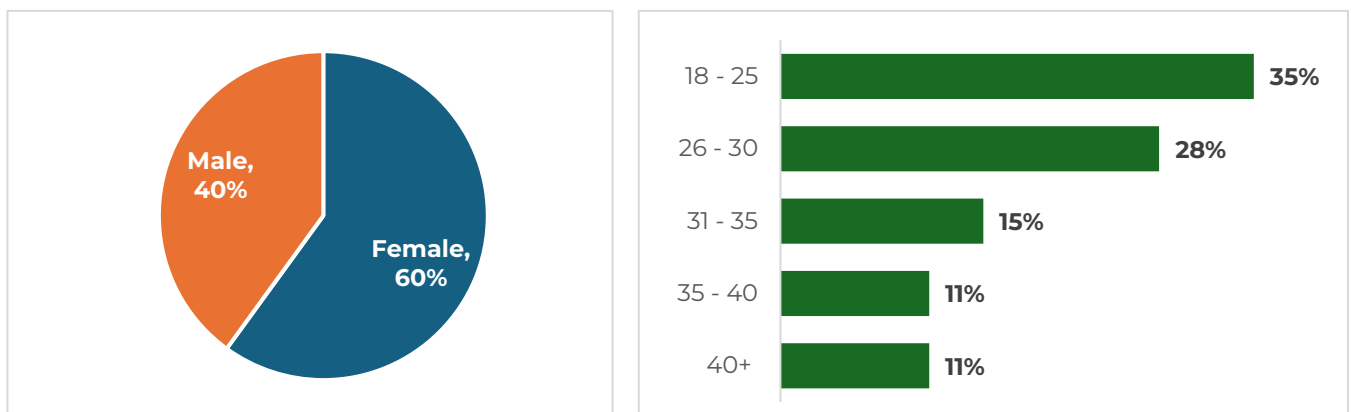
This section examines the workforce's demographic profile, mobility patterns, skill challenges, training access, and aspirations, and the extent to which the system supports workers' professional aspirations.

D.3.1 Workforce Profile and Career Mobility

The sector's workforce is young, predominantly female, and largely in the early-to-mid stages of industrial careers. Employment stability is high, the large majority hold permanent contracts. The gap between sector experience and factory tenure points to a workforce that moves between employers while remaining within the industry.

Age and Gender Composition

Figure 11: Worker Gender and Age Profile

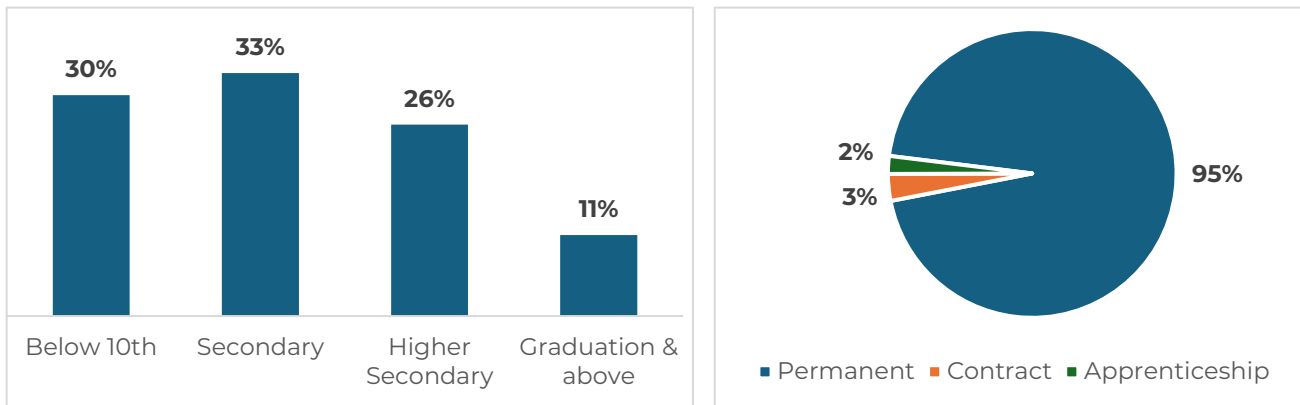


Source: Primary Research Findings

The workforce is predominantly young, with 63% of workers up to the age of 30 and only 11% above 40. The mean age of the workforce is 30 years, reflecting an industry that continues to attract younger entrants while experiencing a gradual thinning of its experienced workforce cohort. Women constitute the majority (~60%), reinforcing the sector's role as a significant source of female employment. The gender composition aligns with the concentration of women in production-intensive functions such as stitching, quality control, and finishing.

Education and Employment Stability

Figure 12: Workers Educational Background and Type of Employment



Source: Primary Research Findings

Educational attainment is concentrated around secondary schooling. 59% of workers have completed either secondary or higher secondary education, while only 11% possess graduate-level qualifications. Most jobs in the sector rely on technical and experiential learning than on formal higher education credentials.

The workforce demonstrates a high degree of employment stability. Permanent workers account for 95% of the sample, with contract workers (3%) and apprentices (2%) representing only a small share. The factories largely rely on a stable core workforce rather than short-term or contingent labour arrangements.

Experience, Tenure, and Intra-Industry Mobility

Sector experience exceeds tenure in the current factory, pointing to active workforce mobility within the industry. Workers report a total experience of 7.5 years compared with 1-1.5 years of average tenure with any factory. Career progression often occurs through movement between factories rather than through continuous advancement within a single establishment.

The gap between sector experience and factory tenure highlights the existence of an experienced labour pool that circulates within regional apparel clusters. While workers tend to remain in the industry for extended periods, they are comparatively more willing to switch employers, likely in pursuit of better wages, working conditions, skill utilisation, or advancement opportunities. The retention strategies may need to focus beyond job security, on creating visible pathways for skill development and career advancement within the enterprise.

D.3.2 Migration Patterns

Inter-State Migration at Scale

Inter-state labour migration is a structural feature of the sector's workforce. ~47% of the workforce is employed in a state different from their state of origin. Factory-level data corroborates the significance of migration, with several surveyed units, particularly in northern states, reporting migrant shares of 60–85% of their workforce.

Table 92: Key Inter-State Labour Migration Flows in the Sector

Origin State	Share %	Primary Destination
Uttar Pradesh	28%	Delhi NCR / Haryana
Bihar	26%	Delhi NCR / Gujarat
West Bengal	9%	Tamil Nadu/ Delhi NCR
Jharkhand	9%	Tamil Nadu/ Karnataka
Odisha	6%	Tamil Nadu/ Karnataka
Assam & Meghalaya	6%	Tamil Nadu
Himachal Pradesh	4%	Punjab
Madhya Pradesh	4%	Gujarat
Others (Chhattisgarh etc.)	~8%	Delhi NCR / Karnataka

Source: Primary Research Findings

Implications for Skilling and Retention

The high migrant share of the sector's workforce has direct implications for skill development programme design and delivery:

- Training programmes designed for stable local populations are less suitable for a mobile migrant workforce. Short-duration, modular, and certificate-linked training formats are better aligned with the employment patterns of migrant workers.
- Recognition of Prior Learning (RPL) is particularly relevant for this cohort; a significant share of migrant workers has accumulated practical skills through years of on-the-job learning without any formal certification.
- Factory-level attrition among migrant workers is driven not only by wages but also by seasonal pull-back to home states, access to accommodation, and proximity to family, factors that targeted employer and policy interventions can partially address

D.3.3 Task Difficulty by Role and Department

Task difficulty patterns reveal a workforce that is capable at its established function but stretched by the pace and complexity of contemporary production demands. The primary constraint is the workforce's ability to absorb frequent production changes while sustaining throughput and quality.

Table 93: Task Difficulty by Department

Process	Top Areas of Difficulty		
	Rank #1	Rank #2	Rank #3
Stitching	Maintaining production speed (16%)	Machine setup / changeover (13%)	Maintaining Quality Standards (12%)
Cutting	Following new methods (20%)	Handling style changes (14%)	Handling different fabric types (11%)
Finishing & Packing	Handling style changes (13%)	Following new methods (10%)	Understanding technical instructions (8%)
Quality Inspection	Handling different fabric types (20%)	Handling style changes (15%)	Meeting production targets (14%)
Line Supervision	Following new methods (31%)	Machine setup / changeover (21%)	Dealing with machine breakdowns (17%)
Embroidery	Meeting production targets (17%)	Machine setup / changeover (17%)	Understanding technical instructions (14%)
Overall	Maintaining production speed (11%)	Machine setup / changeover (11%)	Handling style changes (11%)

Source: Primary Research Findings

The three leading difficulties are tied at 11% each, maintaining production speed, machine setup/changeover, and handling style changes. This is a clear signal that the production system is under pressure from both efficiency demands and process variability.

Female and male workers report distinctly different difficulty profiles within the same production environment. Among women, the leading challenges are maintaining production speed (14% of female responses), handling style changes (13%), and maintaining quality standards (12%). Among men, the profile shifts toward technical and disruption-related tasks, led by machine setup/changeover (16%) and dealing with machine breakdowns/downtime (10%).

Difficulty by Production Function

Stitching is constrained primarily by throughput and quality discipline. The top difficulties are maintaining production speed (16%), machine setup/changeover (13%), and maintaining quality standards (12%). This is a clear sign that the stitching function is under simultaneous pressure to move faster and stay consistent.

Cutting and quality inspection are the two functions that are most exposed to change and variability. In cutting, following new methods (20%) is the dominant issue, followed by handling style changes (14%) and handling different fabric types (11%). In quality inspection, the leading problem is handling different fabric types (20%), followed by handling style changes (15%) and meeting production targets (14%). The shortfall here is less about effort and more about adapting to variation in inputs, methods, and specifications.

Line supervision shows the sharpest capability gap in process management. Supervisors report the highest difficulty in following new methods or process changes (31%), with machine setup/changeover (21%) and dealing with machine breakdowns/downtime (17%) next. This is a strong indicator that the supervisory layer is being asked to absorb operational change faster than it can stabilise it. Embroidery is a mix of delivery pressure and technical clarity gaps. The leading issues are meeting production targets (17%) and machine setup/changeover (17%), followed by understanding technical instructions (14%). That combination points to a function where precision, pace, and instruction clarity are simultaneously critical.

Age and Regional Patterns

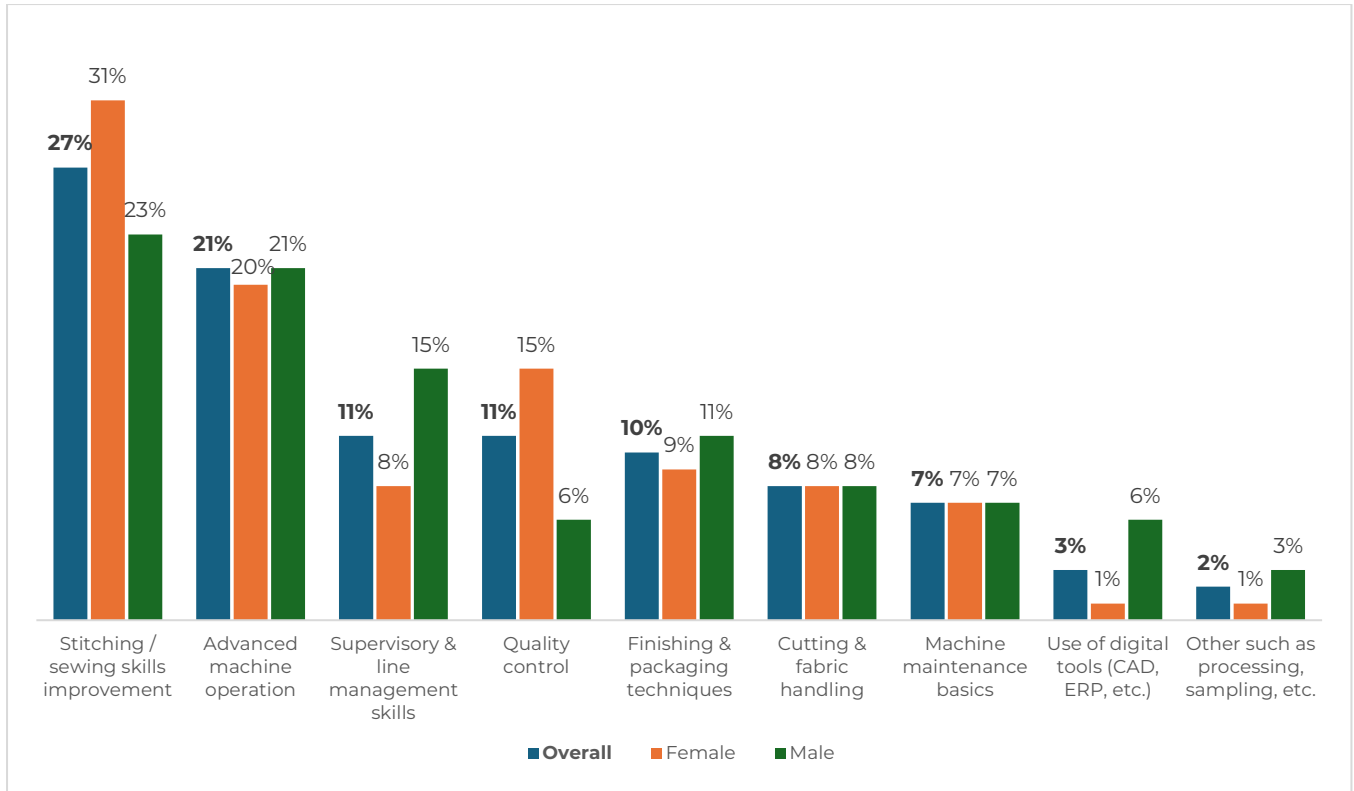
Age patterns reinforce the same story. Among women, younger workers are more exposed to style changes and production speed, while older women shift toward quality standards and process changes. Among men, machine setup/changeover peaks in the 26-30 age group at 20%, breakdowns become more prominent in the 36-40 group at 23%, and by 40+ a majority of men report no major difficulty (53%). Experience clearly reduces perceived difficulty, but only after workers have absorbed enough operational variation.

Regional difficulty profiles follow cluster production contexts: Tamil Nadu's fast-fashion intensity surfaces style and target pressure, while Punjab's specification-driven environment surfaces technical instruction and quality gaps.

D.3.4 Workforce Training Preferences

Aspiration to learn has a near-universal pattern across the workforce, consistent across gender, age, and department.

Figure 13: Preferred Skill Training Areas



Source: Primary Research Findings

Preference by Skill Category

- Stitching and sewing skills improvement is the dominant training preference, accounting for 27% of overall responses. Interest is broad-based but notably stronger among female workers (31%) and those aged 18–25 (31%), indicating a continued demand for strengthening foundational production capabilities among early-career women.
- Advanced machine operation demonstrates the most uniformly distributed demand profile across the workforce, with preferences remaining consistently high across age groups (18–23%) and virtually identical between male and female workers. The technical upskilling is perceived as a universal rather than demographic-specific requirement.
- Quality control training shows a pronounced early-career female orientation, with interest peaking among workers aged 18–25 (14%) and remaining relatively high through the 31–35 cohort before declining among older workers. Female employees express more than double the preference level of male workers (15% vs. 6%), pointing to an opportunity to build quality-specialist pathways specifically targeted at women.

- Supervisory and line management training reflects a clear career progression, with demand peaking among workers aged 26–30 (14%) before moderating in later cohorts. The higher preference among male workers (15% vs. 8% for females) indicates that men currently perceive greater access to, or aspiration for, supervisory roles.
- Finishing and packaging techniques gain relevance with workforce maturity. Unlike most skill categories, interest rises steadily with age, from 8–9% among workers below 30 to 16% among those above 40, suggesting that experienced workers increasingly value specialised downstream capabilities that complement broader operational expertise.
- Cutting and fabric handling displays the strongest age effect among technical skills, with preference levels nearly doubling from 6–8% among workers below 35 to 13% among those aged 36–40. This points to capabilities that are associated with more experienced roles requiring greater precision and process knowledge.
- Machine maintenance basics is the only training category with near-identical demand across gender (7% each). Interest is spread across most age groups, with a slight concentration among workers aged 26–30 (10%), reflecting broad recognition that basic troubleshooting and equipment knowledge can improve daily productivity.
- Digital tools (CAD, ERP, etc.) currently represent a strategically important but low-demand category, accounting for 4% of overall preferences. Male interest (6%) is considerably higher than female interest (1%), and demand is concentrated among mid-career employees, indicating that digital adoption is currently led by workers in technical or specialised roles.

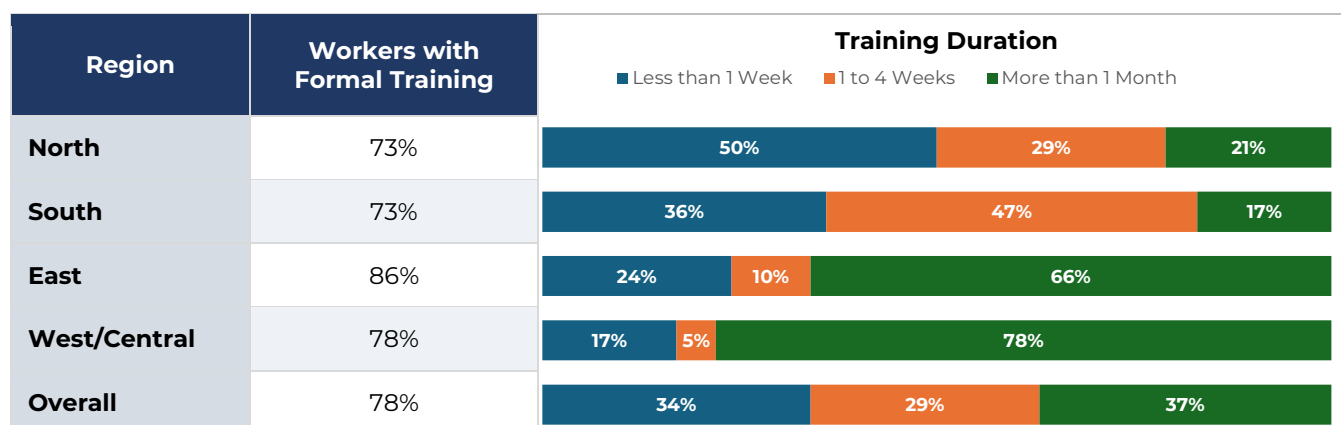
Career-Stage Pattern

The training preferences reveal a clear capability lifecycle within the workforce. Employees in the early stages of their careers (18-25 years) prioritise foundational production and quality skills, those in the mid-career stage (26-35 years) increasingly seek technical advancement and supervisory capabilities, while older employees (36+ years) show greater interest in specialised operational functions such as cutting, fabric handling, and finishing. A career-stage-based training architecture would likely generate higher engagement and stronger outcomes than a uniform curriculum.

D.3.5 Training Access: Coverage, Duration, and Provider Structure

Training access is widespread in headline terms but narrow in institutional diversity and depth. The factory is the dominant provider of skill development, and its training is calibrated to current production needs rather than forward-looking capability building.

Table 94: Formal Training Access and Duration by Region



Source: Primary Research Findings

Regional Access and Duration Profiles

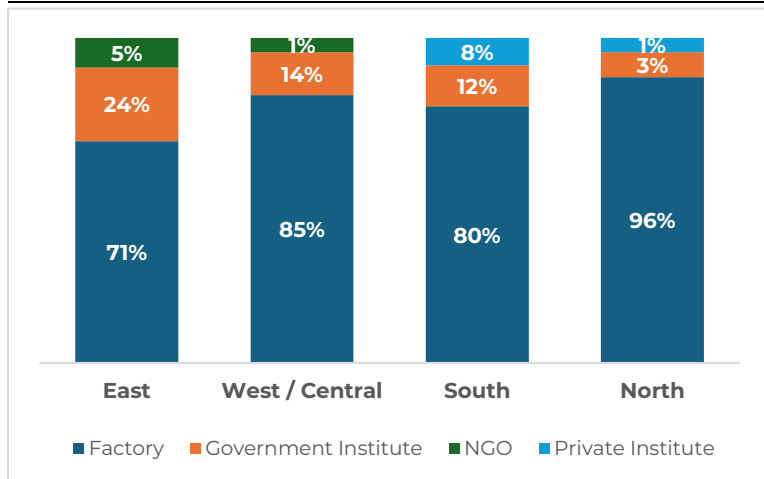
The West and Central regions together record a combined access rate of 78%. More importantly, their training skews toward longer durations, with 74% of trained workers in the West receiving instruction extending beyond one month. The East records 86% access and a similarly depth-oriented profile at 66% for the longer duration band. These three regions, where access is higher and durations longer, represent the more developed end of the training provision spectrum within the sector.

The North and South both record access rates of 73%, and their duration profiles are heavily weighted toward shorter engagements. In the North, 50% of trained workers received less than one week of instruction and only 21% received more than one month. The South is marginally better on duration, with 47% in the one-to-four week band, but only 17% cross the one-month threshold. These two regions represent the most significant capability development gap in the sample.

Provider Structure and Its Impact on Training Depth

The provider structure underlying these patterns explains much of the regional variation. Across clusters, 82% of trained workers received their training from their factory, making the employer the dominant and in many clusters the sole training institution available. This concentration is most extreme in the Central and North regions, where factory provision accounts for 99% and 96% of all training respectively.

Figure 14: Region-wise Share of Training Providers



Government institutes, private providers, and NGOs together reach only 10% of the workforce. The West is the notable exception, where government institutes account for 39% of provision. Government institute training is almost exclusively delivered over durations exceeding one month, while factory training spans all duration bands, with the largest single category being under one week.

Source: Primary Research Findings

Access Variation by Education Level and Department

Workers with below-secondary educational attainment record the lowest training access in the sample at 69%, compared to 81% among secondary-educated workers and 83% among those with higher secondary or graduate qualifications. The gradient is consistent: as educational attainment rises, so does training access. This represents a structural inversion. The workers with the greatest development need and the fewest alternative pathways to capability improvement are the least reached by formal training provision.

Cutting is the least trained department in the surveyed workforce, with only 62% of cutting department workers having received formal training. This stands in direct contrast to the difficulty profile where cutting workers report high rates of adaptation difficulty, particularly around following new methods, handling style changes, and managing different fabric types. Line supervision, which records the most acute difficulty profile of any function in the survey, achieves 94% training access.

State-Level and Gender Disaggregation

State-level disaggregation reveals that Haryana and Karnataka record the two lowest training access rates among major cluster states at 41% and 45% respectively. Both are among the most migration-dependent production environments in the sector, with high concentrations of workers drawn from other states who arrive without prior sector-specific training and depend heavily on in-factory development.

States such as Punjab, Gujarat, Rajasthan, and Madhya Pradesh record access rates of 91% to 94%. Tamil Nadu, the other major southern cluster state, sits at 83%. The gap between Haryana and Karnataka on one side and every comparable cluster state on the other is substantial, and it is occurring in production environments where operational intensity and compliance expectations are among the highest in the sector.

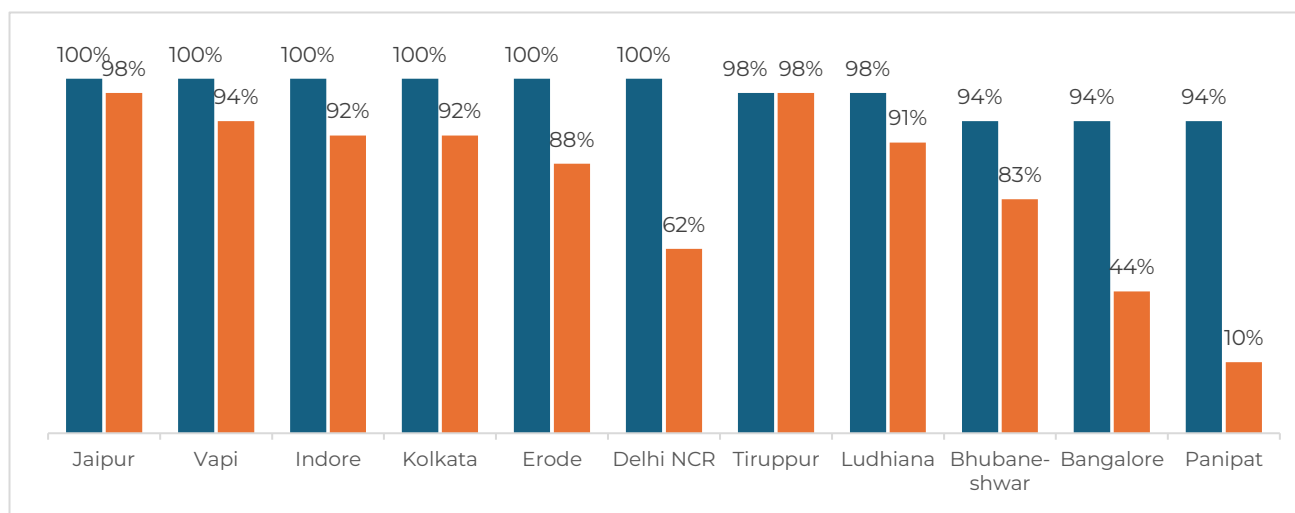
The gender dimension of access introduces a further structural concern. In the South, female workers record a training access rate of 67% compared to 91% among male workers, a gap of 24 percentage points. No comparable gap is observed in other regions. Given that women constitute ~60% of the sector workforce, this is a region-specific under-investment in the development of the sector's primary labour group.

The 22% of workers who have received no formal training, have the largest concentrations among women aged 26 to 40 in the South and men in the North. Short-cycle factory induction builds task familiarity for the current machine and the current style, but it does not build the adaptive capacity that more varied, technology-intensive production environments require.

D.3.6 The Aspiration–Access Gap by Cluster and State

The aspiration–access gap is uneven across the sector. It is highest where industrial capacity is expanding fast but training infrastructure is either moving slow or is stagnant.

Figure 15: Training Aspiration–Access Gap by Cluster



Source: Primary Research Findings

The aspiration to acquire new skills is near-universal, ranging from 94–100% across all clusters, consistent across gender, age group, region, and production function. The training system's capacity to respond to this aspiration, however, is uneven.

Clusters-wise Alignment Between Aspiration and Access

Jaipur, Vapi, Indore and Kolkata record universal aspiration and more than 90% training access, representing high alignment between workforce desire and system delivery. Erode, Tiruppur and Ludhiana are similarly close, with access rates of 88%, 98%, and 91% respectively. In these clusters, the training system is functioning as a responsive mechanism.

Panipat records aspiration at 94% but access of only 10%, Delhi NCR records universal aspiration against 62% access, and Bengaluru records 94% aspiration against a training access rate of only 44%. Majority of gap workers are female, pointing to a concentrated access gap among women in those cluster. Haryana and Karnataka, the two states that anchor these clusters, present the most acute combination of near-universal desire to learn and training access below 50%, with minimal government institute presence in either state.

Panipat reflects the widest gap between training access and aspiration, with 94% of workers expressing a desire to learn against only 10% reported formal training. This represents absence of formal training provision in an operationally active, workforce-intensive cluster.

Gender Dimension of the Access Gap

Tiruppur and Erode record access rates of 98% and 88% respectively against near-universal aspiration, with gap workers entirely female in both clusters. The pattern is consistent, male workers have broadly received training while female workers in the same production environments have not. Given that women dominate the workforce in these clusters, the gender access gap is a structural feature of how training is being distributed rather than an incidental one.

In the South, female workers record a training access rate 24 percentage points below that of male workers in the same production environment, and in Tiruppur and Erode, gap workers are entirely female. Government institutes account for only 10% of training provision nationally, with negligible presence in Haryana and Karnataka, the two states anchoring the largest gap clusters. Access rates appear strong in Punjab, Madhya Pradesh, and Rajasthan, where provision is delivered almost entirely through factory programmes.

D.3.7 Automation Exposure and Workforce Response

Automation is already a lived reality for the large majority of the workforce. The question of how workers respond to it, whether they seek to adapt or move away has direct implications for how training interventions should be designed and targeted.

Table 95: Automation Exposure and Workforce Response by Region

Region	Workers Reporting Introduction of Automation	Worker Preference in Case of Automation		
		■ Learn New Machines		
North	90%	91%	9%	
South	92%	91%	8%	1%
West/Central	65%	96%	4%	
East	71%	76%	14%	10%
Overall	84%	92%	4%	4%

Source: Primary Research Findings

Automation is a direct operational reality for the majority of the workforce, 84% of workers report that new machines or automated processes are being introduced in their factory. Exposure is highest in the South and North at 92% and 90% respectively. The East sits at 71% and the West and Central regions combined at 65%, consistent with the more mixed technology adoption profile observed at the factory level.

Workforce Preference regarding Automation

When asked workers' preference in case of increase in automation adoption, 92% indicate a preference to learn the new automated machines. Only 4% express a preference to shift to another factory and 4% report no clear preference. The West and Central regions record 96% preference to learn and only 4% unclear. The North and South sit at 91% each, and the East, the lowest at 76%, still reflects a substantially adaptive workforce orientation.

The willingness to adapt is consistent across gender and strengthens with experience rather than declining. Female workers prefer to learn at 93% and male workers at 92%. Among workers with six to ten years of sector experience, the preference to learn rises to 94%, and among those with eleven or more years it reaches 97%. Workers do not become more resistant to automation as they accumulate experience, they become more willing to engage with it.

Compounded Disadvantage in Less Automated Settings

Workers in factories where automation is already being introduced record a training access rate of 80%, compared to 66% among workers in factories where automation has not yet arrived. Technology adoption and training provision tend to advance together. Factories investing in machines are also more likely to invest in the workforce capability to operate them. The consequence is a compounded disadvantage for workers in less automated settings. They are less exposed to technology, less likely to receive training, and therefore less prepared for the transition that will eventually reach them.

Shift Preference: Who, Where, and Why

The 4% who express a preference to shift factories concentrate in the three-to-five year sector experience band, where the shift preference reaches 11%, the highest of any experience cohort. Workers at this stage have accumulated sufficient operational competence to be mobile and attractive to competing employers. Among those with six or more years of sector experience, the shift preference falls sharply and disappears entirely beyond ten years. Structured in-factory upskilling pathways are the most effective retention mechanism for this cohort. Workers at this stage of their careers are making active assessments of where their development opportunities lie. Factories that offer a visible pathway forward are substantially better positioned to retain them than those that rely on wage competition alone.

The shift preference is also concentrated by gender and geography. The majority of workers who prefer to shift are female and concentrated in the South region, predominantly in the younger age bands. A subset of young female workers in high-automation southern clusters perceive automation as a displacement risk rather than a development opportunity, due to communication and transition support gap in production environments.

Among workers whose factories have not yet introduced automation, 76% still express a preference to learn should it arrive. The adaptive disposition is a pre-existing feature of the workforce, and it deepens once workers have direct experience of automation in practice.

D.4 Stakeholder Consultations Output

This chapter presents findings from structured consultations with stakeholders: Lectra (machinery manufacturer), the Okhla Garment and Textile Cluster (OGTC) and the Apparel Export Promotion Council (AEPC) (industry associations), and the Apparel Training and Design Centre (ATDC) (training institution).

D.4.1 Machinery Manufacturers: Technology and Workforce Implications

Lectra is a global technology company specialising in Industry 4.0 solutions, digital cutting systems, CAD/CAM tools, and AI-enabled design platforms for the garment sector. The consultation with Lectra addressed the current state of technology adoption in Indian apparel manufacturing, the skill requirements that the technology trajectory is generating, and the advances for workforce and infrastructure development.

Current State of Technology Adoption

The garment industry is navigating three concurrent structural shifts: adoption of Industry 4.0 practices, digital transformation across value chains, and integration of AI and sustainable technologies. Competitiveness, driven by FTA and rising domestic demand, is the primary commercial pressure accelerating the adoption. Companies are under pressure to scale operations and improve productivity, and a holistic approach to technology integration is identified as the requirement for achieving meaningful and sustained gains.

10–15% Automation penetration in MSMEs	50–60% Automation penetration in large enterprises	40–50% Combined penetration projected by 2030
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The digital transformation adoption within large enterprises stands at only 15–20%, despite 50–60% reported automation penetration. The differential between these two factors even among large, well-resourced firms, indicates that physical machinery deployment has advanced ahead of the digital systems and workforce capability required to fully leverage it. Combined automation and digital transformation penetration across the sector is projected to reach 40–50% by 2030.

Skill Requirements Across the Value Chain

- **Pattern making:** Industry dependence on traditional, experience-driven pattern masters remains high. Proficiency in 2D and 3D CAD systems is an identified and growing requirement. Skill-based hiring frameworks are recommended alongside experience-based assessments, and deepening of pattern making within formal training curricula is identified as a priority.
- **Cutting section:** Adoption of automated cutting technologies is growing across the sector. Supervisors and operators require structured training in advanced machinery operation and associated CAD systems to fully deploy these investments. This is identified as one of the most significant skill development priorities in pre-production.
- **Washing segment:** Structured skill development frameworks for automation in the washing segment represent an emerging requirement as the sector's broader technology adoption advances.

Emerging Workforce Demand

As technology adoption advances toward the projected 2030 level, the demand profile for workforce skills is shifting accordingly. Roles with growing demand include operators and supervisors trained in automated cutting systems, personnel with 3D CAD and digital sampling proficiency, and staff capable of managing digitally optimised production systems. The upskilling of the existing workforce, across both operator and supervisory levels, is identified as the primary enabler of the sector's transition toward the projected 40–50% combined penetration level.

D.4.2 Industry Associations: Workforce Conditions and Forward Outlook

The technology trajectory is the context within which industry associations are managing their current workforce realities. Consultations were conducted with OGTC, representing the manufacturing base of one of Delhi NCR's principal garment clusters, and AEPC, the apex body for India's apparel exports. OGTC's inputs reflect cluster-level operational conditions and near-term workforce challenges; AEPC's inputs address national workforce composition, structural trends, and the sector's five-year demand outlook.

Current State of the Workforce

OGTC reported a labour availability gap of ~30–35% at the operator level, the most acute shortage across any occupational category discussed in this study. Around 80% of the cluster workforce is migratory, geopolitical developments in West Asia are currently affecting return migration patterns and placing further pressure on workforce availability. Festive-season absence of approximately one month coinciding with peak production periods, is an additional and recurring factor affecting operational continuity.

Attrition is reported across occupational categories. Among merchandisers, job transitions are occurring within one to two years, with wage arbitrage identified as the primary driver. Workers demonstrate a consistent preference for higher immediate cash compensation, and inter-firm wage competition within the cluster is intensifying. The November to March peak production period is noted as a structural constraint on training participation, limiting the windows available for capability development.

Training Ecosystem and Forward Skill Priorities

On government-supported training, 19% of OGTC member firms have availed the Samarth scheme, with implementation timelines identified as a factor in uptake. Training programmes are currently oriented toward production requirements. OGTC identified digitization capability and sustainability and compliance skills as the two most critical areas for workforce development going forward, and the evolution of training curricula toward these future-oriented capabilities is identified as the priority direction.

National Workforce Profile and Structural Trends

AEPC provided a national characterisation of workforce composition and structural dynamics. Female participation in the sector workforce is estimated at ~60%, primarily within the 20–50 years age group; at the designer level, female participation stands at 40–50%; at CEO and owner level, representation is estimated at 10–15%. Workforce skill distribution is estimated at 60–70% semi-skilled and 30–40% skilled. Migration patterns follow consistent regional flows: northern clusters draw predominantly from Uttar Pradesh and Bihar; southern clusters from West Bengal, Odisha, and Madhya Pradesh.

Automation adoption is advancing across the sector, with higher penetration currently observed in southern clusters relative to northern clusters. Concurrently, a structural shift in product mix toward synthetic knits and man-made fibres (MMF) is underway, driving demand for Specialised Sewing Machine Operators (SMOs) trained in advanced material handling, a profile that is increasingly central to buyer sourcing requirements.

Emerging Workforce Demand and Five-Year Outlook

ESG-related roles, including ESG managers, sustainability consultants, and traceability specialists, are expected to grow significantly over the next five to seven years. Global compliance requirements and supply chain transparency mandates from international buyers are the primary drivers, and the current supply of trained personnel in these roles is at an early-stage relative to projected demand. In parallel, demand for managers with large-scale operations capability is increasing as the sector consolidates toward greater economies of scale.

D.4.3 Training Institutions: Infrastructure, Curriculum, and Capability Gaps

The workforce conditions documented operator shortages, attrition, the shift toward MMF and digital production systems, and the emerging demand for ESG and compliance roles together define the requirements that the training system must address. The consultation with ATDC, the principal sector-specific training institution for the apparel industry operating under AEPC, covered the current training infrastructure, programme portfolio, curriculum governance, identified skill priorities, and the direction of programme development.

Training Infrastructure and Programme Portfolio

ATDC operates ~80 centres pan-India. Training is delivered through a combination of offline centres and digital modules, including six online modules training ~3,000 candidates annually. The programme portfolio comprises a three-year B.Voc degree (300–400 enrolments per year), one-year diploma programmes (~1,200 annually), and certification modules (700–800 annually). Curriculum is reviewed every three months; Training of Trainers is conducted every three to five months to align faculty with evolving industry and technology requirements.

Core training domains include Quality Control, Supply Chain Management, CAD and Pattern Making, Design and Boutique Management, and Merchandising. Practical training includes hands-on exposure to industrial machines and access to textile learning labs. A sustainability module has been introduced in pilot phase in the NCR region, and three-dimensional design tools, including Tukatech, are being incorporated into the curriculum.

Workforce Characteristics and Identified Skill Priorities

The trainee base draws predominantly from rural backgrounds, with a primary orientation toward employment in production roles. ATDC identified aesthetic understanding, design orientation, and design-to-production communication as skill areas requiring development to support trainee progression into higher-value roles. The integration of design capability with manufacturing execution, specifically, bridging the output of design institutions with shop-floor requirements, is identified as a sector-wide development priority.

Skill areas identified by ATDC as priorities for curriculum development span four categories:

- Technical and digital skills: advanced CAD pattern making, 3D visualisation, generative AI applications in design, and automation system handling
- Analytical and systems skills: Industrial Engineering, MIS, and data-driven production management
- Design and product development: R&D capability, fashion trend interpretation, and design-to-production integration
- Communication and industry awareness skills

Emerging Role Demand

Roles with the highest current placement demand include multi-skilled SMOs, Industrial Engineers, and MIS Executives. Roles with growing demand and active curriculum development underway include 3D Visualisers, advanced CAD Pattern Makers, Generative AI-enabled Designers, Data Analysts in manufacturing, and tech-enabled design studio roles. ATDC maintains placement linkages with 50–80 factories in the NCR region.

D.4.4 Convergence of Findings Across Stakeholder Consultations

Above sections present the perspective of each stakeholder constituency independently. Read together, a consistent set of structural findings emerges across all three. The table below maps the principal themes, the degree of convergence across independently gathered perspectives strengthens the evidential basis for the skill gap assessment, role framework, and training capacity analysis presented in subsequent chapters.

Table 96: Convergence Across Stakeholder Consultations

Theme	Lectra	OGTC / AEPC	ATDC
Automation & digital transformation	10–15% penetration in MSMEs; 50–60% in large firms; digital transformation at 15–20% among large firms; combined penetration projected at 40–50% by 2030	Accelerating across the sector; adoption higher in southern clusters; workforce skill requirements shifting toward automation-capable profiles	Automation and digital systems modules being incorporated into curriculum; structured programmes in development
Pre-production & technical skills	Pattern making and cutting section priority areas for skill development; 2D/3D CAD proficiency a key requirement	Shift to MMF and synthetic knits driving demand for SMOs with advanced machine-handling capability	CAD pattern making and 3D visualisation identified as high-demand areas; being incorporated into advanced curriculum
ESG & compliance roles	Sustainability identified as one of three major transformation drivers alongside Industry 4.0 and AI integration	ESG managers, sustainability consultants, and traceability specialists expected to grow over 5–7 years; driven by buyer compliance mandates	Sustainability module introduced in NCR; international brand certification requirements incorporated into programme design
Labour availability & workforce stability	Upskilling of supervisors and operators identified as the key enabler for automation transition	30–35% shortage at operator level; 80% migratory workforce; wage arbitrage driving attrition; festive-season absence coinciding with peak production periods	Multi-skilled SMOs represent the highest demand profile; entry-level placement pipelines established in NCR
Training ecosystem	Dedicated training centres in MITRA parks and clusters recommended; policy subsidisation of advanced machinery advocated	Samarth scheme uptake at 19% of OGTC member firms; training production-oriented; digitization and compliance skills identified as curriculum priority	80 centres pan-India; curriculum reviewed every 3 months; ToT every 3–5 months; placement linkages with 50–80 factories in NCR
Emerging job roles	3D CAD operators, digital sampling specialists, Industry 4.0-capable supervisors and machine operators	ESG managers, large-scale operations managers, digitization and compliance specialists, SMOs for MMF and synthetic knits	Industrial Engineers, MIS Executives, 3D Visualisers, advanced CAD Pattern Makers, Generative AI-enabled Designers, Data Analysts in manufacturing

Source: Primary stakeholder consultations with Lectra, OGTC, AEPC, and ATDC

Key Convergent Findings

Five findings are consistent across all stakeholder consultations:

- Automation and digital transformation are advancing across firm sizes and regions, with upskilling of the existing workforce identified as the central enabler of continued progress. The differential between automation penetration and digital transformation adoption, particularly among large enterprises, points to a growing and sustained workforce development requirement across the sector.
- Pre-production and technical roles, such as pattern making, cutting, industrial engineering, and materials-specific machine operation, represent priority areas for skill development alongside operator-level requirements, and are consistently identified as under-addressed in the current training ecosystem.
- ESG, sustainability, and compliance roles represent the fastest-growing demand category over the next five to seven years, driven by buyer-side compliance mandates and global supply chain transparency requirements, with curriculum development in this area identified as a shared priority by both industry and training institutions.
- Curriculum evolution toward digitization, automation, and advanced technical capabilities is a sector-wide priority, with government scheme alignment, delivery timelines, and the scaling of advanced training infrastructure identified as the key enablers of accelerated progress.
- Emerging job roles including 3D Visualisers, Generative AI-enabled Designers, Data Analysts in manufacturing, advanced CAD Pattern Makers, and ESG specialists, represent a growing and increasingly significant component of the sector's future workforce demand, with active programme development underway across the training ecosystem.

D.5 Training Ecosystem Assessment

Institutional Coverage, Curriculum Alignment & Regional Training Access

D.5.1 Institutional Training Landscape: Capacity and Coverage

The training ecosystem is anchored by dedicated specialist institutions, management programmes, state skill missions, and the machinery manufacturer training ecosystem. Each institution occupies a distinct position in the training value chain, serves a different learner profile, and has different geographic reach.

As mentioned, the training programmes span entry-level short-term operator training through one-year diploma programmes to B.Voc degree programmes. The backend placement network of over 8,800 AEPC member exporters gives it a direct demand-side connection.

The ITI network contributes significant geographic reach through three garment-related trades under the NCVT Craftsman Training Scheme: Dress Making, Sewing Technology, and Fashion Technology, each one year in duration leading to the National Trade Certificate. ITIs are present in most districts and provide access to training in areas where ATDC centres are absent, particularly in semi-urban and rural geographies.

NIFT's 20 campuses provide degree-level design, technology, and management education that feeds the sector's higher-order talent needs, namely Fashion Designers, Merchandisers, Pattern Masters, and Production Managers. NIFT graduates are well-represented in the supervisory and mid-management pipeline of large export units, but the institution's reach is concentrated in urban centres and its intake is selective, limiting its role as a mass workforce development channel.

The state skill missions, such as OSEPA in Odisha, KSDCL in Karnataka, TNSDC in Tamil Nadu, UPSDM in Uttar Pradesh, provide the implementation architecture for centrally funded skilling programmes including PM Kaushal Kendra and DDU-GKY.

Table 97: Training Ecosystem: Institutional Landscape, Scale, and Coverage

Institution Type	Scale & Coverage	Primary Programmes	Typical Duration	Cluster Reach
ATDC	~80 centres; 22 states; 4,00,000+ trained under ISDS; 70-75% wage placement	Short-term: SMO, Finisher, Cutter (300 hrs); Long-term: AMT, IE, QC, Pattern Maker diploma (4-12 months); B.Voc; RPL	300 hours (short-term) to 3 years (B.Voc)	All 11 surveyed clusters; high footprint in NCR, Tamil Nadu, Karnataka; expanding in MP, Rajasthan, WB
ITIs (Garment Trades)	Nationwide; Dress Making, Sewing Technology, Fashion Technology trades under NCVT-CTS	1-year Craftsman Training Scheme programmes; domestic sewing focus; NTC certification	1 year (2 semesters)	Broad geographic spread; better presence in urban centres; limited penetration in MSME cluster areas
NIFT	20 campuses across India including Bengaluru, Delhi, Kolkata, Mumbai, Chennai, Gandhinagar, Patna, Jodhpur	Graduate and postgraduate: Fashion Design, Knitwear, Accessories, Apparel Production Management, Fashion Management, Textile Design	4-year B.Des / B.FTech; 2-year M.Des	Present in or near southern and northern clusters; limited MSME cluster proximity
State Skill Missions / DDU-GKY / PM Kaushal Kendra	State-specific; implemented through VTPs including Odisha OSEPA, Karnataka KSDCL, UP UPSDM, TN TNSDC	Short-duration manufacturing skill courses (150-300 hours); primarily entry-level operator training	150-300 hours	Active in Tamil Nadu, Karnataka, UP, MP, Odisha
Machinery Manufacturer Training	Lectra, Juki, Brother, Durkopp Adler, Morgan Tecnica; factory-level machine-specific training	Machine setup, operation, basic maintenance; product-specific operator training	1-5 days; machine commissioning	Available through dealership networks; concentrated in larger clusters and export units
In-Factory Training	91% of surveyed factories; primary training channel for 82% of trained workers	Informal OJT: line demonstration, buddy training, operator induction	Majority under 4 weeks; 45% received >1 month	Universal; only consistent training touch-point for MSME workers and migrant workforce

Source: ATDC; NIFT; Directorate General of Training; ITI Dressmaking

D.5.2 Curriculum Alignment

The most consequential dimension of the training ecosystem's readiness for the sector's growth needs is curriculum relevance. A training programme that reaches workers but does not build the needed capabilities generates certifications without productivity gains.

The ITI curriculum represents a significant alignment gap in the ecosystem. The NCVT Dress Making and Sewing Technology trades, the two primary garment-related ITI programmes, are oriented around domestic garment construction. The industrial sewing machines, assembly-line pace management, multi-style changeover capability, AQL-based quality discipline, and MMF fabric handling that constitute the core operational demands of export factories are absent in the NCVT CTS syllabus.

SMO and related programmes use industrial sewing machines in simulated factory environments that has produced over 2,80,000 placed workers with 70–75% placement rates. The long-term diploma programmes represent a comprehensive curriculum alignment with the sector's mid-level skill needs. The programmes cover the full value chain from fibre to shipment, including pre-production planning, merchandising, IE basics, quality systems, digital tools, and sustainability overview.

Table 98: Curriculum Alignment

Training Track	Current Content Focus	Industry Demand Signal	Alignment Gap
ITI Dress Making / Sewing Technology (NCVT-CTS)	Garment construction; basic machine maintenance; pattern drafting for boutique/tailoring	AQL-based quality; multi-style changeover; assembly-line pace; woven & MMF machines	High: curriculum oriented to self-employment/boutique; does not address export factory requirements, assembly-line discipline or multi-machine operation
ATDC (Short-Term SMO/Finisher/Cutter & AVI Long-Term Diploma AMT, 4–12 months))	Assembly-line production; industrial machine operation; quality basics; IE & pre-production; CAD; soft skills; sustainability overview	Multi-machine capability; MMF handling; AQL standards; IE with line balancing; digital literacy; ESG	Moderate to Good, entry-level needs met; gaps in MMF, multi-machine sequencing; limited to 65 AVI centres; sustainability not GOTS/OEKO-TEX benchmarked
Machinery Manufacturer Training (Lectra, Juki, others)	Machine-specific setup, operation & basic maintenance; factory floor delivery	Automation; fault diagnosis; first-level maintenance, the skills workers in West / Central clusters identify as their most acute challenge	Narrow: highly relevant for machine capability; no NSQF certification; no career ladder; not accessible to MSME-tier workers without large-unit machinery partnerships

Source: ATDC; NIFT; Directorate General of Training (ITI Dressmaking); Lectra; JUKI Corporation

D.5.3 Capability Enabler: Training of Trainers Pipeline

The emerging role framework identifies priority roles, requiring new or substantially adapted curriculum. The aspirational pathways map progression arcs that depend on structured, quality-delivered training at every stage. The effectiveness of both rests on a trainer pool equipped to deliver them. Curriculum development and qualification creation are necessary foundations, but their impact is realised only through the quality of training delivery.

Current State of the Trainer Pool

The sector's training delivery depends on institutional faculty at training and affiliated centres, industry-nominated trainers under Samarth, and ITI instructors. Across all three channels, the trainer profile shares a common limitation, that technical formation rooted in production realities of five to ten years ago, with limited exposure to the modern systems, digital tools, ESG frameworks, and MMF processing, that emerging roles now require.

ATDC conducts Training of Trainers every three to five months to keep pace with emerging role requirements. The focus of these programmes is progressively shifting from frequency toward depth of technical formation. Trainers preparing to deliver content for Automation Technician, Digital Production Operator, and ESG Coordinator roles require direct working familiarity with computerised cutting systems, live ERP environments, and compliance framework, making structural currency of trainer knowledge the defining standard for programme effectiveness.

A Functional ToT Architecture

- **Industry immersion as a formation method:** Trainers preparing to deliver automation, digital, or ESG content need structured time within factories operating the systems they will train others on. Formalised trainer placement rotations of four to eight weeks with export-oriented factories in each cluster would provide the formation depth that periodic workshops cannot.
- **OEM and technology partner engagement:** Equipment manufacturers already have technical training infrastructure for their own service networks. Formalising these as ToT delivery partners for automation and cutting system trainer preparation would leverage existing technical expertise that institutional providers do not independently hold.
- **Certification body engagement for compliance roles:** For ESG and compliance trainer formation, the most credible source is direct engagement with industry and certification bodies. ToT programmes co-designed with these bodies, potentially co-funded by buyers

who directly benefit from supplier compliance capability, would anchor trainer knowledge in standards as they are applied.

The Samarth 2.0 Opportunity

The Parliamentary Standing Committee on Labour, Textiles and Skill Development has recommended continuation of Samarth beyond FY 2025-26 with restructuring toward advanced manufacturing and technical textiles. This is the most significant near-term policy opportunity for embedding a reformed ToT architecture within the sector's primary skilling scheme.

Samarth in its current form has trained 5.95 lakh candidates with a 70-90% placement rate depending on grade (entry-level to upskilled), the demand-driven model works. What currently lacks is the currency of the trainer pool delivering those outcomes. Samarth 2.0, if designed to include a mandatory ToT component tied to emerging role curriculum requirements, would close the loop between qualification development, trainer formation, and trained worker output.

D.6 Infrastructure Enabler: Accommodation Facilities in Clusters

The aspiration-access gap is sharpest in the clusters where migrant workforce concentration is highest. Bengaluru records 94% workforce aspiration against 44% training access. Delhi NCR records universal aspiration against 62% training access. Panipat records 94% aspiration against 10% formal training access. Industry consultations confirm that upward of 80% of the workforce in the Okhla cluster is migratory, with comparable patterns across Tiruppur, Bengaluru, and Indore. Workers who have travelled from Uttar Pradesh, Bihar, West Bengal, or Odisha to work in cluster factories frequently cannot take up training programmes because their living situation provides neither the time, space, nor security to do so. The aspiration-access gap is in large part an accommodation gap.

Existing Policy Architecture Across Schemes

- **The PM MITRA Park framework**, developed through Special Purpose Vehicles in PPP mode with 51% State Government and 49% Central Government equity, formally designates workers hostels and housing as core infrastructure, on par with training and skill development facilities, effluent treatment, and logistics infrastructure. The seven sanctioned parks include dedicated hostel provision with specific provisions for women workers.
- **The Scheme for Integrated Textile Parks (SITP)**, under which 74 parks have been sanctioned nationally with a Government of India grant of up to 40% of project cost subject to a ceiling of INR 40 Cr. per park, includes workers' hostels, crèches, canteens, and recreation facilities as eligible components under Group C of its infrastructure framework. SITP-funded parks therefore already carry a policy mandate for worker residential infrastructure, though implementation has been uneven and hostel provision has not always been realised in practice within sanctioned parks.
- **The Ministry of Textiles' standalone pilot hostel scheme**, offering up to 50% grant funding capped at INR 3 Cr. per hostel within a 5-kilometre radius of textile parks, was designed to address worker accommodation at the cluster level. It was conceived in the context of the same migrant workforce retention challenge that primary research continues to document, and its pilot phase demonstrated that the intervention is viable and demand driven.

The recommendation across these schemes is not for new policy creation. The instruments exist, the gap is in convergent deployment, directing PM MITRA hostel infrastructure, SITP Group C provisions, and the standalone pilot hostel scheme toward the same set of clusters where the aspiration-access mismatch is most acute and the migrant workforce share is highest.

Gender Safety as a Design Standard

The gender safety dimension must be addressed explicitly in design standards. Female migrant workers access to training and career progression is constrained by mobility restrictions and safety concerns associated with inadequate accommodation as much as by programme availability. Hostel provision designed to enable progression, with study facilities, predictable schedules, and independently governed management, is a materially different infrastructure model from accommodation designed primarily as a retention or control mechanism. The case for hostel investment in cluster PPP mode rests on training access grounds: it is the physical precondition for converting the sector's near-universal aspiration signal into actual workforce capability development.

E. Market Growth and Manpower Projection

Market Growth Projections

For calculating projected market size and the resultant employment numbers, a Market-Based Manpower Projection Framework has been developed. The framework begins by establishing base year market size values for domestic consumption and exports as of 2025, and projects these forward to 2030 under three scenarios:

- Business As Usual
- Likely Expansion
- Optimistic

Since each market segment follows a distinct growth pattern and responds differently to macroeconomic drivers, the market has been disaggregated into two broad segments — domestic and exports, further divided by product category into Apparel and Home Textiles, yielding four discrete projection streams.

Figure 16: Market Segmentation Framework



For each of the four projection streams, the methodology follows a structured, step-by-step approach.

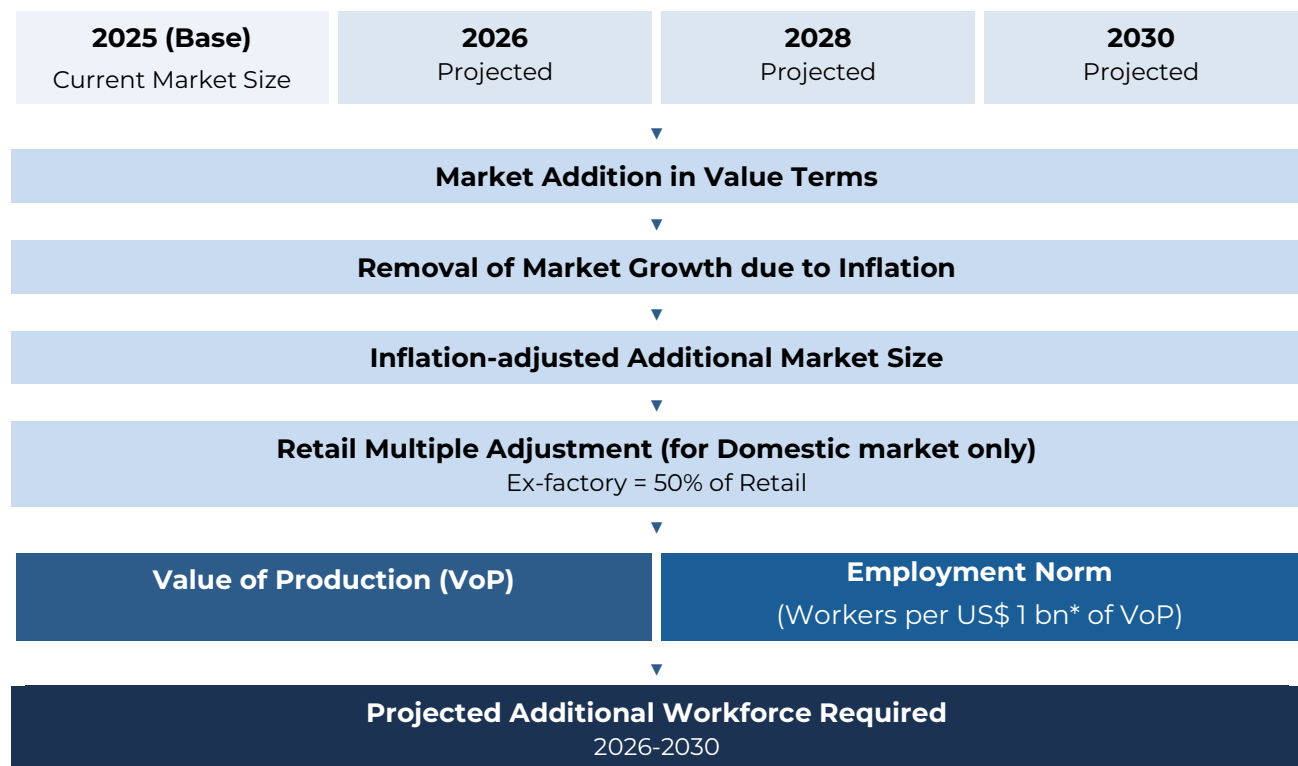
1. Domestic market projections are derived using a Market-to-GDP ratio method, anchored to India's GDP growth trajectory, while export projections are estimated through an OLS regression model that links export performance to World GDP.
2. In both cases, growth attributable to inflation is removed to isolate real, demand-driven expansion. For domestic projections, inflation adjustments are made using the relevant CPI indices (Clothing for Apparel and Home Furnishing for Home Textiles), while export projections are adjusted using the Unit Value Realization (UVR) CAGR to separate price

⁵ Home Textiles include Home Furnishing and Made-Ups

effects from underlying volume growth.

3. The resulting incremental real market size is then converted into Value of Production (VoP) using an appropriate retail multiplier, which adjusts for retail and trade margins and translates consumer market value into manufacturing-level production value.
4. Finally, sector-specific employment intensity norms (employment per unit of production value) are applied to the incremental VoP to estimate the additional workforce demand generated under each scenario.

Figure 17: Market Growth Projection Approach



* For estimating employment generation, the incremental Value of Production (VoP) is translated into workforce requirements using sector-specific employment norms. For every USD 1 Bn. of additional production value generated through domestic consumption or exports, the corresponding incremental employment requirement is estimated using standardized employment coefficients for Apparel and Home Textiles, respectively.

Base Data and Historical Context

Table 99: Baseline Market Indicators

Indicator	Value (USD Bn.)	Key Remarks
India's GDP at Current Prices		
2025	3,920	Among the world's five largest economies, with nominal GDP growing at ~10–12% annually in recent years
2030 (E)	6,170	CAGR of ~9% (2025–2030), consistent with IMF's India growth baseline
Domestic Market (2025)		
Apparel	115	Market-to-GDP ratio of 2.93%; among the fastest-growing apparel markets globally
Home Textiles	12	Market-to-GDP ratio of 0.31%; underpenetrated relative to global benchmarks
Exports (2025)		
Apparel	16	India holds only 3.0% of global pool; China (~31%) and Bangladesh (~8%) indicate significant scope for share gains
Home Textiles	6	India is among the world's leading home textile exporters to the US and EU
Total Market Size (2025)		
Domestic + Exports	149	Domestic market accounts for ~85% of total size; export share remains underpenetrated relative to India's manufacturing scale
CPI Inflation		
Clothing	5.0% p.a.	10-yr CAGR 2013–2024; persistent price inflation reduces real market growth
Furnishings & Household Equipment	4.6% p.a.	10-yr CAGR 2013–2024; moderate but consistent inflation in the home textiles segment
UVR CAGR (Exports)		
Unit Value Realization	0.7% p.a.	Marginal UVR growth reflects a volume-driven export trajectory; stripped out to isolate real export growth

Source: IMF, DGCIS, Ministry of Textiles, CPI- MoSPI

The tables below present the historical trajectory of domestic market size and export performance across Apparel and Home Textiles, validating the base year values and key ratios used in the projection framework.

Table 100: Historical Domestic Market vs. GDP (2012–2025)

(Values in USD Bn.)

Year	India GDP	Apparel Market Size	Market/GDP Ratio	Home Textile Market Size	Market/GDP Ratio
2012	1,820	44.3	2.4%	4.7	0.3%
2013	1,850	49.8	2.7%	5.0	0.3%
2014	2,020	56.0	2.8%	5.4	0.3%
2015	2,080	59.0	2.8%	5.9	0.3%
2016	2,260	63.0	2.8%	6.3	0.3%
2017	2,610	67.0	2.6%	6.9	0.3%
2018	2,650	74.0	2.8%	7.4	0.3%
2019	2,780	78.0	2.8%	8.0	0.3%
2020	2,610	55.0	2.1%	6.5	0.3%
2021	3,080	80.0	2.6%	7.9	0.3%
2022	3,250	92.0	2.8%	9.0	0.3%
2023	3,500	102.0	2.9%	9.9	0.3%
2024	3,760	108.0	2.9%	11.0	0.3%
2025	3,920	115.0	2.9%	12.0	0.3%

Source: IMF, DGCI&S, Ministry of Textiles

Table 101: Historical Export Data (2012–2025)

(Values in USD Bn.)

Year	World GDP	Global Apparel Trade	India Apparel Exports	India Apparel Share	Global HT Trade	India HT Exports	India HT Share
2012	75,990	398.0	12.8	3.2%	45.7	4.4	9.7%
2013	78,260	431.3	15.7	3.6%	47.1	4.6	9.8%
2014	80,460	434.0	16.5	3.8%	48.5	4.9	10.0%
2015	75,940	432.0	17.1	4.0%	50.0	5.1	10.2%
2016	77,180	419.9	16.9	4.0%	50.0	5.1	10.2%
2017	82,080	438.3	17.3	3.9%	50.0	5.2	10.4%
2018	87,170	455.7	15.6	3.4%	50.5	5.5	10.9%
2019	88,480	482.0	15.5	3.2%	51.0	5.3	10.4%
2020	86,190	410.0	12.3	3%	49.0	5.7	12.2%
2021	98,440	492.0	16.0	3%	60.0	7.1	11.7%
2022	102,670	544.0	16.2	3%	58.0	5.8	10.3%
2023	107,250	503.0	14.5	3%	56.0	6.0	10.7%
2024	111,600	522.0	16.0	3%	58.0	6.5	12.1%
2025	118,180	540.0	16.0	3%	59.0	6.0	10.2%

Source: IMF, DGCI&S, Ministry of Textiles

Projection Methodology

Domestic Markets

Domestic market projections for both Apparel and Home Textiles are developed using a three-scenario framework anchored to GDP penetration ratios.

- For the **Business As Usual** scenario, the Market-to-GDP ratio is held constant at the 2025 level across all projection years (2026–2030), reflecting an assumption of broadly stagnant market conditions with growth tracking GDP.
- For the **Likely Expansion** scenario, the 2026 starting ratio is kept same as Business As Usual⁶, with the ratio for the subsequent four years derived by a trendline fitted to the historical Market-to-GDP ratio over 2005–2025. This trendline represents the market's statistically projected trajectory based on observed trends.
- The **Optimistic** scenario endpoint is back-calculated from the assumption that LE represents the arithmetic average of Business As Usual and Optimistic growth rates. Once the 2030 Optimistic endpoint is determined, intervening years (2026–2029) are populated by back-tracking using the YoY changes implied by the trendline. However, for initial years, a gradual, controlled increase is assumed as the market expands only modestly in the early part of the horizon before momentum builds.

This approach ensures internal consistency across all three scenarios while anchoring the central projection to observed historical trends and grounding the Business As Usual in a considered analytical assessment of market conditions.

⁶ Projection/ Business As Usual whichever is higher

Exports

Export projections for Apparel and Home Textiles are estimated using an OLS regression model linking India's export performance to World GDP growth. The regression is run on historical data from 2012 to 2025.

Regression Analysis for Export Market Projections

Export projections use bivariate OLS regression of historical global trade value against world GDP: $\text{Global Trade (USD Bn)} = \beta_0 + \beta_1 \times \text{World GDP (USD Bn)}$. Estimated separately for Apparel and Home Textiles for the period 2012–2024.

Table 102: Regression Statistics — Global Apparel Trade vs. World GDP

Adjusted R Square	0.826	
	Coefficients	P-value
Intercept	180.21	3.33×10^{-4}
X Variable 1 (World GDP)	0.003134	4.24×10^{-6}

Source: Regression Analysis

Regression equation: **Global Apparel Trade (USD Bn) = 0.003134 × World GDP (USD Bn) + 180.21.**

Interpretations: A high Adjusted R^2 (0.826) indicates strong goodness of fit. The positive coefficient indicates a direct relationship between world GDP growth and global apparel trade. A very low P-value (4.24×10^{-6}) confirms statistical significance.

- Positive intercept (180.21) represents the baseline level of global apparel trade independent of GDP, reflecting structural consumer demand.
- Low P-value of X Variable 1 indicates a high degree of relationship between world GDP and global apparel trade.

Table 103: Regression Statistics — Global Home Textiles Trade vs. World GDP

Adjusted R Square	0.792	
	Coefficients	P-value
Intercept	24.949	3.45×10^{-5}
X Variable 1 (World GDP)	0.000302	1.25×10^{-5}

Source: Regression Analysis

Regression equation: **Global HT Trade (USD Bn) = 0.000302 × World GDP (USD Bn) + 24.949.**

Adjusted R^2 of 0.792 confirms strong goodness of fit. The positive coefficient indicates direct

relationship between world GDP and HT trade. P-value of 1.25×10^{-5} confirms statistical significance.

- Positive intercept (24.949) reflects baseline structural demand for home textiles independent of income levels.
- Low P-value confirms the high degree of relationship between world GDP growth and global HT trade.

India's export values and market share are then derived on top of these projections as follows:

- For the **Business As Usual** scenario, in case of apparel 6% growth rate is taken into account considering the impact of FTAs, while for home textiles, a flat 2% annual growth rate is applied to India's 2025 export base across all projection years (2026–2030), reflecting a conservative assumption of incremental, organic growth with no structural improvement in India's global competitive positioning.
- For the **Optimistic** scenario, the 2030 endpoint is anchored to India's stated policy target for textile and apparel exports (USD 45 Bn. for apparel and USD 15 Bn. for home textiles).
- The **LE** scenario is treated as the arithmetic mean of Business As Usual and Optimistic. The implied CAGR over 2025–2030 is from this endpoint and then applied uniformly to the 2025 base to populate the intervening years (2026–2029).
- Across all three scenarios, India's share of global trade for each year is computed as:
India's Share = India's Projected Exports ÷ Regression-Projected Global Trade.

Scenario Design

Three scenarios bound the range of outcomes across domestic and export segments.

Table 104: Scenario Design Parameters

Scenario	Business As Usual	Likely Expansion	Optimistic
	Status quo — current trajectory maintained	Moderate push — partial policy uptake	High growth — full policy execution
Policy Support (PLI / PM-MITRA)	Existing policy support	Partial PLI / PM-MITRA uptake	Full PLI / PM-MITRA execution
China+1 Opportunity Capture	Minimal	Moderate	Substantial
Technology / Capacity Upgradation	Incremental	Moderate investment	Accelerated upgradation
FTA-led Market Access	Existing FTAs with limited utilisation	Expanded FTA utilisation	Full FTA leverage
Sustainability & Compliance Readiness	Limited readiness for evolving sustainability regulations	Improved compliance with emerging global sustainability requirements	Industry-wide compliance with global sustainability and traceability standards
2030 Market growth Scenarios	In-line with current growth trends (exports-nominal growth rate, domestic market- ~8-10% CAGR)	Mid-way between BAU and Optimistic	Achievement of government targets of USD 250 Bn. of domestic market and USD 100 Bn. of exports
Apparel Market Projection Hypothesis			
Domestic market	Market-to-GDP Ratio at 2.93% (2025 value)	Market-to-GDP Ratio to reach 3.04% by 2030 (based on extrapolation of 2005-2025 trend)	Market-to-GDP Ratio to reach 3.16% by 2030 (to meet government target)
Exports	Global market share to reach 3.3% by 2030 (considering nominal growth of 2% CAGR)	Global market share to reach 5.1% by 2030 (mid-point of BAU and Optimistic scenario)	Global market share to reach 6.9% by 2030 (to meet government target)
Home Textiles Market Projection Hypothesis			
Domestic market	Market-to-GDP Ratio at 0.26% (USD 16 Bn. 2030 market size)	Market-to-GDP Ratio to reach 0.31% by 2030 (mid-point of BAU and Optimistic scenario)	Market-to-GDP Ratio to reach 0.36% by 2030 (to meet government target)
Exports	Global market share to reach 9.4% by 2030 (considering nominal growth of 2% CAGR)	Global market share to reach 15.3% by 2030 (mid-point of BAU and Optimistic scenario)	Global market share to reach 21.2% by 2030 (to meet government target)

E.1 Apparel Market Projections (2025–2030)

Apparel domestic projections apply the GDP-to-market ratio to IMF GDP projections. The 2025 base of USD 115 Bn. corresponds to a ratio of 2.93%.

Table 105: Apparel Domestic Market Projections

(Values in USD Bn.)

2025 (Base)	Scenario	2026	2027	2028	2029	2030	CAGR (2025–30)
115.0	Business As Usual	121.7	134.4	148.4	164.3	181.0	9.5%
	Likely Expansion	121.7	135.1	150.8	168.6	187.6	10.3%
	Optimistic	126.6	140.6	156.9	175.3	195.0	11.1%

Apparel export projections apply the regression model to projected world GDP, then apply India's share by scenario.

Table 106: Apparel Export Projections

(Values in USD Bn.)

2025 (Base)	Scenario	2026	2027	2028	2029	2030	CAGR (2025–30)
16.0	Business As Usual	17.4	18.3	19.3	20.3	21.4	6.0%
	Likely Expansion	18.5	21.4	24.8	28.7	33.2	15.7%
	Optimistic	19.7	24.2	29.8	36.6	45.0	23.0%

Table 107: Consolidated Market Projections for Apparel (2030)

(Values in USD Bn.)

Segment	2025 Base	Business As Usual	Likely Expansion	Optimistic
Domestic	115.0	181.0	187.6	195.0
Exports	16.0	21.4	33.2	45.0
Total	131.0	202.4	220.8	240.0

E.2 Home Textiles Market Projections (2025–2030)

Home Textiles⁷ domestic projections follow the same GDP-ratio methodology. The 2025 base of USD 12 Bn. corresponds to a ratio of 0.31%.

Table 108: Home Textiles Domestic Market Projections

(Values in USD Bn.)

2025 (Base)	Scenario	2026	2027	2028	2029	2030	CAGR (2025–30)
12.0	Business As Usual	12.7	13.5	14.3	15.1	16.0	5.9%
	Likely Expansion	12.8	14.1	15.6	17.2	19.0	9.6%
	Optimistic	13.3	15.6	17.7	20.0	22.0	12.9%

Table 109: Home Textiles Export Projections

(Values in USD Bn.)

2025 (Base)	Scenario	2026	2027	2028	2029	2030	CAGR (2025–30)
6.0	Business As Usual	6.1	6.2	6.4	6.5	6.6	2.0%
	Likely Expansion	6.8	7.6	8.5	9.6	10.8	12.5%
	Optimistic	7.2	8.7	10.4	12.5	15.0	20.1%

Table 110: Consolidated Market Projections for Home Textiles (2030)

(Values in USD Bn.)

Segment	2025 Base	Business As Usual	Likely Expansion	Optimistic
Domestic	12.0	16.0	19.0	22.0
Exports	6.0	6.6	10.8	15.0
Total	18.0	22.6	29.8	37.0

⁷ Home Textiles include Home Furnishing and Made-Ups

Table III: Consolidated Market Projections (Apparel & Home Textiles)

(Values in USD Bn.)

Segment	2025	Business As Usual 2030	Likely Expansion 2030	Optimistic 2030
Apparel				
Domestic	115.0	181.0	187.6	195.0
Exports	16.0	21.4	33.2	45.0
Total	131.0	202.4	220.8	240.0
Home Textiles				
Domestic	12.0	16.0	19.0	22.0
Exports	6.0	6.6	10.8	15.0
Total	18.0	22.6	29.8	37.0
Grand Total	149.0	225.0	250.6	277.0

The consolidated analysis reveals several structural features of India's textile market trajectory.

- The spread between Business As Usual and Optimistic outcomes is substantial. The overall market ranges from USD 225 Bn. to USD 277 Bn. by 2030, a USD 52 Bn. gap reflects the sensitivity of outcomes to export policy and global trade conditions.
- Export CAGR variability is far wider than domestic: apparel exports range from 6.0% (Business As Usual) to 23.0% (Optimistic), confirming that exports represent the principal source of scenario divergence. The Optimistic endpoint reflects India's policy export targets (USD 45 Bn. apparel, USD 15 Bn. home textiles), which drives its higher CAGR.
- Home textiles, while a smaller segment at USD 18 Bn. in 2025, exhibit meaningful upside under favourable conditions, with the total market reaching USD 37 Bn. under the Optimistic scenario at a 15.5% CAGR.
- The CAGR across scenarios frames the overall ambition: even the conservative Business As Usual path implies a ~50% increase in nominal market size over five years, underscoring the scale of productive and workforce capacity that must be built to meet projected demand.

E.3 Inflation Adjustment, Value of Production and Combined Outlook

Nominal market projections include inflationary price increases that do not represent additional productive capacity. To isolate the underlying real growth that drives incremental production, employment, and investment requirements, inflation is removed from the projected market size estimates.

Table 112: Inflation Parameters by Segment

Segment	Inflation Parameter	Rate (p.a.)
Apparel — Domestic	CPI: Clothing (MoSPI)	5.0%
Home Textiles — Domestic	CPI: Furnishing & Made-Ups (MoSPI)	4.6%
Apparel — Exports	Unit Value Realization (UVR) CAGR	0.7%
HT — Exports	Unit Value Realization (UVR) CAGR	0.7%

Source: MoSPI CPI data (2014–2024). DGCI&S

Domestic segments are adjusted using Consumer Price Index (CPI) inflation, which reflects changes in retail prices. Apparel is adjusted using the CPI for Clothing, with an average inflation rate of ~5.0%, reflecting sustained price increases arising from input cost pass-through and consumer price inflation. Home Textiles are adjusted using the CPI for Furnishings, with an average inflation rate of 4.6%, consistent with relatively stable commodity-linked pricing trends.

Export segments are adjusted using the Unit Value Realization (UVR) CAGR of 0.7%, which captures the modest average price appreciation observed in India's textile and apparel export unit values.

The Inflation Baseline 2030 is computed for each segment as $\text{Base 2025} \times (1 + \text{Inflation Rate})^n$, where n represents the number of years between 2025 and 2030. The resulting value represents the market size that would be achieved by 2030 solely due to price increases, assuming no underlying real growth in demand or production.

Value of Production (VoP)

The VoP figures represent the incremental production value that the sector must generate above the inflation baseline under each scenario.

Table 113: Apparel Domestic Market VoP

	2025	2026	2027	2028	2029	2030
Market Size	115.0					
Inflation Rate (p.a.)	5.0%					
Market Size (Inflation Adjusted)		120.8	126.8	133.2	139.8	146.9
Business As Usual						
Market Size (Projected)		121.7	134.4	148.4	164.3	181.0
YoY Growth		5.9%	10.4%	10.5%	10.7%	10.2%
Additional Market Size		1.0	7.5	15.3	24.4	34.2
Retail Multiple		2	2	2	2	2
VoP		0.5	3.8	7.6	12.2	17.1
Likely Expansion						
Market Size (Projected)		121.7	135.1	150.8	168.6	187.6
YoY Growth		5.7%	11.1%	11.6%	11.8%	11.3%
Additional Market Size		0.8	8.3	17.6	28.7	40.7
Retail Multiple		2	2	2	2	2
VoP		0.4	4.1	8.8	14.4	20.4
Optimistic						
Market Size (Projected)		126.6	140.6	156.9	175.3	195.0
YoY Growth		10.1%	11.1%	11.6%	11.7%	11.2%
Additional Market Size		5.8	13.8	23.7	35.4	48.1
Retail Multiple		2	2	2	2	2
VoP		2.9	6.9	11.9	17.7	24.1

(Values in USD Bn.)

Table 114: Apparel Exports VoP

	(Values in USD Bn.)					
	2025	2026	2027	2028	2029	2030
Market Size	16.0					
Inflation Rate (p.a.)	0.7%					
Market Size (Inflation Adjusted)		16.1	16.2	16.4	16.5	16.6
Business As Usual						
Market Size (Projected)		17.4	18.3	19.3	20.3	21.4
YoY Growth		8.8%	5.1%	5.4%	5.4%	5.4%
Additional Market Size		1.3	2.1	2.9	3.8	4.8
VoP		1.3	2.1	2.9	3.8	4.8
Likely Expansion						
Market Size (Projected)		18.5	21.4	24.8	28.7	33.2
YoY Growth		15.7%	15.7%	15.7%	15.7%	15.7%
Additional Market Size		2.4	5.2	8.4	12.2	16.6
VoP		2.4	5.2	8.4	12.2	16.6
Optimistic						
Market Size (Projected)		19.7	24.2	29.8	36.6	45.0
YoY Growth		23.0%	23.0%	23.0%	23.0%	23.0%
Additional Market Size		3.6	8.0	13.4	20.1	28.4
VoP		3.6	8.0	13.4	20.1	28.4

Table 115: Home Textiles Domestic Market VoP

	2025	2026	2027	2028	2029	2030
Market Size	12.0					
Inflation Rate (p.a.)	4.6%					
Market Size (Inflation Adjusted)		12.5	13.1	13.7	14.4	15.0
Business As Usual						
Market Size (Projected)		12.7	13.5	14.3	15.1	16.0
YoY Growth		5.9%	5.9%	5.9%	5.9%	5.9%
Additional Market Size		0.2	0.3	0.5	0.8	1.0
Retail Multiple		2	2	2	2	2
VoP		0.1	0.2	0.3	0.4	0.5
Likely Expansion						
Market Size (Projected)		12.8	14.1	15.6	17.2	19.0
YoY Growth		6.5%	10.4%	10.5%	10.7%	10.2%
Additional Market Size		0.2	1.0	1.9	2.9	4.0
Retail Multiple		2	2	2	2	2
VoP		0.1	0.5	0.9	1.4	2.0
Optimistic						
Market Size (Projected)		13.3	15.6	17.7	20.0	22.0
YoY Growth		10.7%	17.3%	13.7%	12.8%	10.2%
Additional Market Size		0.7	2.4	4.0	5.6	7.0
Retail Multiple		2	2	2	2	2
VoP		0.4	1.2	2.0	2.8	3.5

Table 116: Home Textiles Exports VoP

	2025	2026	2027	2028	2029	2030
(Values in USD Bn.)						
Market Size	6.0					
Inflation Rate (p.a.)	0.7%					
Market Size (Inflation Adjusted)		6.0	6.1	6.1	6.2	6.2
Business As Usual						
Market Size (Projected)		6.1	6.2	6.4	6.5	6.6
YoY Growth		2.0%	2.0%	2.0%	2.0%	2.0%
Additional Market Size		0.1	0.2	0.2	0.3	0.4
VoP		0.1	0.2	0.2	0.3	0.4
Likely Expansion						
Market Size (Projected)		6.8	7.6	8.5	9.6	10.8
YoY Growth		12.5%	12.5%	12.5%	12.5%	12.5%
Additional Market Size		0.7	1.5	2.4	3.4	4.6
VoP		0.7	1.5	2.4	3.4	4.6
Optimistic						
Market Size (Projected)		7.2	8.7	10.4	12.5	15.0
YoY Growth		20.1%	20.1%	20.1%	20.1%	20.1%
Additional Market Size		1.2	2.6	4.3	6.3	8.8
VoP		1.2	2.6	4.3	6.3	8.8

Additional Market Size is the difference between projected nominal market size and the inflation-adjusted baseline.

- For domestic segments, the Additional Market Size is converted into Value of Production (VoP) using a retail multiplier of 2×, representing the mark-up between manufacturer realization and the final consumer retail price.
- For exports, no such adjustment is applied since export values are already reported at FOB.
- Under the Business As Usual scenario, total VoP reaches USD 23 Bn., driven primarily by apparel (USD 22 Bn), with home textiles contributing a modest USD 1 Bn.
- The Likely Expansion scenario nearly doubles aggregate VoP to USD 44 Bn, reflecting a structural shift in export competitiveness, particularly for apparel exports, where VoP increases from USD 5 Bn. to USD 17 Bn. as India captures a larger share of trade diversion.
- The Optimistic scenario projects USD 64 Bn. in total VoP, representing the upper bound of India's producible output growth if both domestic consumption and export momentum materialise simultaneously.

Manpower Projections: 2026–2030

Employment Generation Methodology

- Establish total sectoral VoP for each year and scenario
- Split VoP between organised and unorganised segments using a formalisation trajectory
- Apply segment-specific employment intensity norms to derive employment
- Sum to arrive at cumulative incremental jobs above the 2025 baseline

Exchange Rate and Base Assumption

All USD-denominated VoP figures are converted at a constant exchange rate of INR 95 per USD throughout the projection horizon, thereby isolating production-driven employment effects from exchange rate fluctuations.

In addition, Value of Production (VoP) is assumed to increase by 2% annually, reflecting expected gains from technology adoption, process optimization, and operational efficiency improvements across the textile and apparel value chain.

E.4 Apparel Manpower Projections

VoP represents incremental production above the 2025 base, reflecting additional capacity needed to meet projected demand growth under each scenario.

Table 117: Apparel Total VoP (Domestic & Exports)

(Values in USD Bn.)					
Scenario	2026	2027	2028	2029	2030
Business As Usual	1.8	5.8	10.6	16.1	21.9
Likely Expansion	2.8	9.3	17.3	26.6	37.0
Optimistic	6.5	14.9	25.3	37.8	52.5

Split VoP by Formalisation Share

Total VoP is allocated between organised and unorganised segments based on a formalisation trajectory. The organised sector's share rises progressively from 40% in 2025 to 45% by 2030, reflecting the gradual shift of production from informal units to registered factories, driven by PLI incentives, compliance requirements, and export buyer preferences. The unorganised share declines from 60% to 55% correspondingly.

Apply Employment Intensity Norms

Apparel uses a machine-based employment norm. For each segment, the number of sewing machines required per USD 1 Bn. of VoP is calculated from the machine-level productivity (VoP per machine, in INR Lakhs per annum), which grows at 2% CAGR. Employment is then computed by multiplying machines by the Man-to-Machine Ratio (MMR).

The Man-to-Machine Ratio is consistently set higher for the organised segment than for the unorganised segment across the projection period; 2.20 against 2.00 in 2025, narrowing to 2.00 against 1.80 by 2030. This differential reflects the structural distinction between the two segments.

- The organised sector is predominantly export-oriented and operates under formal compliance, audit, and quality-assurance regimes; satisfying buyer and statutory requirements necessitates a larger complement of supervisory, quality-control, checking, and finishing personnel deployed alongside each machine operator, which raises the effective number of workers per machine.
- The unorganised sector, by contrast, runs on less stringent process controls, compliance and quality functions, so fewer workers are engaged per machine. As a result, for an equivalent value of production, the organised segment sustains a higher employment

intensity per machine than the unorganised segment, even as both ratios decline over time with progressive automation.

Table 118: Apparel Organised Sector Employment Norms

	(per USD 1 Bn. VoP)					
	2025	2026	2027	2028	2029	2030
Share of Total Production (%)	40%	41%	42%	43%	44%	45%
Employment per Machine (MMR)	2.20	2.15	2.10	2.05	2.00	2.00
VoP CAGR	2.0%	—	—	—	—	—
VoP per Machine (INR Lakhs p.a.)	15.0	15.3	15.6	15.9	16.2	16.6
Machines per USD 1 Bn. VoP	63,333	62,092	60,874	59,680	58,510	57,363
Employment per USD 1 Bn. VoP	1,39,333	1,33,497	1,27,835	1,22,345	1,17,020	1,14,726

Table 119: Apparel Unorganised Sector Employment Norms

	(per USD 1 Bn. VoP)					
	2025	2026	2027	2028	2029	2030
Share of Total Production (%)	60%	59%	58%	57%	56%	55%
Employment per Machine (MMR)	2.00	1.95	1.90	1.85	1.80	1.80
VoP CAGR	2.0%	—	—	—	—	—
VoP per Machine (INR Lakhs p.a.)	12.0	12.2	12.5	12.7	13.0	13.2
Machines per USD 1 Bn. VoP	79,167	77,614	76,093	74,601	73,138	71,704
Employment per USD 1 Bn. VoP	1,58,333	1,51,348	1,44,576	1,38,011	1,31,648	1,29,067

Workforce Demand in Apparel Sector

The Apparel sector is the primary employment generator within the textile value chain, driven by high labour intensity in cut-make-trim (CMT) operations and the large informal production base.

Business As Usual 2026: Total VoP equals USD 1.8 Bn. With the 2026 organised share at 41%, organised VoP is USD 0.7 Bn and unorganised VoP is USD 1.1 Bn (59%). Applying norms of 1,33,497 (organised) and 1,51,348 (unorganised) per USD 1 Bn. yields ~97,550 and ~1,59,147 workers respectively, a combined cumulative employment of ~2.57 Lakhs. The employment projections under each of the scenarios is calculated in the similar manner.

Table 120: Apparel Organised Sector, Cumulative Employment

(in Lakhs)

Scenario	2026	2027	2028	2029	2030
Business As Usual	0.98	3.13	5.55	8.27	11.30
Likely Expansion	1.54	5.01	9.08	13.69	19.09
Optimistic	3.54	7.98	13.29	19.49	27.09

Table 121: Apparel Unorganised Sector, Cumulative Employment

(in Lakhs)

Scenario	2026	2027	2028	2029	2030
Business As Usual	1.59	4.89	8.31	11.84	15.54
Likely Expansion	2.51	7.83	13.57	19.59	26.24
Optimistic	5.78	12.47	19.87	27.90	37.25

Table 122: Apparel Cumulative Employment (Organised & Unorganised)

(in Lakhs)

Scenario	2026	2027	2028	2029	2030
Business As Usual	2.57	8.02	13.86	20.12	26.85
Likely Expansion	4.05	12.85	22.65	33.28	45.33
Optimistic	9.32	20.45	33.16	47.39	64.35

Table 123: Apparel Additional Employment

(in Lakhs)

Scenario	2026	2027	2028	2029	2030
Business As Usual	2.57	5.46	5.84	6.26	6.73
Likely Expansion	4.05	8.79	9.80	10.63	12.05
Optimistic	9.32	11.12	12.71	14.23	16.95

E.5 Home Textiles Manpower Projections

Home Textiles VoP is computed identically: domestic incremental market size is deflated by a retail multiplier of 2 and export F.O.B. value is added directly.

Table 124: Home Textiles Total VoP (Domestic & Exports)

(Values in USD Bn.)					
Scenario	2026	2027	2028	2029	2030
Business As Usual	0.2	0.3	0.5	0.7	0.9
Likely Expansion	0.8	2.0	3.3	4.9	6.6
Optimistic	1.5	3.8	6.3	9.1	12.3

Split VoP by Formalisation Share

Home Textiles organised share starts at 48% in 2025, rising to 53% by 2030. The higher base formalisation level (versus Apparel) reflects the greater prevalence of registered power-loom clusters and export-oriented processing units in the sector.

Apply Employment Intensity Norms

Home Textiles uses a direct VoP-per-employee model rather than a machine-based framework, given the more capital-intensive and varied production structure of weaving and processing operations. Employment per USD 1 Bn. of VoP equals $100 \div (\text{VoP per employee in INR Lakhs}) \times (\text{INR/USD exchange rate})$. Organised sector starts at INR 50 Lakhs per employee and grows at 2% CAGR; unorganised sector at INR 35 Lakhs.

Table 125: Home Textiles Organised Sector Employment Norms

(per USD 1 Bn. VoP)						
	2025	2026	2027	2028	2029	2030
Share of Total Production (%)	48%	49%	50%	51%	52%	53%
VoP Productivity CAGR	2.0%	—	—	—	—	—
VoP per Employee (INR Lakhs p.a.)	50.0	51.0	52.0	53.1	54.1	55.2
Employment per USD 1 Bn. VoP	19,000	18,627	18,262	17,904	17,553	17,209

Table 126: Home Textiles Unorganised Sector Employment Norms

	(per USD 1 Bn. VoP)					
	2025	2026	2027	2028	2029	2030
Share of Total Production (%)	52%	51%	50%	49%	48%	47%
VoP Productivity CAGR	2.0%	—	—	—	—	—
VoP per Employee (INR Lakhs p.a.)	35.0	35.7	36.4	37.1	37.9	38.6
Employment per USD 1 Bn. VoP	27,143	26,611	26,089	25,577	25,076	24,584

Incremental Workforce Demand — Home Textiles Sector

The Home Textiles sector plays a significant livelihood role in weaving clusters across Gujarat, Tamil Nadu, Uttar Pradesh, and Andhra Pradesh. While smaller in employment scale than Apparel, its growth trajectory under the LE and Optimistic scenarios is steep, driven by export diversification into home furnishings and made-ups.

For Home Textiles under Business As Usual 2026: total VoP equals USD 0.2 Bn. With the 2026 organised share at 49%, and unorganised at 51%, both the sector receives USD 0.10 Bn. Applying norms of 18,627 (organised) and 26,611 (unorganised) per USD 1 Bn. yields ~1,430 and ~2,126 workers respectively, a combined cumulative employment of ~0.04 Lakhs above the 2025 baseline. The employment projections under each of the scenarios is calculated in the similar manner.

Table 127: Home Textiles Organised Sector, Cumulative Employment

(in Lakhs)

Scenario	2026	2027	2028	2029	2030
Business As Usual	0.01	0.03	0.05	0.06	0.08
Likely Expansion	0.08	0.18	0.30	0.45	0.60
Optimistic	0.14	0.35	0.57	0.83	1.12

Table 128: Home Textiles Unorganised Sector, Cumulative Employment

(in Lakhs)

Scenario	2026	2027	2028	2029	2030
Business As Usual	0.02	0.04	0.06	0.08	0.10
Likely Expansion	0.11	0.26	0.42	0.59	0.76
Optimistic	0.21	0.49	0.78	1.10	1.42

Table 129: Home Textiles Cumulative Employment (Organised & Unorganised)

(in Lakhs)

Scenario	2026	2027	2028	2029	2030
Business As Usual	0.03	0.07	0.11	0.14	0.19
Likely Expansion	0.19	0.44	0.72	1.04	1.36
Optimistic	0.35	0.84	1.35	1.93	2.54

Table 130: Home Textiles Additional Employment

(in Lakhs)

Scenario	2026	2027	2028	2029	2030
Business As Usual	0.03	0.04	0.04	0.03	0.05
Likely Expansion	0.19	0.26	0.28	0.32	0.32
Optimistic	0.35	0.49	0.51	0.58	0.61

E.6 Consolidated Employment Summary — Apparel and Home Textiles

The tables below aggregate employment across both sectors to present a composite view of the total manpower demand potential through 2030. Apparel dominates the combined picture, but the Home Textiles contribution becomes more meaningful under the Optimistic scenario.

Table 131: Cumulative Employment (Apparel & Home Textiles)

(in Lakhs)

Scenario	2026	2027	2028	2029	2030
Business As Usual	2.60	8.10	13.97	20.26	27.03
Likely Expansion	4.24	13.29	23.37	34.31	46.69
Optimistic	9.67	21.29	34.51	49.32	66.88

Table 132: Additional Employment (Apparel & Home Textiles)

(in Lakhs)

Scenario	2026	2027	2028	2029	2030
Business As Usual	2.60	5.49	5.87	6.29	6.77
Likely Expansion	4.24	9.05	10.08	10.94	12.38
Optimistic	9.67	11.62	13.22	14.81	17.56

Key Implications

Scale of Employment Creation

The Apparel and Home Textiles sectors together retain strong labour absorption capacity. Under Business As Usual, which assumes broadly stable market conditions, cumulative incremental employment reaches 27.03 Lakhs by 2030. Even this conservative baseline implies a continuous requirement for trained entrants, particularly in stitching, finishing, quality control, and supervisory roles.

The Formalisation Dividend

The progressive shift from unorganised to organised employment is a defining feature of all three scenarios. Workers entering the organised segment are subject to higher productivity expectations, formal wage structures, and access to social security, making formal skill certification increasingly relevant. By 2030, the organised segment is projected to account for 45% of Apparel and 53% of Home Textiles production, compared to 40% and 48% respectively in 2025.

Scenario Sensitivity and Skill Pipeline Planning

The spread between Business As Usual and Optimistic employment by 2030 is $\sim 2.4\times$ for Apparel (26.85 vs. 64.35 Lakhs) and $13.4\times$ for Home Textiles (0.19 vs. 2.54 Lakhs). This range underscores the importance of scenario-contingent workforce planning: skilling infrastructure calibrated only for Business As Usual will be inadequate if export momentum accelerates under the Likely Expansion or Optimistic trajectories.

F. Analysis and Recommendations

F.1 Consolidated Skill Gap Assessment

This section consolidates the skill gaps identified through worker surveys, employer consultations, and stakeholder interactions. The assessment is organised across four dimensions: technical skill gaps across the value chain, behavioural and supervisory capability gaps, emerging capability requirements, and differences in skill needs between MSMEs and larger manufacturing units.

F.1.1 Technical Skill Gaps by Value Chain Stage

The sector value chain spans a wide spectrum of occupational functions, from design and pre-production through sewing, processing, finishing, quality management, and merchandising. The nature and extent of skill gaps vary across these functions, reflecting differences in technology adoption, production complexity, training exposure, and buyer requirements. Assessing skill gaps across the value chain helps identify the functional areas where workforce development efforts can support productivity, operational flexibility, and quality outcomes.

The production stage accounts for the largest share of the workforce, with Core Sewing Machine Operations representing ~49% of total factory employment across the surveyed units. As a result, incremental improvements in operator capability have the potential to influence productivity across a significant proportion of the workforce. Survey findings indicate that maintaining production speed, adapting to new production methods, and operating advanced machines are among the most commonly reported challenges, reflecting the gradual transition towards shorter production runs, greater product variation, and increasing technology adoption.

Capability requirements also vary across supporting functions. Industrial engineering and production planning are more commonly found in larger manufacturing units, while many MSMEs continue to rely primarily on experience-based production management. Similarly, digital product development capabilities, including CAD-based design and digital sampling, remain concentrated among larger export-oriented firms, indicating differing levels of adoption across the manufacturing base.

Table 133: Technical Skill Gaps by Value Chain Stage

Role	Primary Gap Signal	Secondary Gap Signal	Development Priority
Design & Product Development Fashion Designer (L5) ⁸ · Assistant Designer (L4) · CAD Pattern Maker (L5)	Style complexity handling; CAD adoption limited to top-tier units; 3D visualisation absent	Global fashion cycles shortening; buyers increasingly requiring digital tech packs	Expand CAD/3D design capability link institutional design programmes to buyer tech-pack standards
Pre-production (Cutting & Spreading) Fabric Cutter (L2.5) · Layerman (L2) · Cutting Supervisor (L5)	33% of cutting workers cite following new methods as top difficulty; style changeover and marker accuracy gaps	Automated cutting adoption increasing in large firms; MMF fabric spreading requires different tension and lay management	Multi-style, multi-fabric pre-production training; CAD-to-cutter workflow capability for automatic cutting systems
Production (Sewing) SMO Woven/Knit (L2.5-3.5) · Specialised Production Supervisor (L5)	28% of sewing workers cite speed maintenance as top difficulty; 23% advanced machine operation; 21% new methods	Core Sewing Machine Operations constitute ~49% of factory headcount; multi-skilling at this level has significant aggregate productivity impact	Multi-machine operator programmes; style changeover drills; machine-specific MMF training
Processing & Finishing Pressman (L2.5) · Finisher & Packer (L2.5) · Processing Supervisor (L5)	Style change handling (23%) and process adaptation (19%) dominate in finishing workers	Wet processing sustainability requirements expanding due to buyer ESG mandates	Multi-style finishing training; sustainable washing; chemical handling safety for wet processing
Quality Management Inline Checker (L3.5) · QC Executive (L5)	26% of quality workers cite fabric handling as top difficulty; AQL system-level capability limited outside large units	Buyer audit complexity increasing from basic AQL to traceability, social compliance, and sustainability audits	AQL and system-level QC training; buyer audit preparation; fabric and material quality assessment for MMF inputs
Industrial Engineering & Planning Industrial Engineer (L6) · Production Planner/MIS Coordinator (L4-L5)	IE function absent in most MSMEs; 28% employer cite for digital production systems; MIS capability near absent in supervisors	IE productivity impact documented; MSME productivity gap attributed partly to absence of IE function	IE fundamentals for supervisors (line balancing, SAM, bottleneck analysis); MIS and production data literacy
Merchandising & Export Merchandiser (L5) · Export Executive (L5) · Sampling Coordinator (L5) · Sourcing Manager (L6)	Merchandiser attrition within 1.5–2 years; inter-firm wage competition; MMF and technical fabric sourcing knowledge gaps	Export documentation complexity increasing; data compliance requirements for buyer communications	Structured career ladder; MMF sourcing; sustainability regulations in export documentation

Source: Primary Research Findings

⁸ NSQF Level Descriptors

F.1.2 Behavioural and Supervisory Skill Gaps

In addition to technical competencies, employers highlighted several behavioural and supervisory capabilities that influence production efficiency, workforce adaptability, and team coordination. While workers demonstrate a high willingness to upgrade their skills, access to structured career pathways and formal development opportunities remains comparatively limited. As production systems become more technology-enabled and operational requirements continue to evolve, behavioural capabilities are becoming increasingly relevant alongside technical skills.

The findings indicate that adaptability, communication, and supervisory capability are emerging priorities across the sector. Employers increasingly require workers who can operate across multiple processes, adapt to changing production methods, and work effectively within team-based production environments. At the supervisory level, capabilities related to communication, coordination, and workforce management are receiving greater attention as factories expand production complexity and adopt more structured manufacturing practices.

Table 134: Behavioural and Supervisory Skill Gaps

Adaptability to Change

Employers consistently cite multi-skilling as a pressing need, **43%** ranked it among their top emerging skill demands. **22%** of workers identify following new methods as their hardest task, reflecting a workforce built for standardised production now being asked to operate across multi-style, multi-material environments.

Implication

Change-readiness and multi-style briefing drills must be embedded into operator training.

Communication and Coordination

The supervisory pipeline gap is most visible through the communication lens. **41%** of employers cite leadership capability as a development priority, yet structured communication skills development is absent from virtually every factory-led training model. **11%** of workers independently flag difficulty coordinating with supervisors.

Implication

Supervisory training must extend beyond task knowledge to include structured communication and team coordination capability.

Target Orientation and Pace Management

Attrition driven by production target pressure is a consistent employer concern. **18%** of workers cite speed maintenance and **14%** cite meeting production targets as primary task difficulties.

Implication

IE-led target setting that is worker-communicated, not only supervisor-tracked, alongside structured production pace onboarding.

Self-directed Learning and Development

97% of workers express a desire to learn new skills, a near-universal aspiration constrained not by motivation but by low awareness of available programmes beyond the factory gate.

Implication

Career pathway visibility and certification awareness programmes are required to translate aspiration into structured development.

Gender-inclusive Supervision

Women constitute the majority of the production workforce yet supervisory aspiration among women stands at **13%** against **23%** among male workers, a structural access gap, not a capability gap.

Implication

Targeted supervisory pathways for women and structured mentoring within factories are required to address this structural disparity.

Source: Primary Research Findings

F.1.3 Emerging Gaps

The assessment identifies four emerging capability areas where employer demand is increasing alongside changes in production technologies, buyer requirements, and manufacturing practices. While current demand remains lower than that for core production skills, these capabilities are expected to become increasingly important as the sector adopts more technology-enabled and compliance-oriented manufacturing systems.

MMF and Technical Fabric Handling

The global apparel industry is increasingly oriented towards man-made fibres (MMFs) and synthetic fabrics, which account for more than 70% of global fibre consumption. Although India possesses a significant cotton-based manufacturing base, the expansion of MMF production and exports is creating new workforce capability requirements. Investments under the PLI Scheme and increasing buyer demand for synthetic and blended fabrics are expected to accelerate this transition.

Employer responses indicate that 45% rate workforce capability in fabric handling and material understanding as medium, while approximately 8% of workers identify fabric handling as their most difficult production task. These findings suggest scope to strengthen workforce capability in handling diverse materials, particularly as production increasingly incorporates MMF and technical textiles. The requirement is more evident in clusters such as Tiruppur, Bengaluru, Vapi, and Bhubaneswar, where MMF-based manufacturing is expanding.

ESG, Sustainability, and Traceability

ESG, sustainability, and traceability represent emerging areas of workforce capability as global buyers place increasing emphasis on environmental compliance, responsible sourcing, and supply chain transparency. Although only 26% of employers currently identify sustainability-related skills as a priority, stakeholder consultations consistently indicate that demand for these capabilities is expected to increase over the medium term.

The capability requirement extends beyond general awareness to the availability of personnel who can support compliance documentation, sustainability reporting, chemical management, traceability, and audit preparedness. Stakeholder consultations indicate that specialised roles related to sustainability and compliance remain limited across many export-oriented manufacturing clusters.

Automation and Advanced Machine Operation

Automation adoption is progressing across the sector, although its extent varies across production processes. Embroidery and printing demonstrate relatively higher levels of automation, while sewing, cutting, and pattern making continue to operate through a combination of manual and automated systems. Finishing operations remain predominantly manual in many factories.

Automated machine operation is cited by 65% of employers as an emerging skill need, while 84% of workers confirm that new machines or automation are being introduced in their factories. In the West and Central region, 17% of workers identify machine breakdowns as a key operational challenge, indicating the need to strengthen capabilities related to equipment operation, maintenance, and troubleshooting. Stakeholder consultations similarly highlight workforce capability as an important factor influencing the effective utilisation of newly installed machinery.

Digital Production Systems

Digital production capabilities, including production monitoring systems, ERP and MIS platforms, digital order management, and buyer coordination tools, are identified by 28% of employers as an emerging workforce requirement. In contrast, only 2% of workers identify digital tools as a preferred training area, suggesting that workforce awareness of emerging digital capability requirements remains comparatively limited.

Digital production capabilities are currently more prevalent among larger manufacturing units, while adoption across many MSMEs remains at an earlier stage. As buyer interactions increasingly rely on digital platforms for production planning, compliance documentation, and supply chain coordination, strengthening digital capability will become increasingly important, particularly for MSMEs seeking to participate in higher-value and export-oriented supply chains.

F.1.4 MSME vs. Large Manufacturer Gap Differential

MSMEs account for a substantial share of the sector's manufacturing base and employment. The assessment indicates that capability requirements and workforce development practices differ between MSMEs and larger manufacturing units, reflecting variations in production scale, technology adoption, organisational systems, and training investments. These differences have implications for productivity, operational flexibility, and the adoption of emerging manufacturing practices.

The table below compares the capability profile of MSMEs and larger manufacturers across key workforce and operational dimensions.

Table 135: Gap Differential between MSME and Large Manufacturer Across Key Dimensions

Dimension	MSME Position	Large Manufacturer Position	Key Remarks
Workforce Productivity	MSME workers achieve less productivity levels	Large firms achieving ~30 pieces/operator/day equivalent; MSME tier not narrowing this gap at pace consistent with competitiveness targets	IE function, line balancing, SAM-based targets absent in MSME tier; experience-led management replaces data-led optimisation
Technology Adoption	MSMEs operate predominantly manual or semi-automated systems; limited hybrid adoption	Non-MSME units demonstrate stronger automation in sewing and printing; more advanced production monitoring	Gap lies at how far MSMEs progress into hybrid production models
Compliance Capability	Compliance gap most acute at MSME tier; AQL, traceability, and audit preparedness concentrated in large export units	Large export units have structured compliance systems; buyer audit complexity moving beyond basic AQL	91% of factories rate compliance high; MSME tier identified as acutely underserved in cluster profiles
Training Access and Depth	MSMEs rely on short-duration on-the-job training; 82% of trained workers received factory-led training, majority under 4 weeks	Large firms support structured onboarding and capability development; dedicated IE and QC training systems	Commercial constraints limit MSME training investment; workforce operationally deployable in narrow contexts but not equipped for multi-style or upward mobility

Source: Primary Research Findings

F.2 Skill Gap Priority Matrix

- *Perennial High Demand* roles are those where employer and worker evidence is consistent across all cluster types, where the gap has direct measurable impact on productivity or competitiveness, and where existing training supply is structurally insufficient.
- *Emerging High Demand* roles carry a strong and consistent employer signal, clear buyer-driven urgency, and partial but insufficient institutional supply.
- *Futuristic Demand* roles show present but nascent demand signals, either developing in intensity over a medium-term horizon, or with no adequate institutional training infrastructure currently in place to address the need.

Table 136: Skill Gap Priority Matrix

Perennial High Demand	Emerging High Demand	Futuristic Demand
SMO & Multi-skilling Pipeline 43% of employers cite multi-skilling as top need Bhubaneswar, Bengaluru, Indore, Tiruppur	Quality Management Systems 70% employer citation, highest ranked emerging need nationally Delhi NCR, Bengaluru, Tiruppur, export units	MMF/ Synthetic Fabric Handling 45% of employers rate fabric handling skill level as medium Tiruppur, Bengaluru, Vapi, Bhubaneswar
Supervisory & Mid-management Pipeline 41% employer citation; limited formal training at supervisory level All clusters; most acute in Bhubaneswar and Indore	Automated Machine Operation 65% employer citation; 84% of workers confirm automation Ludhiana, Indore, Delhi NCR, Bengaluru, Tiruppur, Bhubaneswar	ESG / Sustainability Compliance 26% employer citation; significant growth expected driven by buyer mandates Bengaluru, Tiruppur, Delhi NCR, Bhubaneswar
	IE/Production Planning 28% employer cite IE function absent in most MSMEs All clusters; especially Ludhiana, Indore, Kolkata, Jaipur	AI based Data Analyst AI-enabled data analytics capability is currently absent at the factory floor level and nascent even among large export units and buying houses Large export-oriented units
	Compliance & Documentation 91% employer rating (High) Bengaluru, Tiruppur, Delhi NCR, Bhubaneswar	
	CAD / Digital Pattern Making 63% CAD pattern makers; manual pattern making still dominant Jaipur, Kolkata, Ludhiana MSME tier	
	Digital Skills (MIS/ ERP) 28% employer citation; 2% worker preference — awareness gap Across all clusters; especially Ludhiana, Indore, Kolkata, Tiruppur	

Source: Primary Research Findings

F.3 Emerging and Aspirational Job Role Framework

Primary research across employers, workers, and industry stakeholders indicates that the occupational structure of the sector is evolving in response to three broad drivers: automation and digitalisation, increasing compliance and sustainability requirements, and the gradual shift towards MMF and synthetic knit production. This section translates these trends into a forward-looking role framework, mapping current roles, emerging capability requirements, and workforce progression pathways.

F.3.1 Current Role Map: The Baseline Across the Value Chain

Understanding which roles are under pressure and which are emerging requires a clear baseline picture of where the sector currently stands. The survey base confirms a workforce structure that is firmly anchored in production, with a thin but operationally indispensable layer of specialist and supervisory functions sitting above the shop floor.

The table below organises existing roles across four value chain segments, distinguishing between roles by their factory-level penetration and strategic function. It frames each role by its deployment spread, its current operational criticality, and its exposure to change, setting up the displacement and emergence analysis that follows.

Table 137: Current Role Mapping Across the Value Chain

Role	Factory Presence	Operational Criticality	Change Exposure
Pre-Production			
Pattern Maker / Master	67% / 82%	High	High: 2D/3D CAD transition active
Sampling Tailor / Coordinator	100% / 82%	Foundational	Moderate: sample cycles accelerating
Fabric Cutter	100%	High	High: transitioning cutting automation
Fabric Layerman	87%	Moderate	High: automated spreading growing
Embroidery Machine Operator	67%	Moderate-High	Moderate: already largely automated
Core Production			
Sewing Machine Operator (SMO)	100%	Very High	Moderate: automation selective; MMF transition active
In-line Checker	91%	High	Moderate
Line Supervisor / Production Supervisor	96%	High	High: process complexity increasing
Post-Production			
Finisher & Packer	100%	High	Low-Moderate: largely manual
Pressman (Stitched Item)	93%	Moderate	Low-Moderate
Quality Control Executive	98%	High	Moderate
Cross-Functional			
Industrial Engineer	80%	Moderate-High	High: IE role expanding
Compliance Auditor	87%	High	High: ESG layer being added
Merchandiser	91%	High	Moderate: digital tools adoption
MIS Executive	50%	Growing	High: production digitalisation driving demand

Source: Primary Research Findings

Pre-Production Roles

Pre-production functions encompass design translation, pattern development, fabric inspection, and cutting preparation. The pattern master has historically been one of the most experience-dependent and informally trained roles in the sector. Pattern masters built their expertise over long careers through apprenticeship and observation rather than formal training, making role-specific knowledge difficult to transfer, standardise, or scale. However, CAD-based pattern making is now present in 63% of factories, 2D and 3D CAD proficiency is an active hiring criterion at export-oriented units. The pattern room is therefore a site of active skill transition, with traditional craft-based mastery increasingly expected to co-exist with digital tooling capability.

Sampling is present in 98% of surveyed factories while representing ~2% of total employment. Sampling capability has become a foundational operational function regardless of factory scale. The role's strategic importance is growing as product cycles shorten, buyer prototyping expectations intensify, and sample approvals become a gating condition for order placement.

The cutting section is simultaneously one of the most technologically mixed processes and one of the functions highly exposed to material variability. Cutting workers report among the highest rates of adaptation difficulty. The cutting section's skill requirements are therefore evolving faster than most pre-production functions, driven by both automation adoption and the MMF product mix shift.

Production Roles

Core Sewing machine operations constitute ~49% of total sector employment, making the production line the dominant occupational zone. The deployment structure reflects a concentrated but layered workforce. SMOs provide throughput, in-line checkers maintain quality discipline at 89% factory penetration, and production supervisors coordinate output and process at 94% penetration.

The supervisory layer is the structurally stressed as factories absorb new machinery, shorten run lengths, and manage frequent style variations. Supervisors are increasingly expected to manage operational change, instead of simply sustaining established production rhythms.

The Specialised SMO profile is growing in strategic importance. Industry associations identify demand for SMOs trained in advanced material handling, particularly for MMF and synthetic knits, signals a rising premium on operators whose skills extend beyond single-material, single-machine operation.

Post-Production Roles

Finishing, packing, pressing, and quality inspection remain among the more labour-intensive segments of the value chain. Around 15% of total employment is concentrated in finishing and packing alone. These roles continue to rely heavily on manual operations and are characterised by short production cycles and a relatively high concentration of female workers, with women accounting for 59% of finishing and 58% of packing roles.

While technology adoption has been comparatively gradual across post-production functions, the Quality Control (QC) Executive role is evolving. Quality management is increasingly shifting from end-line inspection towards process-based quality assurance, expanding the competency requirements of QC personnel without necessarily increasing workforce size. Consequently, QC executives require more specialised training in quality systems, process monitoring, and buyer compliance than traditional quality inspection roles.

Cross-Functional and Enabling Roles

Industrial Engineers, Compliance Auditors, Merchandisers, MIS Executives, and Maintenance Technicians represent the sector's specialist and support functions. Collectively, these roles account for less than 5% of total employment but are present across a substantial proportion of the surveyed factory base.

The presence of Industrial Engineers in 78% of surveyed factories indicates that the function is becoming more widely adopted across manufacturing units, although deployment continues to vary by firm size. Industry consultations also identify industrial engineering capabilities as increasingly important for improving productivity, line balancing, and production planning.

The MIS Executive role is becoming increasingly relevant as production monitoring, ERP systems, and digital reporting are adopted across manufacturing operations. As digital production systems become more widely integrated into factory operations, demand for workforce capabilities related to production data management and digital coordination is expected to increase.

F.3.2 Emerging Role Framework

The seven roles below are ranked by composite priority, a function of demand urgency, breadth of factory-level applicability, timeline to mainstream deployment, and severity of current supply gap. The ranking draws on the employer emerging skill needs data from primary research, industry and institutional stakeholder consultations, and the qualification gap analysis that follows.

Figure 18: Emerging Roles: Summary Profile, Demand Signal and Training Supply

Role	Key Competencies Required	Employer Demand Signal	Current Training Supply	Supply Gap Severity
Automated Machine Operation	PLC comprehension, sensor diagnostics, multi-system fault isolation, electromechanical systems, OEM documentation use	Automated machine operation cited by 65% of employers as an emerging need; upskilling of operators and supervisors identified as the primary enabler of the sector's transition	No structured sector-specific programme; equipment manufacturer-delivered training only, ad hoc	Critical
QMS Specialist	ISO 9001 principles applied to garment manufacturing, SPC tools, root cause analysis, audit preparation, buyer specification interpretation	Quality management systems cited by 70% of employers, highest single emerging skill need in the survey	Foundational QC programme available; no advanced QMS qualification at scale	High
CAD-CAM / Pattern Room Technician	2D/3D CAD proficiency, garment construction knowledge, fabric utilisation optimisation, cutting file preparation	CAD-based pattern making deployed in 63% of factories; 2D/3D CAD proficiency named as an active hiring criterion by technology and training partners	Tukatech programme in development at training centres; limited scale outside NCR	High
ESG/ Sustainability Compliance	Certification knowledge (GRI / Higg / GOTS framework), environmental data calculation, chain-of-custody documentation, buyer ESG reporting	Sustainability compliance cited by 26% of employers; ESG reporting skill at 71% high with 24% medium	Pilot sustainability module in NCR only; no nationally scaled programme	Critical
MMF Process Technician	MMF fibre behaviour, differential feed adjustment, stretch sewing discipline, MMF-specific defect identification	Fabric handling and material understanding records the weakest rating at 55% high; demand for MMF-capable operators now central to buyer sourcing requirements	No MMF-specific module in most existing SMO programmes; gap confirmed across training providers	High

Role	Key Competencies Required	Employer Demand Signal	Current Training Supply	Supply Gap Severity
Digital Production Operator	ERP platform use, data entry discipline, production metric understanding, defect code entry, basic variance reporting	Digital production systems cited by 28% of employers; skill assessment to use digital tools at 73% high with 27% medium-low combined	Basic computer literacy training; no T&A manufacturing-specific ERP programme	Moderate-High
MIS / Data Analyst in Manufacturing	Production analytics, ERP data extraction, variance analysis, management reporting, garment manufacturing metric knowledge	Digital production systems demand at 28%; data analysts in manufacturing among highest-demand emerging profiles	No sector-specific programme; general data analytics courses lack sector context	Moderate

Source: Primary Research Findings

F.3.3 Aspirational Pathways: Workforce Progression Routes

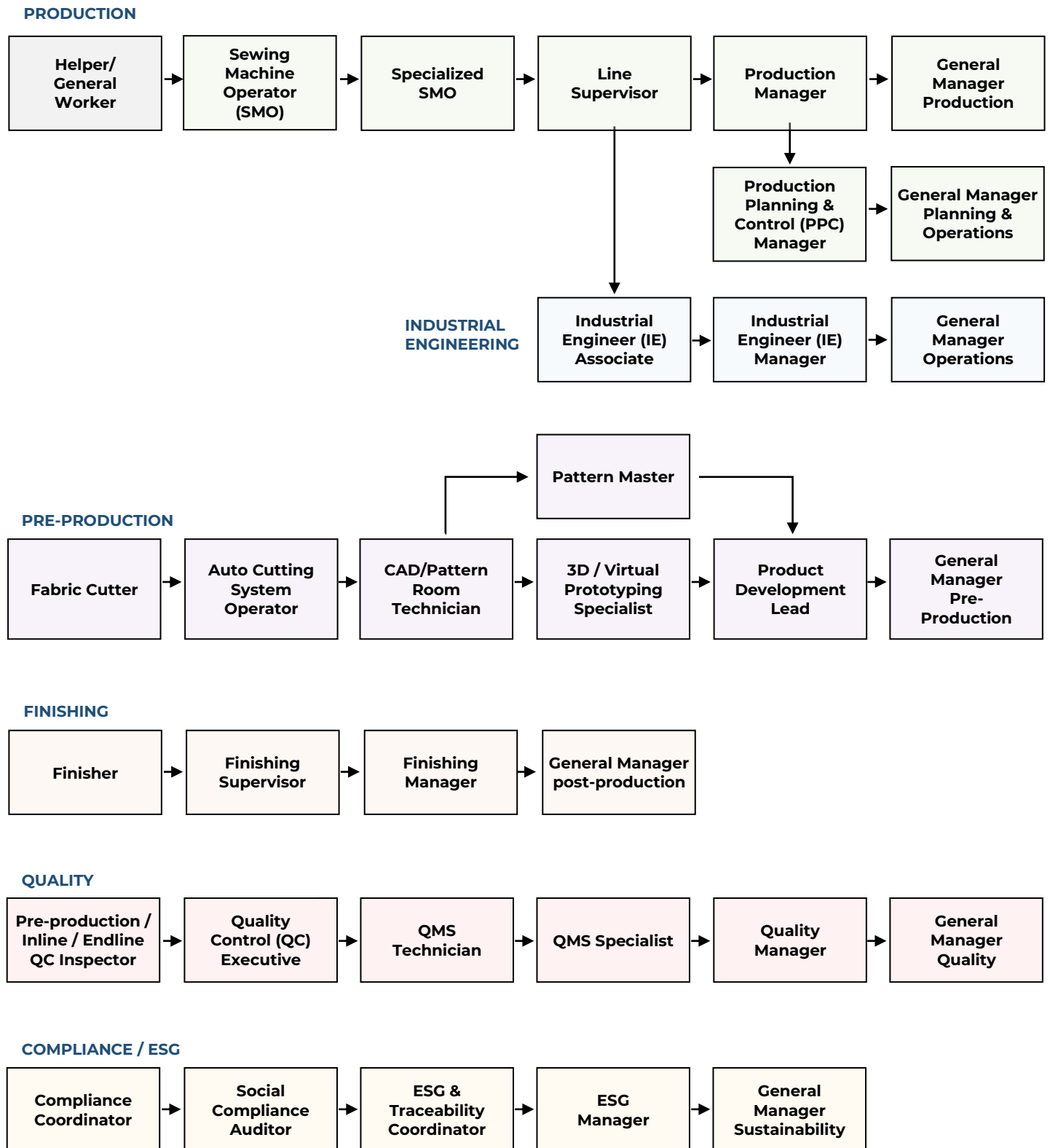
The survey findings indicate a strong aspiration for skill development, with 97% of workers expressing an interest in acquiring new skills, consistently across gender, age groups, and production functions. This section maps the principal workforce progression pathways available within and beyond the sector's current occupational structure, and outlining the transition requirements associated with each pathway

The pathways are in two groups. The first three are grounded in the current workforce profile, operator-origin progressions available to the majority of today's production workforce within a realistic three-to-five-year horizon. The second comprises extended progression pathways, which typically require higher levels of experience, specialised training, or different entry conditions, but are supported by emerging employer demand identified through the assessment.

Workforce Progression Route

The findings indicate that several emerging roles currently have limited formal qualification and training infrastructure. In particular, Automated Machine Operation and ESG and Sustainability Compliance exhibit a combination of increasing employer demand and comparatively limited training availability. Strengthening qualification frameworks and expanding training provision in these areas will be important to support the sector's evolving workforce requirements.

Figure 19: Workforce Career Progression Route Map



F.4 High-Potential Clusters for Future Expansion

The clusters below represent priority locations for deployment, training infrastructure planning, and Samarth scheme activation, grouped into upcoming PM-MITRA park clusters and high-growth existing clusters.

High-Growth Existing Clusters

Table 138: Existing Clusters and their Growth Levers

Cluster	State	Status	Growth Levers
Indore (incl. Dhar)	Madhya Pradesh	Active Investment Stage	Forms a manufacturing corridor with the Dhar PM MITRA park; large enterprises setting up new units; transitioning from cotton to export-oriented mixed production
Bhubaneswar	Odisha	Emerging Investment Stage	New apparel investment driven by state incentives; innerwear and activewear focus; workforce development must be built alongside physical capacity; the formation window is now
Budhni & Sutlapur	Madhya Pradesh	Operationally Active, PLI-Linked	Large-scale commercial production already underway with vertically integrated spinning, processing, and MMF garmenting; skill demand is immediate.

Upcoming Clusters — PM MITRA Parks

Table 139: Upcoming Clusters and their Growth Levers

Cluster	State	Status	Growth Levers
Virudhnagar	Tamil Nadu	Yarn, Fabric, Garmenting, Technical Textiles	Greenfield Park within Tamil Nadu's established textile corridor; 1-3 lakh employment target; benefits from Tiruppur supply chain proximity
Warangal	Telangana	Fibre-to-Apparel, Garmenting, MMF	Brownfield Park with widest value-chain scope — raw fibre to finished garment; 1-3 lakh employment target; Telangana's active industrial investment accelerates operationalisation
Kalaburagi	Karnataka	Garmenting (Cotton + MMF)	Greenfield Park extending Karnataka's apparel capacity into a lower-cost labour region; limited existing institutional training infrastructure makes early preparation critical
Navsari	Gujarat	MMF, Synthetic Garmenting, Processing	Employment potential of 3 lakhs; positioned within India's largest synthetic textile base; MMF processing intensity demands specialist skill development
Dhar	Madhya Pradesh	Garmenting, Spinning, MMF	Most advanced in industry activation with 91 companies and 3 lakh employment targets across 1,300 acres; adjacent to Indore cluster, forming a central India manufacturing corridor
Lucknow-Hardoi	Uttar Pradesh	Garmenting, Apparel	Greenfield Park formalising apparel manufacturing in UP's large semi-skilled labour pool; BHAVYA scheme adds four further parks in the state, compounding demand
Amravati	Maharashtra	Garmenting, Technical Textiles	Brownfield Park enabling faster activation; 2-3 lakh employment target; technical textiles mandate adds specialist skill demand beyond standard garmenting

Source: State PM MITRA SPV websites (Tamil Nadu, Telangana, Karnataka, Maharashtra); Apparel Resources; Textile Value Chain

Key Demand Skills in High-Potential Clusters

Across both established and emerging clusters, skill demand converges on a consistent set of priorities. Foundational Sewing Machine Operator training remains the baseline requirement, particularly in greenfield and first-generation industrial workforce settings. MMF processing and material handling expertise is the most widely recurring technical requirement, reflecting the sector's ongoing product mix transition.

Supervisory and line management development features prominently across scaling and brownfield contexts where production complexity is already advancing. ESG, compliance documentation, and quality systems appear with increasing frequency, particularly in clusters with export orientation or technical textiles mandates. Digital literacy and automated machine operation round out the demand profile in higher-investment settings.

The consistency of these requirements across geographically and structurally diverse clusters reinforces their status as sector-wide priorities rather than location-specific needs.

F.5 Strategic Recommendations

Strengthen MMF operator training across all cluster delivery centres

Workers rate fabric handling as the weakest skill area in the survey. While Samarth has MMF-related training in its portfolio, coverage and depth needs to be strengthened across clusters.

- AMH SSC shall work with Samarth-empanelled training partners to standardise and deepen existing MMF modules across all cluster centres, ensuring consistent delivery of differential feed adjustment, needle and thread selection for synthetics, MMF-specific defect identification, and safe handling of man-made fibres.
- The module should be available as both, standalone short course and as an embeddable component within existing SMO programmes, maximising reach without disrupting current delivery pipelines.

Institutionalise supervisory development

Supervisors are present across factories but are typically promoted without formal preparation in people management and production planning. Supervisory capability is consistently cited as an emerging need by the majority of employers.

- AMH SSC shall create a Supervisory Development Programme as a targeted training programme, covering style changeover management, IE fundamentals, and MIS dashboard reading.

Reorient quality training towards process-based QMS

Quality Management Systems are among the highest-ranked emerging skill need across clusters, cited by employers as a priority capability gap.

- AMH SSC shall develop a QMS Specialist training programme covering process auditing, defect prevention, statistical process control, and buyer audit preparation.

Build structured training programmes for emerging high demand and futuristic roles

Emerging high demand/ futuristic roles, including Automated Machine Operation, CAD/ Digital Pattern Making, Compliance & AQL Documentation, AI-based Data Analyst, and Digital Skills (MIS/ERP), are being created or substantially reshaped by technology and compliance shifts.

- AMH SSC shall develop role profiles, structured training programmes, and competency benchmarks for all emerging high demand or futuristic roles, and design assessment tools accordingly.
- Machinery manufacturers shall be brought in as formal content partners to ensure programmes for automation-related roles reflect actual equipment in use on factory floors and remain current as technology evolves.

Close the aspiration-access gap through targeted enrolment and dedicated training for women

A strong desire to upskill is evident across the workforce, yet the gap is structurally gendered. Women in Southern clusters access formal training at a notably lower rate than their male counterparts, and the aspiration-access gap in clusters such as Panipat and Bengaluru is particularly pronounced.

- Targeted enrolment drives for female workers shall be conducted in clusters with the widest aspiration-access gaps, with enrolment of women tracked as a distinct metric and reported against cluster-level targets annually.

Benchmark India's training curricula against competing nations and build a sustained trainer development pipeline

National Council for Vocational Training Dress Making and Sewing Technology trades remain oriented toward domestic tailoring — AQL discipline, MMF handling, multi-style changeover, and assembly-line pace are limited. Simultaneously, trainer pipelines require industry exposure, and technology currency to deliver relevant programmes.

- Conduct a structured benchmarking exercise against training frameworks of competing nations including Vietnam, Bangladesh, and China to identify gaps in productivity-linked training and buyer compliance requirements, with findings feeding a defined annual curriculum update cycle applied across training institutions.
- The ToT curriculum shall be revised every two years, with interim reviews triggered by significant technology shifts or new machinery adoption in the sector, to ensure content reflects both current production realities and projected industry trends over a 3–5 year horizon.

Integrate ESG, traceability, and sustainability compliance into training programmes

A growing share of employers cites sustainability compliance as an emerging need, with significant growth projected as buyer-embedded sourcing conditions and international regulatory requirements continue to expand.

- AMH SSC shall develop a foundational Sustainability Compliance module internationally recognised reporting and documentation frameworks, and supply chain traceability requirements.
- For the ESG or Sustainability Compliance roles, training content shall cover factory-level environmental reporting, chain-of-custody documentation, application of ILO standards in the garment factory context, worker interview techniques, and buyer self-assessment reporting, developed in consultation with relevant industry and certification bodies.

Deploy industrial engineering capability in MSMEs to address the productivity gap

MSME workers record considerably lower productivity levels compared to large manufacturing units. The IE function is largely absent at the MSME tier, contributing to a gap that bears on sector competitiveness targets.

- AMH SSC shall design a short-duration IE Fundamentals programme, covering line balancing, SAM measurement, style changeover, and basic production reporting, specifically for MSME supervisors and owners.
- Delivery shall be routed through existing Samarth centres and industry associations at cluster level to enable rapid deployment without requiring new institutional infrastructure.

Annexures

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Annexure 2: Primary Research Questionnaires and Discussion Guides

Factory Level Questionnaire

Skill Gap Analysis Form

Section I - Company Profile

**Indicates Mandatory Questions*

1. Name of the Organisation & Location*

2. Contact person*

Name:	Designation:
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3. Industry type* (Please tick appropriate choice)

- ☐ Garmenting
- ☐ Made ups
- ☐ Home Furnishing

4. Type of company MSME / Non MSME*

*(MSME- Investment in plant & machinery is less than 10 crores,
Non MSME: Investment in plant & machinery is more than 10 crores)*

5. Market orientation* (Please tick appropriate choice)

- ☐ Domestic
- ☐ Export
- ☐ Both

Major export market (if export oriented):

6. Production capacity*:

S No	Segment	Product Range	Installed capacity (No of machines)	Production capacity (Output per month)
1	Apparel		Machines	Pieces
2	Made ups / Home Furnishing		Machines	

7. Production processes performed and Technology used*

If a particular process not performed, please mention NA

Process	Manual	Semi-Automatic	Automatic
Pattern Making			
Spreading			
Cutting			
Sewing			
Printing			
Embroidery			
Hemming/ Quilting/ Padding			
Finishing			
Washing			
Packaging			
Inspection			
Warehousing			
Any Other: _____			

8. Emerging skill needs* (Top 3) (Please tick appropriate choice)

- Automated machine operation
- Digital production systems
- Quality management systems
- Sustainability compliance
- Supervisor / leadership skills
- Multi-skilling across operations
- Industrial engineering / productivity improvement
- Handling complex styles / product development
- Any Other: _____

Section II - Worker

9. No. of workers (Fulltime + Contractual) *

10. Gender ratio of the workforce (%) * **Male** **Female**

11. Major age group of the workforce* (Please tick appropriate choice)

☐ 18-25yrs ☐ 25-30yrs ☐ 31-35yrs ☐ 36-40yrs ☐ 40+yrs

12. Habitat ratio of the workforce (%) * **Local** **Migratory**

13. Which State do Migratory workers belong? (Add top 3 states and their share (%))

14. Education level of majority of workforce*

- ☐ Less than 10th Standard
- ☐ Secondary
- ☐ Higher Secondary
- ☐ Graduate and Higher

15. Job-role wise workers deployed in the unit*

If Not Employed for a particular role, please mention NA

S. No.	Job-role	No. of Operators Deployed
1.	Sampling Coordinator	
2.	Boutique Manager	
3.	Sampling Tailor	
4.	Self Employed Tailor	
5.	Fashion Designer	
6.	Assistant Designer- Apparel, Made-Ups & Home Furnishings	
7.	Pattern Master (Apparel)	
8.	Advance Pattern Maker (CAD/CAM)	
9.	Layerman (Fabric)	
10.	Fabric Cutter	
11.	Hand Embroiderer (Addawala)	
12.	Embroidery Machine Operator	
13.	Sewing Machine Operator	
14.	Sewing Machine Operator Knits	
15.	Specialized Sewing Machine Operator	
16.	Record Keeper- Stitched Items Manufacturing	
17.	Pressman- Stitched Items	
18.	Finisher and Packer	
19.	Washing Machine Operator	
20.	Cutting Supervisor (Fabric)	
21.	Processing Supervisor (Printing)	
22.	Production Supervisor (Sewing)	
23.	Inline Checker Sewing	
24.	QC Executive - Stitched Items	
25.	Factory Compliance Auditor	

26.	Sourcing Manager- Stitched Items	
27.	Export Executive- Stitched Items	
28.	Export Manager- Stitched Items	
29.	Merchandiser – Apparel, Made-Ups & Home Furnishings	
30.	Industrial Engineer (IE)- Apparel	
o	Any Other: _____	

16. Rate the overall skill level of workers*

If a particular area of operation not performed, please mention NA

S. No.	Area	Low	Medium	High
1.	Machine Operation			
2.	Fabric Handling & Material Understanding			
3.	Cutting Accuracy			
4.	Stitch Quality			
5.	Finishing & Packing			
6.	Pattern Making & Pattern Reading (Manual/CAD)			
7.	Quality Inspection			
8.	Handling Automated Machines			
9.	Compliance & Documentation			
10.	Production Planning & Supervision			
11.	Processing Knowledge (Dyeing, Printing, Washing)			
12.	Use of Digital Tools (CAD/CAM, MIS, etc.)			
13.	ESG Reporting			
14.	Merchandising & Export Coordination			
15.	Safety Practices			
	Any Other: _____			

17. Multi-level Skilling in the factory* (Please tick appropriate choice)

- ☐ Workers operate only one machine
- ☐ Some workers operate multiple machines
- ☐ Most workers are multi-skilled

18. Any training for up-skilling given to the workers? *

19. Overall attrition rate of workers (per month) *

20. Which job role has higher attrition rates? * *(Add top 3 states and their share (%))*

21. Reason for attrition*

- Low wages / compensation
- Migration (return to native place / relocation)
- Better opportunities (higher pay / benefits elsewhere)
- Family / personal reasons
- Lack of career growth opportunities
- Lack of skill fit / performance issues
- Seasonal employment
- Long working hours / shift issues
- Any Other

22. Availability of Skilled Work force*

- Easily Available
- Available with Difficulty
- Scarce
- Very Scarce

23. Suggestions to improve skilled labour availability in the sector:

Worker Level Questionnaire

**Indicates Mandatory Questions*

S. No.	Questions	Response
1.	Name*	
2.	Age*	
3.	Gender* (Please tick appropriate choice)	☐ Male ☐ Female ☐ Other
4.	Contact Number*	
5.	Which state do you belong to? *	
6.	Which state do you live in? *	
	Reason for Migration	
7.	What are your educational qualifications? * (Please tick appropriate choice)	☐ Less than 10th standard ☐ Secondary ☐ Higher Secondary ☐ Graduation & Higher
8.	Factory/Unit Name*	
9.	Job Role/ Designation*	
10.	Department* (Please tick appropriate choice)	☐ Cutting ☐ Stitching ☐ Finishing ☐ Packaging ☐ Embroidery / Value Addition ☐ Quality (Inline / Final Inspection) ☐ Sampling ☐ Washing / Processing ☐ Pattern Making / CAD ☐ Production Planning & Control (PPC) ☐ Machine Maintenance ☐ Line Supervision ☐ Others: _____
11.	Type of employment* (Please tick appropriate choice)	☐ Permanent ☐ Contract ☐ Apprenticeship
12.	Years of experience in apparel / made ups/ home furnishing sector*	
13.	Years of experience in current factory*	
14.	Which tasks do you find most difficult? * (Please tick appropriate choice)	☐ Maintaining production speed ☐ Maintaining quality standards ☐ Handling style changes ☐ Handling different fabric types ☐ Operating advanced machines ☐ Understanding technical instructions

		- o Meeting production targets - o Machine setup / changeover between styles - o Dealing with machine breakdowns / downtime - o Following new methods or process changes - o Coordination with supervisors - o Any Other: _____
15.	Are you satisfied with your current skill level? *	Yes / No
16.	Have you undergone or undergoing any formal training? *	Yes / No
17.	If yes, who is the training provider? (Please tick appropriate choice)	- o Factory - o Government Institute - o Private Institute - o NGO
18.	Duration of Training? (Please tick appropriate choice)	- o <1 week - o 1-4 weeks - o >1 month
19.	Are new machines/automation being introduced in your factory? *	Yes / No
20.	If automation increases, what would you prefer? * (Please tick appropriate choice)	- o Learn new machines - o Shift to another factory - o Any Other: _____
21.	Would you like to learn new skills for better jobs? *	Yes / No
22.	Preferred skill training areas * (Please tick appropriate choice)	- o Advanced machine operation - o Stitching / sewing skills improvement - o Cutting & fabric handling - o Quality control & defect reduction - o Finishing & packaging techniques - o Pattern making / CAD - o Machine maintenance basics - o Supervisory & line management skills - o Use of digital tools (CAD, ERP, etc.) - o Any Other: _____
23.	Challenges Faced? * (Please tick appropriate choice)	- o Lack of skills / training opportunities - o Long working hours - o Low wages / wage inequality - o Work pressure / production targets

		○ Health issues / physical strain ○ Management-related issues (supervision, communication) ○ Family / personal constraints ○ Any Other: _____
24.	Any other Feedback	

Stakeholder Discussion Guides

Discussion Guides for Machinery Manufacturers

To understand technology evolution, automation trends, digitization adoption, and the resulting impact on job roles and skill requirements in apparel and home textile manufacturing.

1. Major machinery innovations that have emerged in the last 5 years.
 - a) Digitization/ Automation,
 - b) Traceability and Sustainability, etc.
2. Processes that remain largely manual today but are likely to automate in the next 5–10 years.
3. Technologies that are gaining fastest adoption in Indian factories, and those still under-adopted in India.
4. Expected penetration by 2030.
5. New roles are emerging due to automation.
6. Traditional roles that may decline or disappear.
7. Typical digital skill gaps observed among operators and factory technicians. (Key barriers to digital readiness)
8. Skill readiness differences across clusters; roles unique to home furnishing vs. apparel.
9. Most frequent machine misuse issues.
10. Curriculum gaps in existing training programs.
11. Job roles that are expected to face talent shortage and any policy intervention needed for skill readiness.
12. Customer training provided by the company, if any. - format, duration, location

Discussion Guides for Industry Associations

To capture industry-wide perspective on workforce trends, emerging job roles, digitization, sustainability compliance and future skill demand across manufacturing clusters.

1. What is the current workforce structure?
 - a. Average employment size,
 - b. Skilled vs Semi-Skilled vs Unskilled,
 - c. Female Participation
 - d. Local vs Migratory
2. What changes have been observed among member units in last 5 years? (Operator, Technician, Supervisory, Middle Management)
3. Are factories shifting toward multi-skilled operators?
4. Emerging job roles in areas such as:
 - a. Production & operations: automation technicians, digital production planners, etc.
 - b. Design and Product Development: 3D design specialists, etc.
 - c. Compliance & Sustainability: ESG managers, traceability specialists, chemical compliance officers, etc.
 - d. Entrepreneurship
5. Which roles are hardest to hire in the above areas?
6. Which job roles will see highest demand in the next 5 years? (Operator, Supervisor, Management)
7. Where are the largest skill gaps today? Especially in quality & compliance, sustainability reporting, and digital documentation / traceability.
8. Which clusters are likely to see highest employment growth?
9. What training channels are used by members? (ITI, PMKVY, ATDC, NIFT, in-house, private institutes)
10. Quality of available training: relevance, equipment modernity, placement linkage
11. What government interventions are most needed to address skill supply

Discussion Guides for Training Institutes

To assess the current training ecosystem, infrastructure capacity, curriculum relevance, and industry linkage to identify gaps in skill development and future training requirements for apparel and home textile manufacturing.

1. What courses are offered related to textile and apparel manufacturing?
2. What is the annual training capacity and number of trainees enrolled per year?
3. How frequently is the **curriculum updated** to reflect industry changes?
4. What **infrastructure and equipment** are available for training? (*sewing machines and automation equipment, CAD, digital pattern making software, etc.*)
5. What are the major infrastructure limitations faced by the institute?
6. Which **job roles are most in demand from industry?**
7. What **skills are currently lacking among trainees?**
8. Are trainees prepared for automated or digital manufacturing environments? (Training of Trainers (ToT))
9. What **new courses or skills should be introduced in the next 5–10 years?**
10. What **support is needed from government or industry** to strengthen the training ecosystem?

Annexure 3: Job Role Mapping with NCO-2015 Classification

S No	Job Role	QP Code	NCO-2015 (3-digit)	NCO-2015 (8-digit)	NSQF Level
1.	Advance Pattern Maker (CAD/CAM)	AMH/Q1101	753	7532.0902	Level 5
2.	Assistant Designer – Apparel, Made-Ups & Home Furnishings	AMH/Q1210	753	7532.0100	Level 4
3.	Boutique Manager	AMH/Q1910	-	-	Level 6
4.	Cutting Supervisor	AMH/Q0610	753	7532.9900	Level 5
5.	Embroidery Machine Operator	AMH/Q0801	815	8153.0601	Level 3
6.	Export Executive – Stitched Items	AMH/Q1602	332	3322.6001	Level 5
7.	Export Manager – Stitched Items	AMH/Q1603	121	1219.0101	Level 6
8.	Fabric Cutter	AMH/Q1510	753	7532.0700	Level 2.5
9.	Factory Compliance Auditor	AMH/Q2201	754	7543.4001	Level 6
10.	Fashion Designer	AMH/Q1201	753	7532.0100	Level 5
11.	Finisher & Packer	AMH/Q2255	-	-	Level 2.5
12.	Hand Embroiderer (Addawala)	AMH/Q1001	753	7533.0201	Level 2
13.	Industrial Engineer-Apparel	AMH/Q2001	214	2141.0300	Level 6
14.	Inline Checker Sewing	AMH/Q0103	754	7543.0302	Level 3.5
15.	Layerman (Fabric)	AMH/Q0201	753	7532.0903	Level 2
16.	Merchandiser – Apparel, Made-Ups & Home Furnishings	AMH/Q0911	216	3323.0102	Level 5
17.	Pattern Master – Apparel	AMH/Q1105	753	7532.0600	Level 4
18.	Pressman – Stitched Items	AMH/Q0401	815	8157.0401	Level 2.5
19.	Processing Supervisor (Dyeing & Printing)	AMH/Q0615	312	3122.3400	Level 5
20.	Production Supervisor Sewing	AMH/Q2101	312	3122.3551	Level 5

21.	QC Executive – Stitched Items	AMH/Q1401	754	7543.0201	Level 5
22.	Record Keeper – Sewn Items Manufacturing	AMH/Q1920	432	4321.0100	Level 3
23.	Sampling Coordinator	AMH/Q1801	332	3323.9900	Level 5
24.	Sampling Tailor	AMH/Q0701	753	7531.0101	Level 4
25.	Self Employed Tailor	AMH/Q1947	753	7531.0100	Level 2.5
26.	Sewing Machine Operator	AMH/Q0301	815	8153.0101	Level 2.5
27.	Sewing Machine Operator – Knits	AMH/Q0305	815	8153.0101	Level 2.5
28.	Sourcing Manager – Stitched Items	AMH/Q0920	132	1324.0100	Level 6
29.	Specialized Sewing Machine Operator	AMH/Q2301	815	8153.0103	Level 3.5
30.	Washing Machine Operator	AMH/Q1810	815	8157.0100	Level 2.5