वस्त्र मंत्रालय
MINISTRY OF
TEXTILES
सत्यमेव जयते

Bharat TEX 2025
TEXTILES | FASHION | SUSTAINABILITY

# The Crouching Tiger

## Report on Startups in the Textiles Sector

February 2025


Centre for Research on
Start-ups and Risk Financing

ynos
VENTURE ENGINE
www.ynos.in

**VIBGYOR: The Dashboard of Textile Startups**
A single point information resource on startups and investors in the Textile sector.

www.ynos.in/vibgyor/

# Table of Contents

# Preface

*"Roti, Kapda, and Makaan"* (Food, Clothing, Shelter) has long been considered as the essential requirements for mankind. Clothing, which is a manifestation of textiles, thus occupies a primary position in our day to day lives. Apart from being a basic necessity, clothing also plays an important role in societal status. "God made man but the tailor made him a gentleman" is a phrase that many of us are aware. The Roman philosopher Publilius Syrus had gone on to say, "Clothes maketh a man." The textile sector is thus inextricably intertwined in daily lives.

Clothing and textiles have also played an important role in the nationalist and independence movement, such as the Champaran Satyagraha or the Swadeshi or Non-cooperation Movement. The symbolism of charkha during the freedom struggle united the nation. The textile sector continues to play a major role in modern India. The natural endowments of the country in terms of cotton growth, cost advantages, skills and workmanship has made India as one of the major global producers of clothing and garments today. Furthermore, textiles sector contributes significantly to the GDP and provides substantial employment (specifically to women in smaller towns).

The textile sector in recent years has marched ahead from the traditional plant based fibers (cotton, jute, hemp, bamboo, and so on) and animal based fibers (wool, silk and so on) to man made fibers (linen, polyester, nylon, and so on). The man-made fibers has carved a niche for itself in recent years in addressing the specialized requirements such as the performance textiles for sportspersons and clinical needs for health workers. The recent emergence of technical textiles as a separate category with high growth potential has given a big fillip to the fluctuating fortunes of the traditional segments in the Indian textile sector.

Behind the bling that we can see, touch, feel, and experience, is a complex value chain, that starts with fibre, resulting in the fabric, and leading to the fashion. End product innovations would not have been possible with out break through innovations in the upstream value chain. The textile sector is today at the cusp of the traditional and modernity.

Technological advancements, changing consumer tastes, and market opportunities are relentlessly pushing the sector to embrace innovation with a velocity that has never been experienced before. It has been well known that start-ups play a big role in commercializing innovations across industries, and the textile sector offers a trajectory today that can nurture start-ups. While the 4800+ existing textile start-ups augurs well, potential exists for several thousand more.


**Chief Editor**
Arun Venkatesh

**Case Studies Editor**
N. Ramakrishnan

**Technology, Data and Analytics**
- Alagu Kumar M
- Chinni Chaitanya
- Priyadarshini
- Pradeep Kanna
- Reeba Devaraj
- Dr. Ramesh Kuruva
- Rohit Umashankar
- Shailendra Gupta

**Design**
Poovannan A

**Knowledge Partner**
YNOS Venture Engine

This report explores the intersection of startups within the textiles industry and is structured into four chapters:

**1. The Indian Textiles Sector**
Examines the strengths, challenges, enablers, and performance metrics of the textiles industry.

**2. Lessons from Indian Startups**
Discusses the growth trajectory of the startup ecosystem, identifying the drivers of success and key performance indicators beyond mere valuation metrics.

**3. Startups in the Textile Sector**
Delves into the specifics of startups in the textiles sector, their enablers, their impact and performance measures.

**4. Case Studies**
Highlights a selection of textile startups that have carved out notable success stories.

This report is a collaborative effort between the Centre for Research on Start-ups and Risk Financing (CREST) and YNOS, dedicated to enhancing and understanding the Indian startup ecosystem. The editorial team is grateful to the Ministry of Textiles and the Bharat Tex Team for giving the opportunity to publish this report during Bharat Tex 2025. We look forward to your feedback and comments.

**Thillai Rajan A**
Professor,
Department of Management Studies
and Head, Centre for Research on
Start-ups and Risk Financing
Indian Institute of Technology Madras

# Foreword

Over the past decade, the Indian startup ecosystem has witnessed unprecedented growth, accompanied by substantial capital infusion running into several trillion rupees. India has now the third largest start up ecosystem globally with over 157,000 recognised start-ups. India's democratization of access to cutting-edge consumer and business technologies has empowered an entire generation, enabling our youth to pursue their aspirations. This surge is underpinned by significant value creation and the emergence of companies commanding global leadership in technology and market valuations, creating a robust foundation for the realisation of the dreams of Indian entrepreneurs.

With a rich legacy spanning millennia, a leadership in natural fibres, strengths across the value chain, a strong domestic demand, and an abundant talent pool, India is a natural leader in the textiles sector. With nearly 5,000 startups in the sector, most of them young, and with an investment of over ₹300 billion in the sector, the start up ecosystem in textiles today stands on the threshold of - what could be, a renaissance. Innovation, fresh perspectives and the spirit of entrepreneurship are driving this growth.

It is in this context that the report, "The Crouching Tiger" is both relevant and contemporary. It attempts to address the critical question of how textile startups can bring about a transformative growth in the sector. Given that Indian startups have carved a name that resonates worldwide, how can we forge a path forward where the traditional strengths of the textile sector can be aligned with innovative startup dynamics to foster a mutually beneficial growth environment?

I am confident that this report prepared by The Centre for Research on Startups and Risk Financing (CREST), an Institute of Eminence-Research Centre at IIT Madras, India's top ranked university, will illuminate the path to a future where the vibrant threads of tradition and innovation intertwine to weave a tapestry of entrepreneurial success that is uniquely Indian.

**Rohit Kansal, IAS**
Additional Secretary
Ministry of textiles
Government of India

# Executive Summary

## The Indian Textiles Sector is significant in scope and future potential, despite constraints

- **Significant in scope:** The Indian textiles sector, deeply ingrained in the country's history and culture, plays a key role in the economy. It employs about 45 million people directly, contributes 2.3 percent to GDP, represents 13 percent of industrial production in India and accounts for 6 percent of global textiles and apparel exports. The sector features a complex value chain that includes numerous stakeholders from cotton farmers to apparel retailers, further enhancing the significance of the sector. Key strengths include abundance of raw materials, availability of labour pool, large and growing domestic market and supporting government policies over the years.

- **Challenges have limited the performance of the sector:** Despite the strengths and structural growth drivers, the sector has seen stagnation in terms of production and exports. Key challenges include fragmented value chains and stiff competition from countries like Bangladesh and Vietnam.

- **Promising future potential aided by government initiatives:** Government initiatives aimed at capability building, technology modernization and promotion of technical textiles promise potential unlocking of future growth opportunities.

## Indian startups are set to continue with the stellar growth of the past decade

- **Explosive growth of Indian startups:** Driven by investments exceeding ₹6 trillion, India has seen explosive growth in startups, with over 157,000 startups added between 2016 and 2024. Supported by significant government initiatives and a conducive investment climate, the country is now the third largest startup ecosystem globally.

- **Impressive performance across financial and non-financial parameters:** Over a hundred startups across various sectors have achieved the holy grail of becoming 'unicorns', exceeding a billion dollars of market capitalization, and over 50 DPIIT recognised startups have taken the IPO route to unlock value for shareholders. Other than financial success, the 1.6 million direct jobs generated by startups and the over 4,200 startups with published patents demonstrate the startup story beyond financials.

## Startups can be the threads of transformation for the textiles sector

- **Rapid growth in textiles startups in the last decade:** Over 4,800 startups have emerged in the textiles sector. The sector has attracted over ₹330 billion from various angels, VCs, and financial institutions.

- **Healthy mix of debt and equity in the funding mix:** Debt accounting for 40 percent of the capital mix, augurs well for the more mature startups that qualify for debt funding. This is because, access to debt presents a relatively lower cost of financing versus equity and thereby makes the companies more sustainable.

- **Financial value creation is visible:** 6 unicorns (including a decacorn) and 4 IPOs (including startups without DPIIT recognition) promise the financial value creation that energizes the Indian startup ecosystem and attracts entrepreneurs to the sector.

- **Promising value added outside of financials:** The promise of textile startups beyond financials is visible on several fronts. 79 startups with published patents, over half of the DPIIT recognised textile startups with at least a woman founder, 20 percent of textile founders coming from tier 2 cities and the 38,800 direct jobs generated by textiles in the last decade are evidence of all round value addition.

- **Government Role and Future Outlook:** Textiles startups can benefit from several government schemes, some of which are uniquely focused on the textiles sector or startups.

- **Inspirations abound, for textile startups:** India's metamorphosis into a top exporter of PPE equipment at the height of the COVID-19 pandemic is a shining light for textile startups to take inspiration from. And there are success stories to be understood from some of the awarded textile startups in India!

Convergence of traditional practices with innovative startup dynamics may well position India as a global leader in textiles, driven by agile entrepreneurs and enabled by the government policy framework.

More details on the start-ups, investors, enablers, and other key stakeholders of the Indian start-up ecosystem can be found from the online dashboard on textiles start-ups: https://www.ynos.in/vibgyor/

# 1. The Indian Textiles Sector

*Despite challenges and constraints, the sector is significant in scope and future potential.*

*"We have resolved to transform Bharat into a 'Viksit Rashtra' in the next 25 years. Four important pillars of Viksit Bharat are poor, youth, farmers and women. And notably, the textile sector of Bharat is connected with all these pillars."*

*– Hon. Prime Minister of India, Shri. Narendra Modi*[1]

## 1.1. The Textiles sector has been historically significant for India

Cotton is recorded to have been used in India from the times of the Indus Valley Civilization. Silk has been a special fabric material for several centuries. Then, in the colonial period, the British utilized India as their textile factory to serve European markets. Post independence, we have seen the rise of manmade fibres leading up to uniquely designed performance fabrics of late in fields such as sports and medicine.

Hence, it is no surprise that textiles sector has been historically significant for the Indian nation and culture, with several prominent labels in the global market. From Kanjeevaram and Sambalpuri sarees to Pashmina shawls and Bandhani prints, Indian textiles have been well known globally.

[1] As part of his address at Bharat Tex 2024.

## 1.2. It continues to remain significant as of 2025

The Textiles sector is significant for the country across several key parameters such as, employment, exports, contribution to GDP and so on.

In addition, the sector has a significant impact on the upstream sectors such as agriculture (linked to cotton usage) and petrochemicals (linked to polyester consumption) as well as some downstream sectors (such as apparel retail and e-commerce).

**Figure 1.1: Significance of the Indian Textiles sector**


Source: Ministry of Textiles Annual Report 2023-24, ciiblog.in

Beyond the quantitative indicators in Figure 1.1, there are qualitative factors that depend significantly on the textiles sector.

- Textiles sector is a significant employer of women in India, more so in the relatively backward areas of the country. Hence, the sector has significant socio-economic and lifestyle impact.
- Several segments of the textiles value chain do not entail substantial capital expenses in terms of large production plants or equipment. They enable entrepreneurship and employment in relatively underdeveloped areas in the country.
- Fashion and culture are intertwined with the textiles sector driving economic activity in areas such as apparel retail, advertising, e-commerce, transportation, and logistics as well as the overall cultural evolution in the country.

## 1.3. The Textiles value chain involves multiple stakeholders

Raw materials for textiles come from varied sources such as agricultural produce, sericulture, animals, and in the last century, from petrochemicals.

In addition to the raw materials, as with other manufacturing sectors, textiles involve other inputs such as land, energy (including fuels as well as electric power), human resources, access to finance (both debt and equity) and transportation options.

Being at the intersection of multiple other industries adds to the complexities faced by textile manufacturers. This is particularly difficult for small and medium sized players in the industry, which dot the overall textiles landscape in India.

**Figure 1.2: Value chain interfaces for the Textiles sector**


Source: CREST IITM Analysis

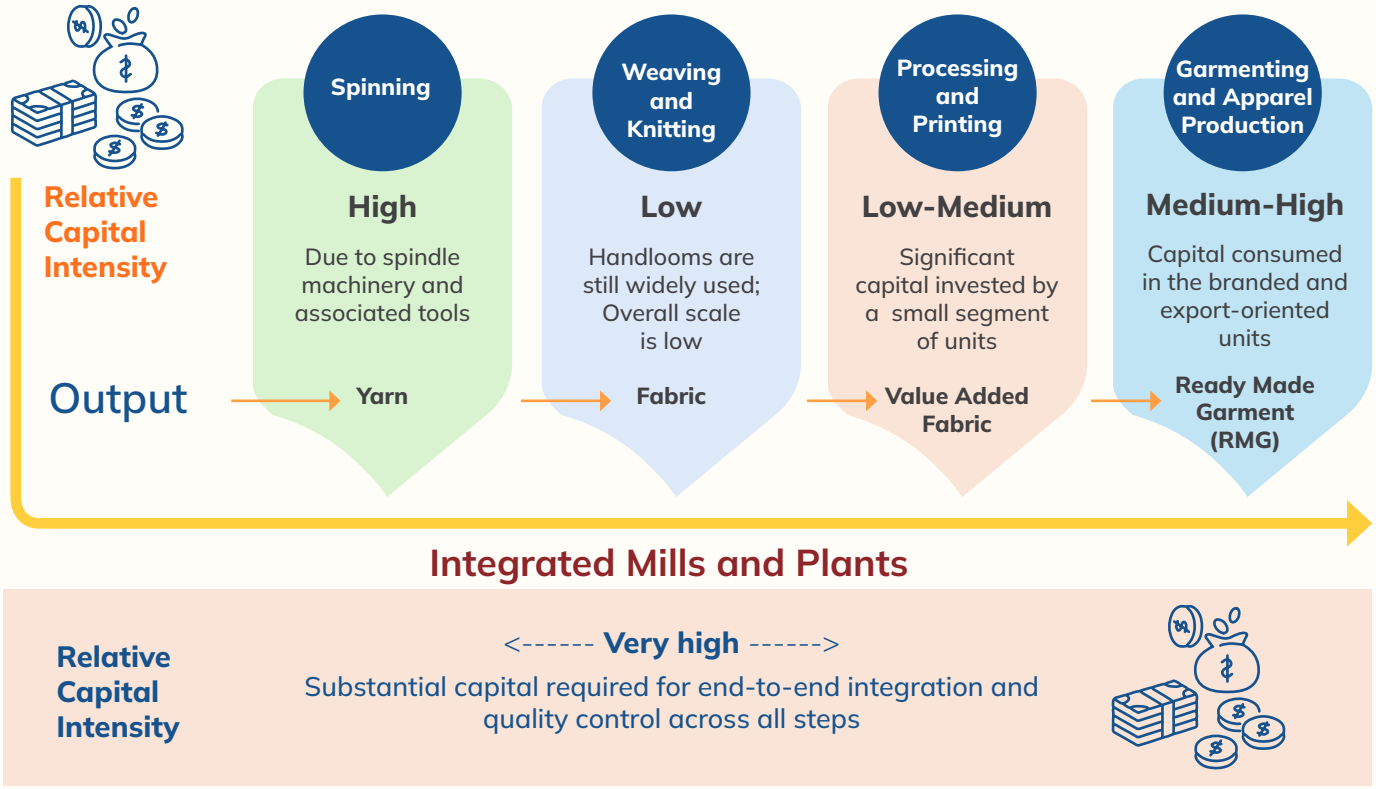
**Figure 1.3: Key textile clusters in India**

| Cluster | Key Strengths |
|---|---|
| Tirupur | Hosiery and knitwear |
| Ludhiana | Woollen textiles |
| Surat | Synthetics and processing |
| Bhiwandi | Power loom weaving |
| Erode | Cotton yarn |
| Varanasi | Silk weaving |
| Pochampally | Handloom sarees |
| Ichalkaranji | Powerloom weaving |
| Kanchipuram | Silk weaving |

Within the textile sector, the value chain involves several steps -from ginning the (natural fibre) raw material to spinning them into yarns and then subsequently weaving the yarn into fabrics that can finally be stitched into garments for ready use. This value chain leads to several intermediate goods that are themselves traded significantly. As a result, the value chain is often geographically concentrated in clusters in India, based on factors, such as, the availability of relevant raw material, physical markets to buy and sell relevant items, location of large customers, and the availability of service providers and talent pool.

Large companies have set up integrated plants or mills that optimize for the complete set of operations in one large plant. Intermediate products are often not sold separately from such plants. Accordingly, the relative capital intensity varies across the key value chain stages in the Textiles sector.

**Figure 1.4: Key value chain stages for the textiles sector**




Source: CREST IITM Analysis

## Cotton, the staple fibre in India

Cotton accounts for about 60 percent of the raw material consumption basket in India. This is different from the global basket that is weighted towards manmade fibres. As per the Ministry of Textiles[2], globally, manmade fibres account for approximately 75% of the total fibre market. The key factor for cotton in India is that cotton is a cash crop for the Indian farmer and as a result, benefits from favourable government policies and taxation relative to other raw materials.

In addition, the climatic patterns in the country support the usage of cotton garments versus those made from polyester, even if the latter has been more attractively priced.

India, therefore, occupies the top position globally in terms of the area under cotton cultivation, accounting for over 40 percent of the world area under cotton cultivation. This is enabled by 6 million cotton farmers.

In Figure 1.5 indicators for the other raw material segments are provided.

**Figure 1.5: Key indicators for textile segments**

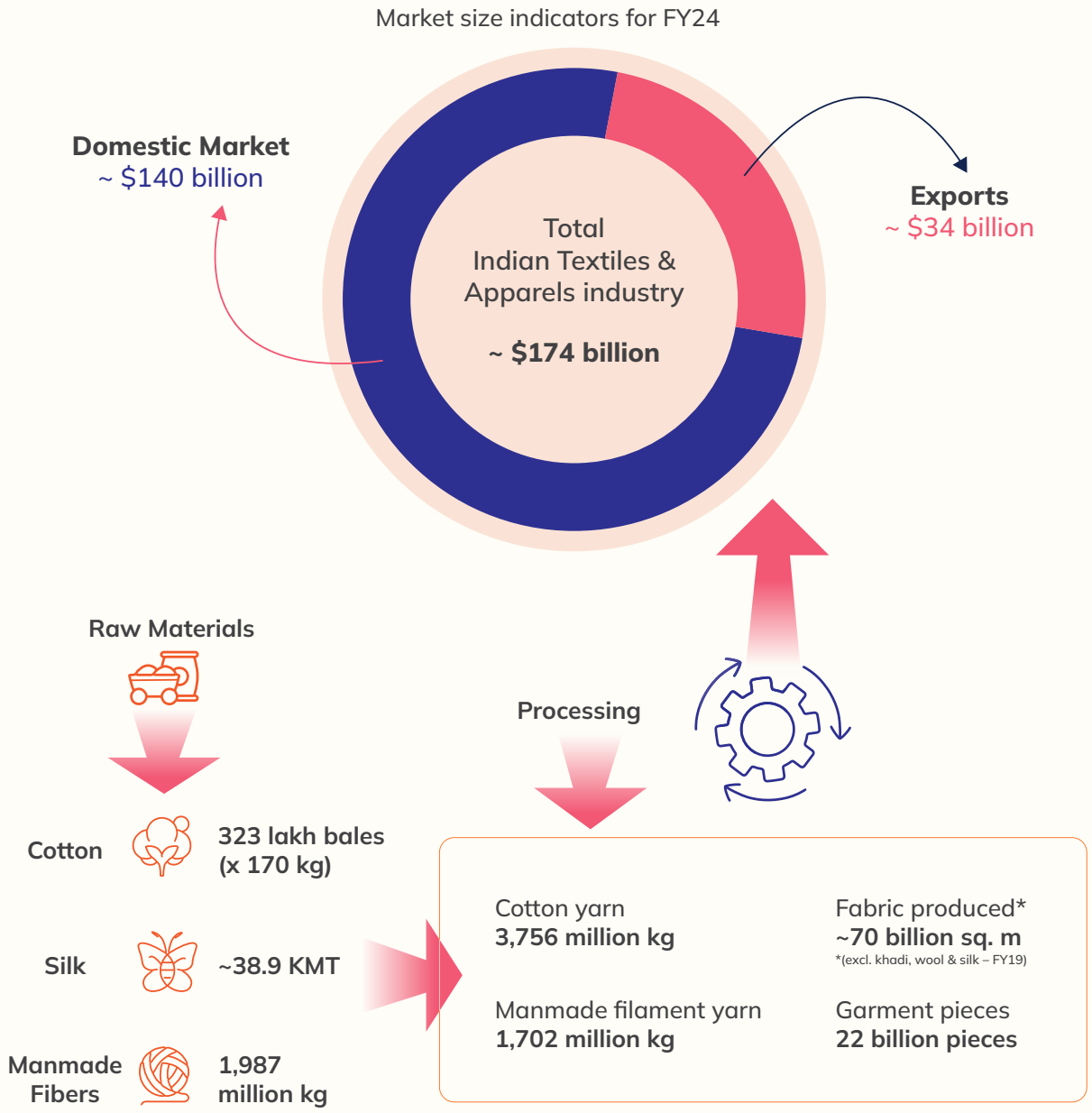
| Segment | Indicator | Remark |
|---|---|---|
| Jute | 111 | Mills in India |
| | 400,000 | Direct employment |
| | 4 million | Farm Families Supported |
| | 70-80% | Share of West Bengal state in the number of jute mills |
| Silk | 2 | India's rank in silk production |
| | ~39,000 | Metric tonnes of silk produced in India |
| Manmade Fibre (MMF) | $8.2 billion | Export of MMF textiles and apparel in FY 2024 |

Source: Ministry of Textiles

[2] https://ministryoftextiles.gov.in/sites/default/files/Indian%20Manmade%20fibre%20textile%20industry.pdf

## 1.4. Key indicators of the Indian Textiles sector

**Figure1.6: Market size indicators for the Textiles sector**



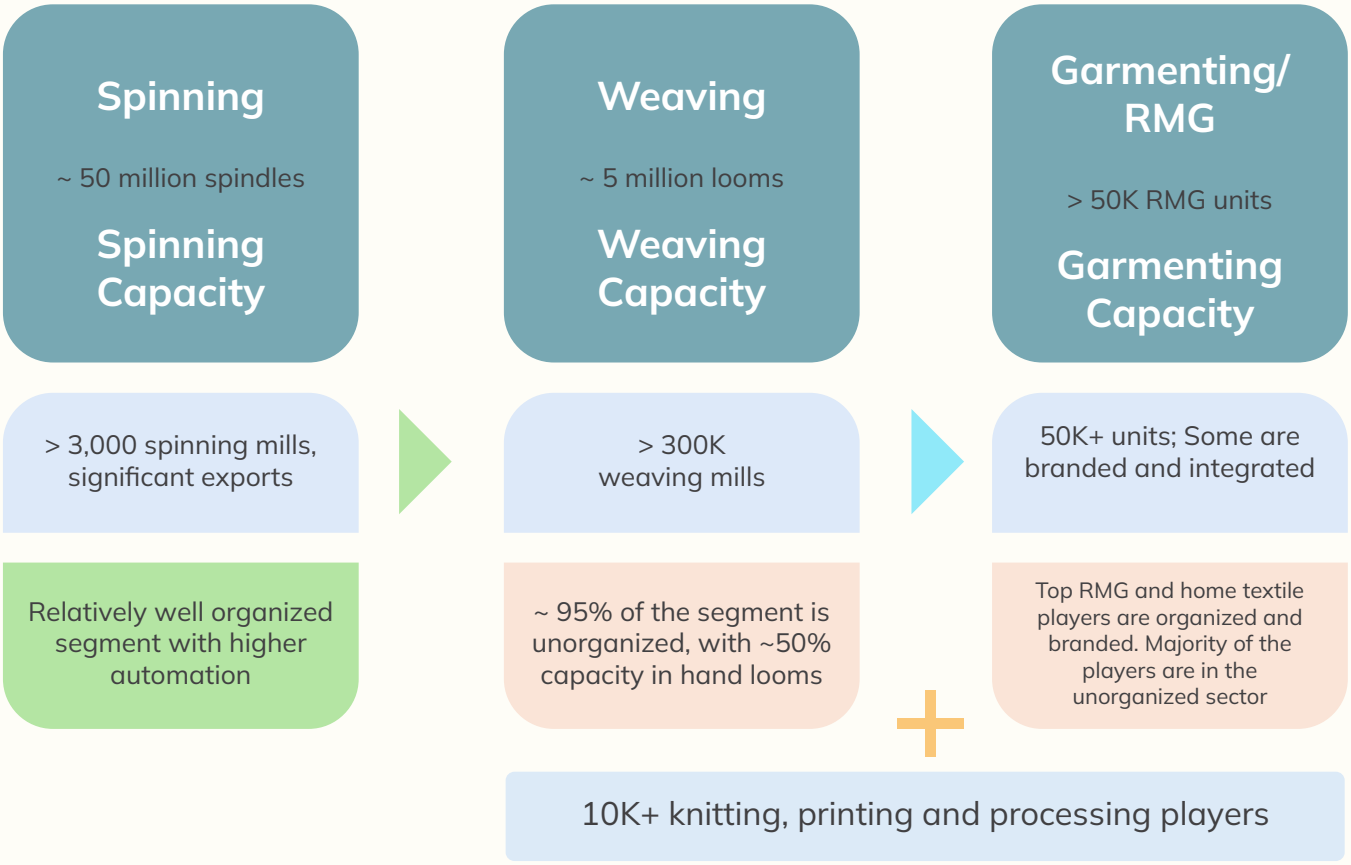

Source: Ministry of Textiles, InvestIndia, Office of the Textile Commissioner

The output from the Indian Textiles and Apparels (T&A) sector is estimated at ~ $174 billion[3] as of FY2024. About 20 percent of the production was exported in FY2024, largely driven by cotton textiles, cotton yarn and manmade fibres.

India is one of the largest producers and consumers of raw materials (cotton, silk and manmade fibres) and textile products globally. This is supported by access to raw materials as well as a large consuming population.

[3] https://www.investindia.gov.in/sector/textiles-apparel

**Figure 1.7: Key indicators for the Textiles value chain stages**




Source: Indiantextilejournal.com, Yarnbazaar.com

The production of textiles and apparels in India is supported by a large and fragmented base of manufacturers across the textiles value chain. The weaving segment has the largest set of mills operating in India including a geographically spread-out base of handloom-based mills.

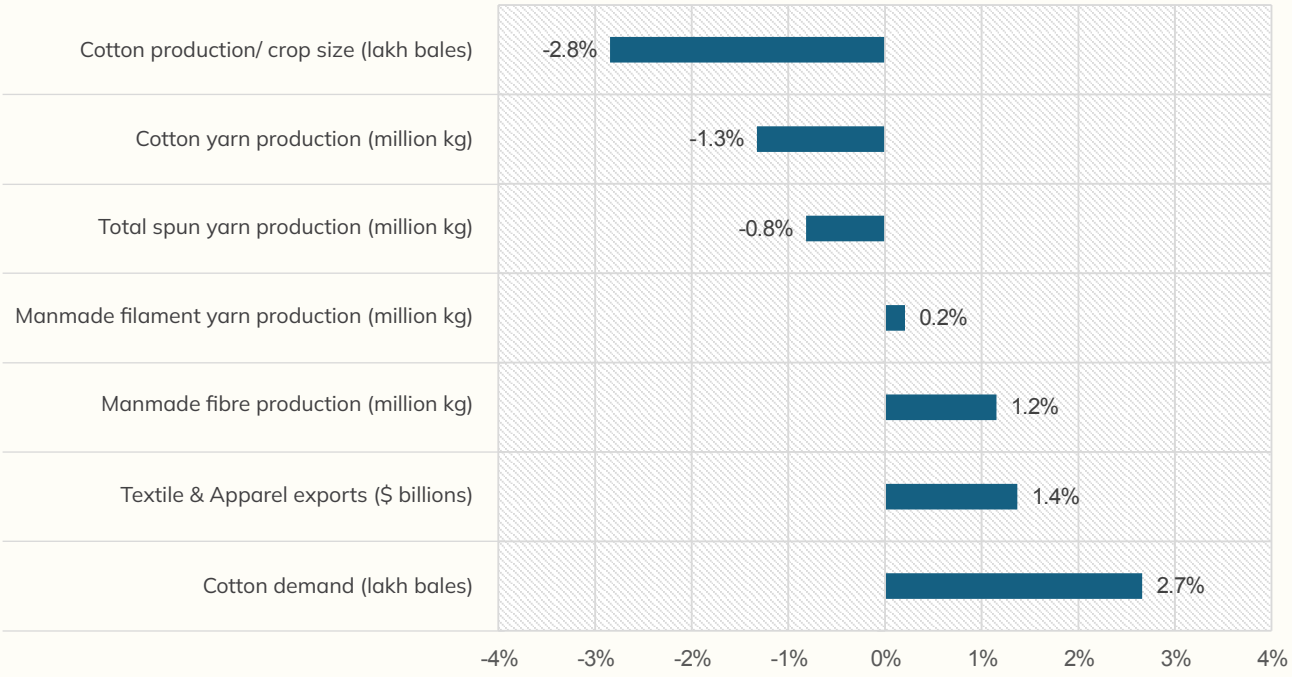
As a result, weaving is relatively the least organized segment in the value chain. Spinning and readymade garments (RMG), including home textiles are relatively better organized. This is due to the need for higher capital levels needed for spinning technology and marketing strength needed for garment and home textile brands.

Beyond spinning, weaving and RMG, the sector includes value chain partners that provide services such as printing, processing, texturizing and knitting.

## Stagnation in the sector

Despite the relative significance of the sector in India, key indicators from the domestic and global markets point to relative stagnation in the sector due to several factors.

**Figure 1.8: Key growth indicators for the Textiles sector**




Source: IndiaInvest, Ministry of Textiles, Office of the Textile Commissioner

For one, cotton production is significantly based on rains in India and thereby, presents challenges in ensuring consistently growing raw material availability.

In addition, increased competition from Bangladesh and Vietnam impacted growth in exports of Indian textiles[4].

Over the longer term, India has not been able to build on its strengths in the sector and expand its global market share. Key challenges for the sector has been outlined in Section 1.6.

## Aggressive growth plans for the future

Despite challenges encountered in the past, the government is keen on expanding the potential of the sector in the coming years. The government is looking at 10-15 percent CAGR growth till 2030 for the overall textiles sector.

- Production targeted to grow from $174 billion in FY24 to $250 billion by FY30
- Exports to nearly triple from $34 billion in FY24 to $100 billion, in the same period
- Share of textiles in GDP to double from 2.3 percent to almost 5 percent
- Technical textiles to see rapid growth at about 15 percent CAGR during the period

Given the inherent strengths of India, it may be feasible to achieve the targets with a coherent approach across the key stakeholders involved including government bodies, regulators, equity investors, lenders and third party intermediaries in addition to the private sector owners and managers of textile companies.

[4] https://www.thehindubusinessline.com/economy/indias-garment-exports-lags-trail-behind-china-eu-bangladesh-and-vietnam-gtri-report/article67888406.ece https://www.business-standard.com/article/companies/bangladesh-vietnam-seen-as-competitors-in-textile-and-garment-trade-122101701349_1.html

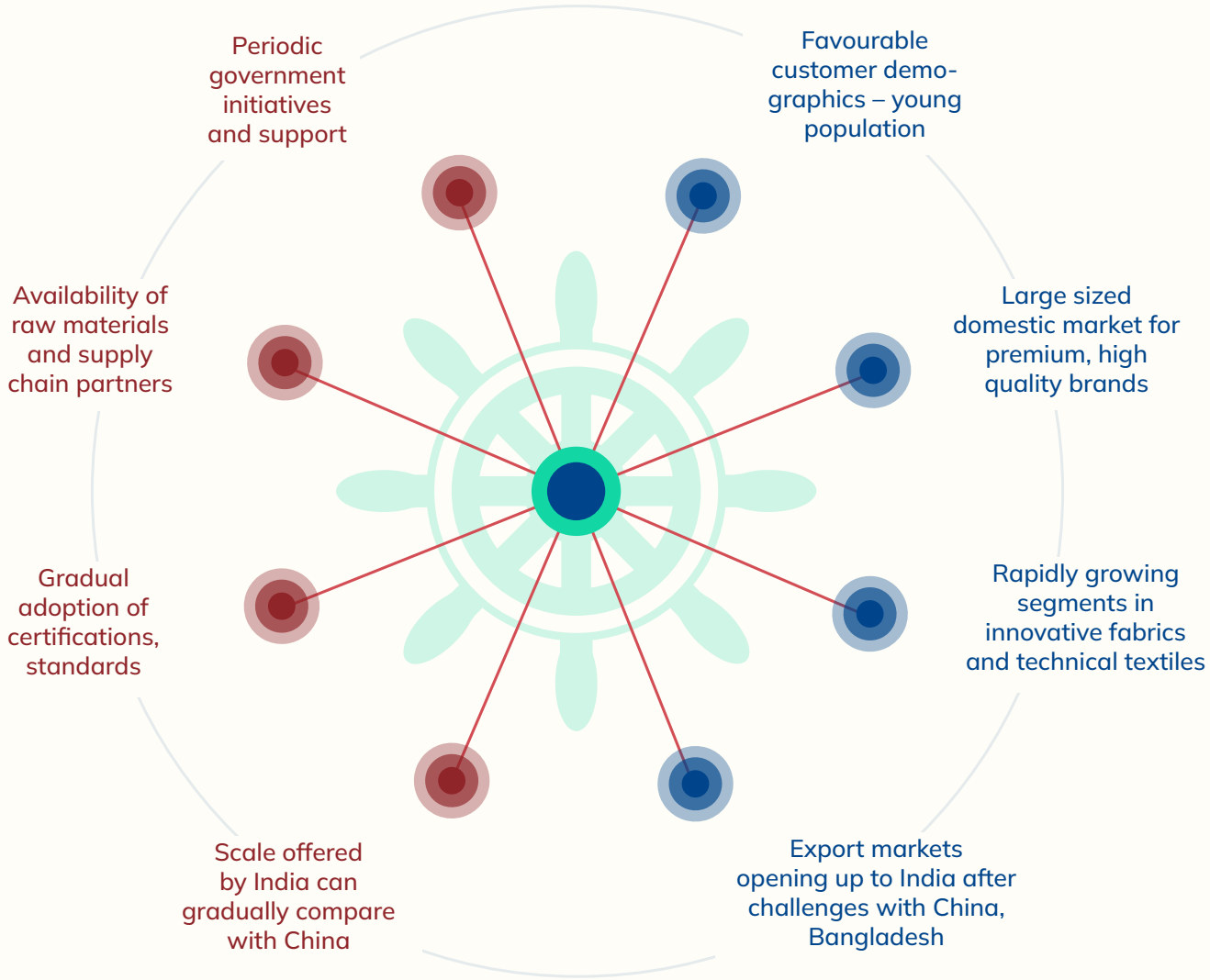
## 1.5. Key drivers for the sector

The promise of the textiles sector in India has been enabled by a combination of demand side and supply side factors. By and far, the promise of a thriving sector remains valid till date.

Demand side factors include drivers of demand from the domestic as well as the international market, in addition to substantial scope for and increased traction seen in the innovative, premium ends of the markets.

Supply side drivers include the starting point of raw material availability and an active network of supply chain partners, augmented by periodic government initiatives and capacity building across the value chain as the long term prospect of becoming a significant rival to China remains in focus.

**Figure 1.9: Growth drivers for the Textiles sector**




Source: CREST IITM Analysis

## 1.6. Key challenges for the sector

Despite several factors that enhance the potential for the Indian textiles sector, the sector faces key challenges, particularly with respect to the less commoditized and profitable segments of the market.

As a result, India has not yet been able to achieve its full potential in the exports market or offer an economically lucrative domestic market for a significant part of the sector.

**Figure 1.10: Key challenges for the Textiles sector**


Source: CREST IITM Analysis

The challenges faced by the sector are also visible in the share of FDI received by the textiles sector. Despite total FDI received by India exceeding $1 trillion between 2000 to Sept 2024, the cumulative FDI received by Textile sector (including dyed and printed fabrics) has been about $4-5 billion in the same period.

Despite 100 percent FDI (automatic route) being allowed in the sector, the sector has received just about 0.5 percent of the total FDI received, much lower than the share of economy or exports. This highlights the limited impact of investments from international players, which has transformed other sectors in India.

## 1.7. Government initiatives position the sector for future growth

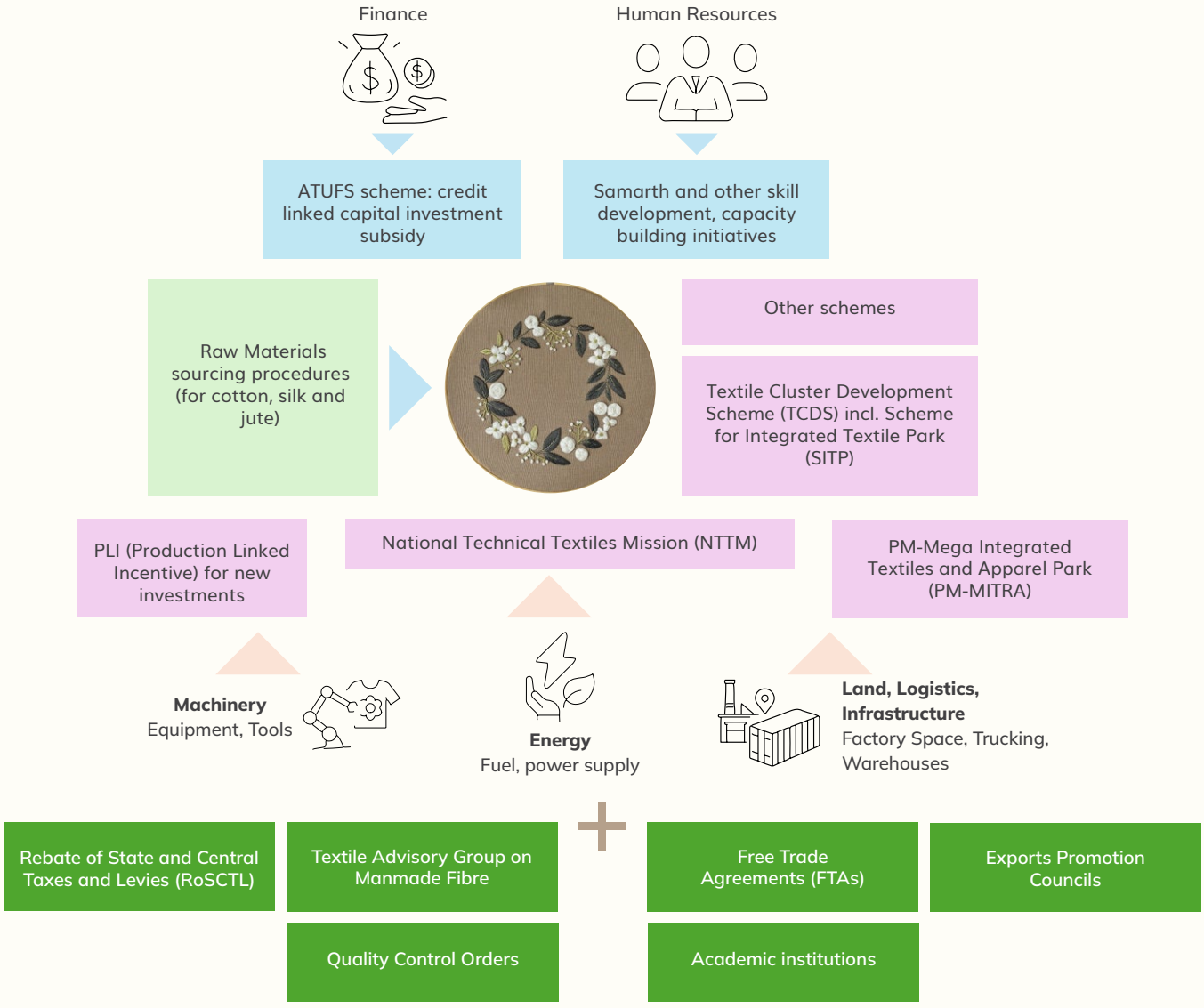
Given the importance of the sector, historically, governments have often supported through budgetary allocations to the sector via various schemes and initiatives. Over the years, the schemes have been continually refined and improved upon to enhance the sector's competitiveness and growth potential.

The extant government schemes try to target specific areas of support for the sector in order to alleviate the pain points of the industry while optimizing the overall budgetary resources.

With technology upgradation and new project investments being key to the sector's growth, government schemes have aimed to incentivize new capacity creation in addition to offering credit linked capital subsidy for the qualifying projects.

Beyond new projects and technology upgradation, there are initiatives to address a key concern for small companies – access to land and infrastructure for textile units. In addition, there are initiatives directed at capacity building and skilling of the workforce, which are obligatory for Indian textile units to move up the value chain in the global export markets.

**Figure 1.11: Broad areas of government support in the Textiles value chain**



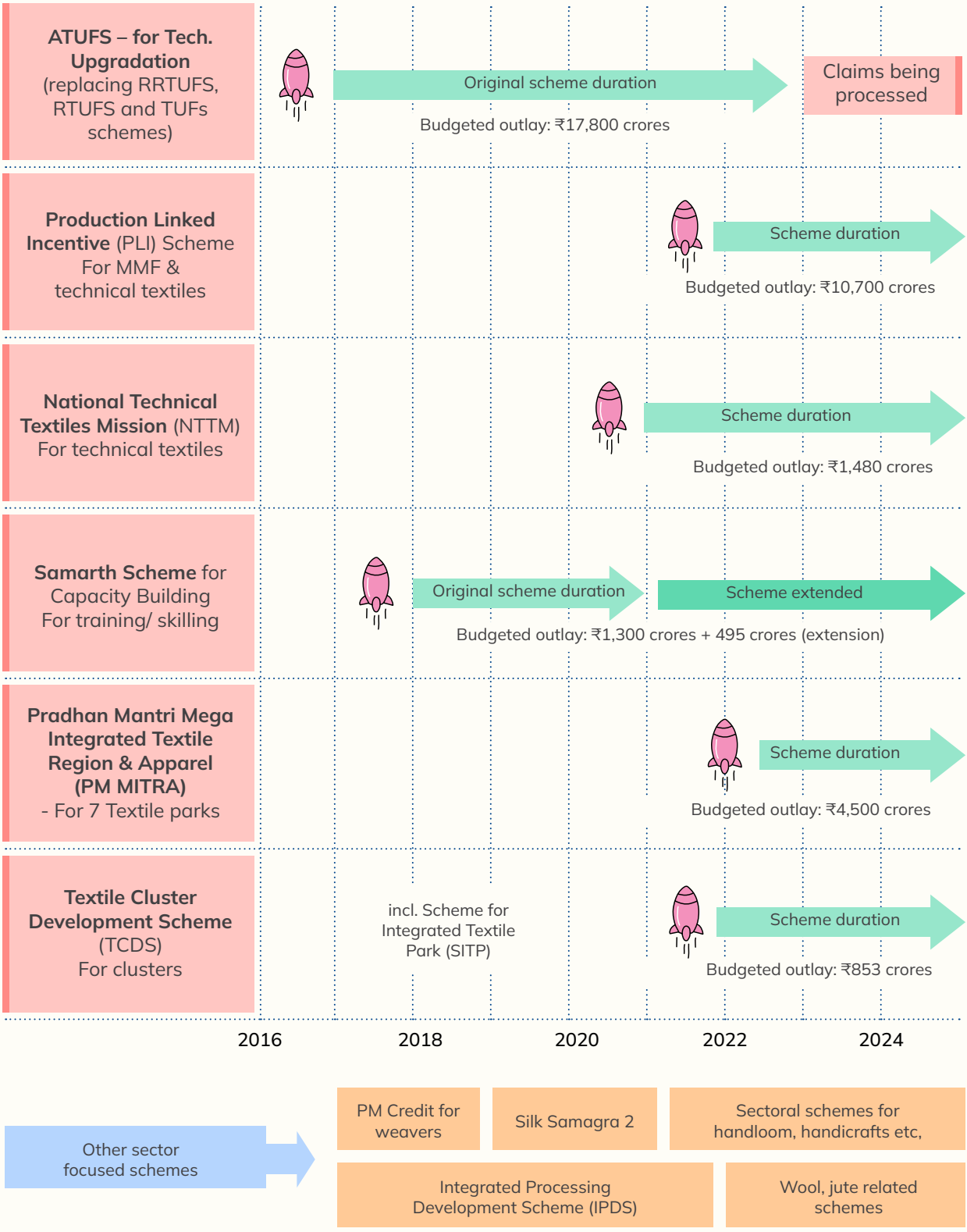

Source: CREST IITM Analysis, Ministry of Textiles

These schemes complement other ongoing efforts of the government in opening up new export markets, establishing technical standards and linkages with academic institutions, enabling export market readiness for companies and support in rebates on taxes and levies.

## Key government schemes of relevance in the recent years

To support the aggressive export growth plans for the future, the government has put in place a framework of initiatives in recent years covering key aspects of the textiles value chain.

**Figure 1.12: Recent schemes of the government for the sector**




Source: Ministry of Textiles, CREST IITM Analysis

## 1.8. Trends in the Indian Textiles sector are aligned to innovation

In the recent years, there are several trends that have emerged in the Indian textile sector cutting across key business areas and market opportunities. Many of the trends are favourably aligned to the emergence and adoption of innovation in products as well as business processes or approaches.

**Figure 1.13: Key trends in the Indian Textiles sector**

### Sustainable textiles: To minimize environmental impact of textiles

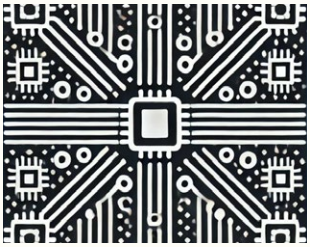
**Sustainable materials for fibres and fabrics**

Eco-friendly and bio degradable materials involving organic, natural dyed and recycled materials

**Circular economy**

Recycle and upcycle apparel items in order to extend the overall lifecycle. This can include sustainability focused business processes as well.

### Smart textiles & 3D printing: For improved functionality, aesthetics and rapid customization



**Smart and novel textiles**

Textiles containing sensors or wearable technology or being made of novel materials such as conducting or nano materials provide unique benefits.

**3D printing**

Can reduce wastage in materials while providing rapid prototyping, even of complex designs. Permits low cost mass customization.

### Technical textiles: For varied applications involving technically engineered materials

**Growing set of applications across industries**

Products designed specifically for individual use cases and gaining adoption globally.

**Higher engineering value addition and pricing**

Higher level of engineering design and value addition relative to traditional textiles, leading to better realizations

### Technology enhancement: To utilize textile specific as well as larger tech themes

**Advanced textile machinery and technologies**

Auto power looms, advanced Jacquard machinery, VisioNxt (for fashion trends) and Virtual fitting rooms have emerged.

**AI, IOT, Big data, VR/AR and e-commerce**

The more established players have adopted broader tech themes from the larger economy to the textile business

Source: Multiple online industry portals, CREST IITM Analysis

The key trends in Figure 1.13 augur well for the transformation of the textiles sector into a more profitable, innovation-led sector. There is clearly a significant role for nimble and technology savvy startups to emerge and thrive once they achieve a cost-effective product market fit.

## 1.9. Spotlight: Technical Textiles, a promising driver for the future

Among all components of the textiles sector in India, one of the most promising opportunities is Technical Textiles.

**What are Technical Textiles?**
They are defined as "high-performance textile products, materials, and fibres that are used for their functional use rather than for aesthetic purposes" The main differentiation is the engineering and technology quotient of these products that is higher than the traditional textile products.

They have applications across several segments such as packaging, automotive (mobility), industrial, sports, agriculture, and so on.

**Why are they important for Indian textiles?**
They are important for companies to move up the textile value chain. Given their relatively recent origin, the gap with competition is more addressable. Further, they present scope to add value from an engineering standpoint, which augurs well for the educated workforce available in India. Lastly, they are new product categories that offer high growth rates and potentially, newer markets for Indian companies.

**Categories of Technical Textiles**
Based on the application areas, Technical Textiles have been classified by the Ministry of Textiles into 12 key categories.

**Figure 1.14: Key categories of Technical Textiles**

| Packtech | Indutech | Mobiltech |
|---|---|---|
| . Designed for packaging that offer protection & durability<br>. E.g. FIBC Jumbo bags, woven sacks, shopping bags | . Textiles used for industrial purposes, such as filtration and mechanical reinforcement<br>. E.g. Varied industrials | . To provide comfort, functionality, safety in automotive, aerospace<br>. E.g. Air bags, seat belts, tire cords |
| **Clothtech** | **Meditech** | **Hometech** |
| . Used in clothing for functional components like insulation and support<br>. E.g. Hooks, labels, laces | . Medical applications, offering sterility and patient comfort<br>. E.g. Diapers, ear buds | . Home furnishings thanks to flame retardance and antimicrobial properties<br>. E.g. Blinds, mosquito nets |
| **Agrotech** | **Protech** | **Geotech** |
| . Agri applications due to enhance crop protection and soil quality<br>. E.g. Bird nets, crop covers | . Textiles to protect against environmental, industrial hazards<br>. E.g. Bullet proof, fire retardant, high-altitude clothing | . Geotechnical uses for soil stabilization & erosion control<br>. E.g. Geonets, geo-composites |
| **Sportech** | **Buildtech** | **Oekotech, fibres & composites** |
| . Performance enhancement and protection for sports and outdoors<br>. E.g. High performance swimwear | . Construction textiles used in buildings and similar<br>. E.g. Tarpaulin, scaffolding nets | . Used for waste containment and environment protection<br>. E.g. Drainage nets, land fill solutions |

Source: CREST IITM Analysis

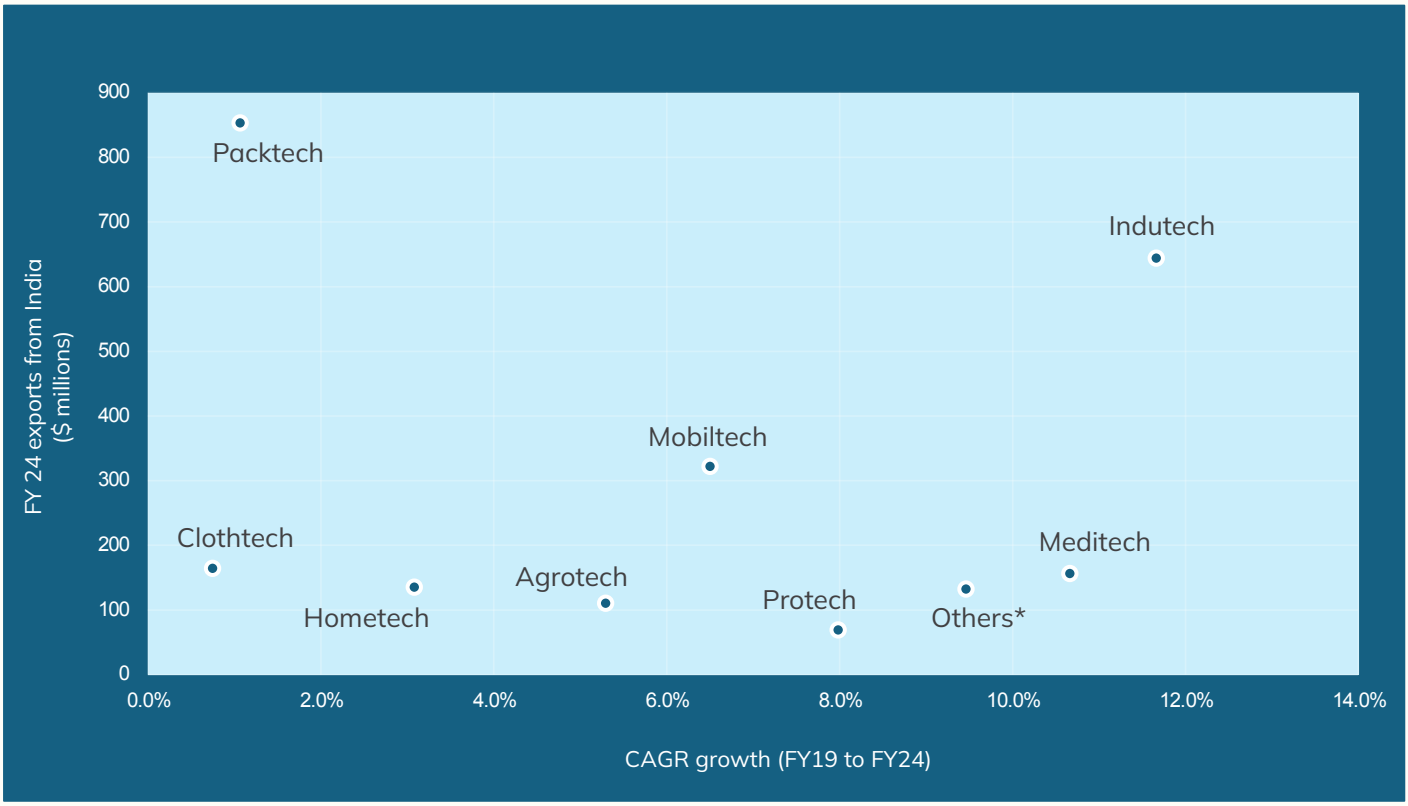
## Market size indicators for Technical Textiles

As per estimates available from the Ministry of Textiles, as of FY2022, the market for technical textiles in India was estimated at $22.5 billion[5]. This is about 8-10 percent of the global market that was estimated at $272 billion in 2021. While the global market has reached a 30-70 percent penetration level, the level of penetration for the Indian market has been only 10-12 percent[6]. This implies the potential for the market in India to grow faster than the global market in the future.

The estimated exports from India for FY2024 was ~$2.5-2.6 billion, that accounted for less than 5 percent of the global market. This presents an opportunity for Indian exporters to target specific segments of the global market and revive the growth prospects of the sector.

Of the categories of Technical Textiles, Packtech and Indutech have been the most dominant segments for Indian exports as of FY 2024.

**Figure 1.15: Category wise exports of Technical Textiles**




Source: NTTM Compendium (Jan 2025), CREST IITM Analysis

[5] *"Technical Textiles Ecosystem in India" – Ministry of Textiles*

[6] *"Technical Textiles Ecosystem in India" – Ministry of Textiles*

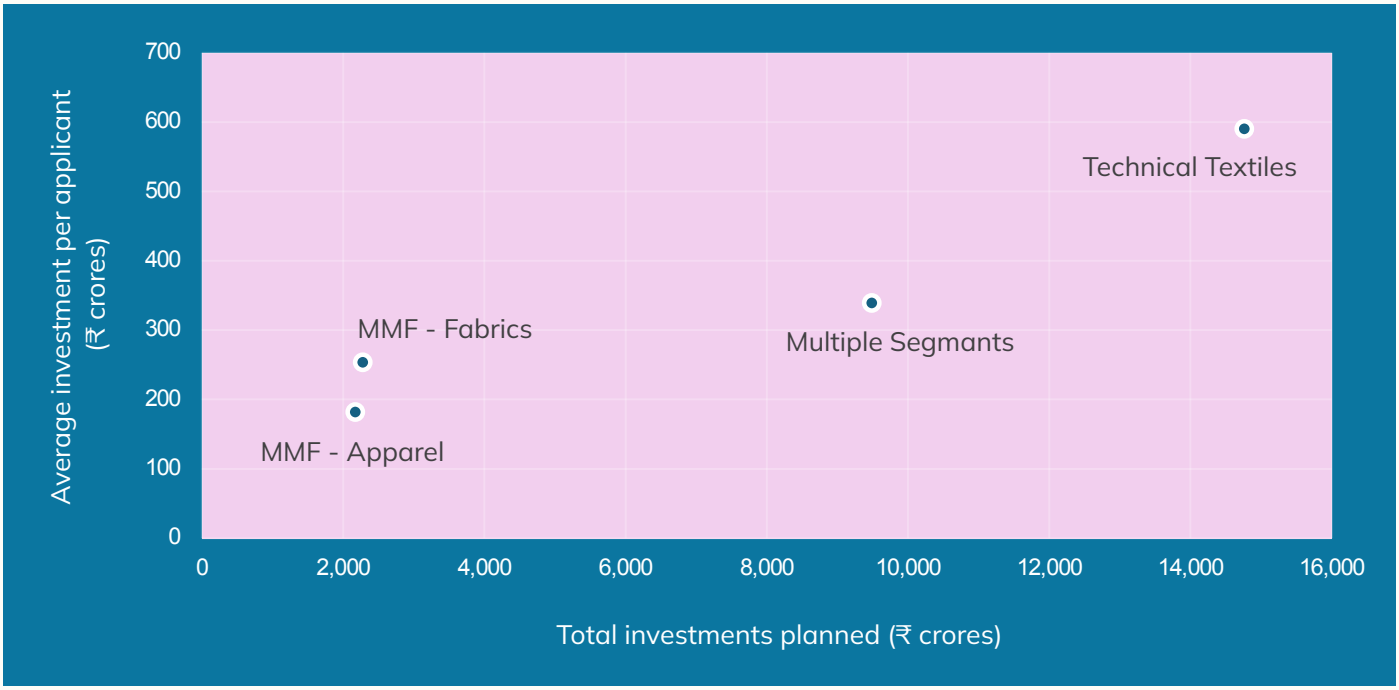
## Government initiatives

Technical textiles are a key focus of government initiatives in the larger textiles sector.

In 2020, National Technical Textiles Mission (NTTM) was launched with a total outlay of ₹1,480 crores, covering the entire spectrum of the sector: R&D, market development, export promotion and skilling.

Given the promise of the sector and the support from NTTM, the private sector has taken interest in the segment. Analysis of applications received for the Productivity Linked Incentive[7] (PLI) scheme in textiles shows technical textiles accounting for over 50 per-cent of the planned investments under PLI in Textiles at about ₹14,800 crores. The average investment per application is also much higher than the rest of the segments at about ₹590 crores.

**Figure 1.16: Segment wise analysis for PLI in Textiles**




Source: PLI portal within the Ministry of Textiles (Jan 2025), CREST IITM Analysis

## 1.10. Summary

The Indian Textiles Sector, deeply embedded in the nation's history and culture, plays a pivotal role in the economy, while employing about 45 million people. It accounts for 13 percent of India's industrial production and 6 percent of global textiles and apparel exports. Despite facing challenges like fragmented value chains and stiff competition from countries like Bangladesh and Vietnam, which have caused stagnation in production and exports, modern management practices, new technology, and path breaking innovations promise a glorious dawn. Supported by government initiatives focused on capability building, technology modernization, and the promotion of technical textiles, the sector is poised for future growth, leveraging its abundant raw materials, vast labour pool, and expanding domestic market.

[7] *Schemes launched by the Government of India to attract investments in key sectors in order to boost production, employment and economic growth in future*

# 2. The Indian Startup landscape

*Impressive growth of the past aligns with tremendous future potential*

*"Startups are going to be the backbone of new India. When India completes 100 years of independence, startups will have an important role. Country's innovators are making the country proud globally."*

*– Hon. Prime Minister of India, Shri. Narendra Modi*[8]

## Third largest startup ecosystem globally

From a traditionally strong presence in the global services market, the last decade has seen India turn into one of the most vibrant locations for startups globally.

A confluence of factors has contributed to India becoming the third largest startup ecosystem globally after the USA and China. For one, rapid digitization and cost-effective access to electronics has democratized access to technology for much of India across income levels. Benign interest rates globally and availability of capital boosted the early-stage investor ecosystem globally, with several players investing significantly on their Indian operations too.

In this background, the Government of India put together a slew of targeted interventions to unlock the growth potential in startups. Overall, the positive sentiment and the opportunity to solve complex issues, brought to fore the entrepreneurial ambitions of seasoned professionals and youth in the country.

[8] *In Jan 2022, while announcing Jan 16 as the National Startup Day*

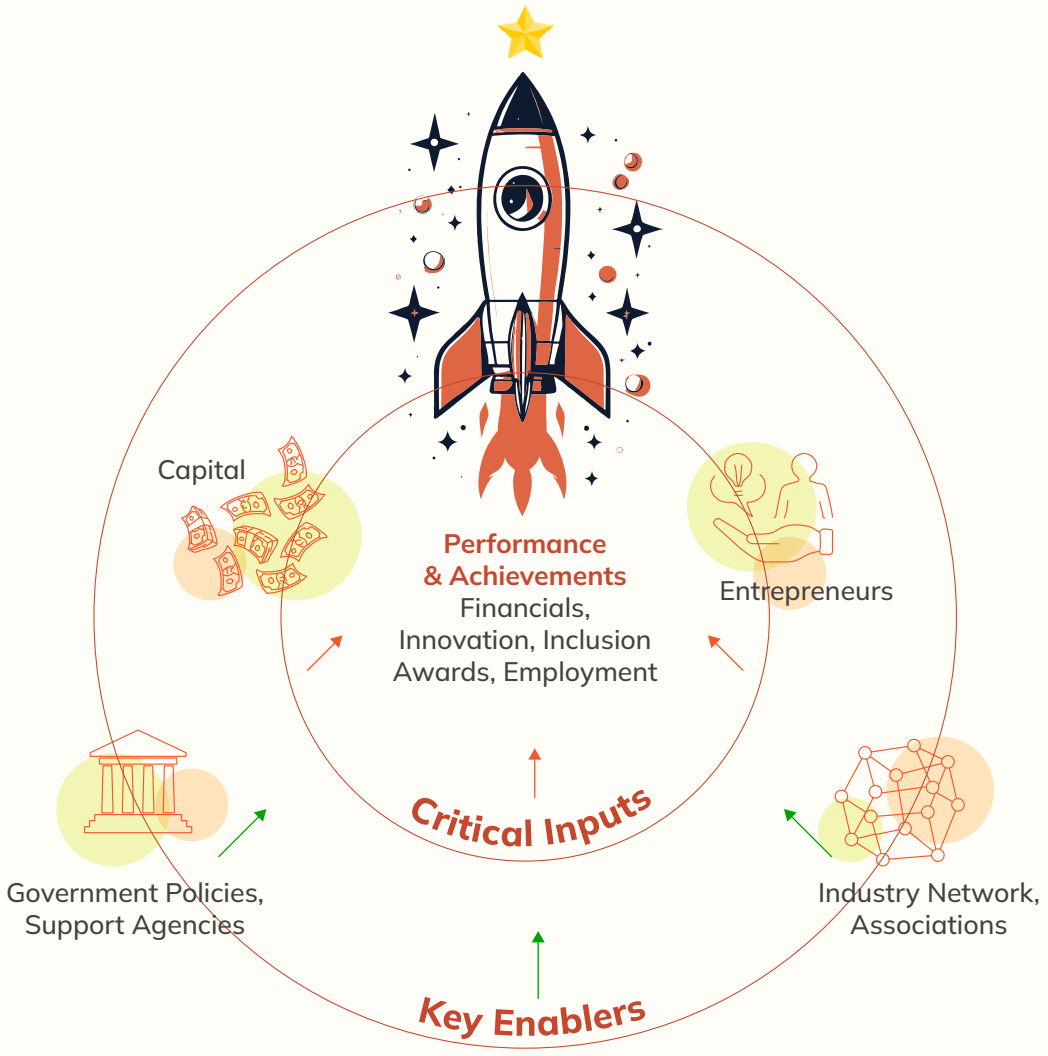
## 2.1. The startup narrative explained: YNOS framework

Based on proprietary datasets of YNOS, it is clear that the growth of startups in India is well balanced across key factors of relevance as indicated in the framework.

Clearly, the startup journey commences with the critical inputs – the entrepreneurs starting out with their own capital (irrespective of the size). Soon enough, the startup starts benefiting from the key enablers – the members of the startup ecosystem, including equity investors, debt financiers and the government.

Equity investors could involve incubation cells, angel networks and venture capital funds. In addition to capital, these entities often enable the startups with non-financial support measures such as networking opportunities, business development leads, capability building and so on.

**Figure 2.1: Inputs and enablers for the Indian startup ecosystem**




Source: YNOS framework, CREST IITM Analysis

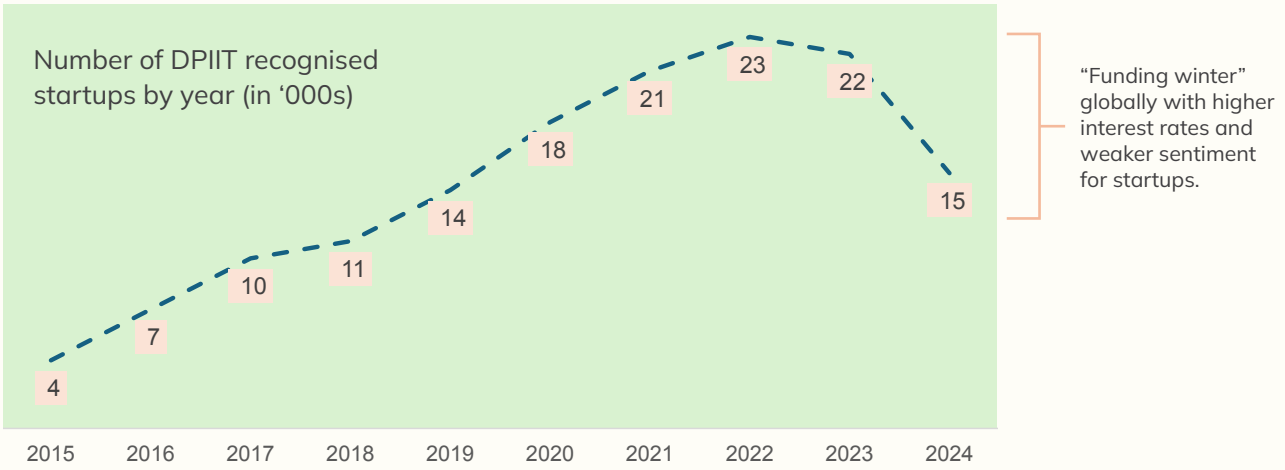
Debt financiers include private sector and public sector banks and NBFCs that typically support larger startups. Finally, the government plays its unique role by offering its mix of financial and non-financial support measures.

Clearly, the critical inputs needed for startups have been supported well by the key enablers for startups. Not surprisingly, the performance has been remarkable across financial and non-financial parameters.

[9] *YNOS, an incubatee start-up of IIT Madras incubation cell is India's largest and most comprehensive start-up and investor platform. It regularly monitors and tracks the components that make the startup ecosystem using various variables, which are regularly updated on the platform. The platform can be accessed at www.ynos.in*

## 2.2. About 1.5 lakh startups added in India between 2016 and 2024

**Figure 2.2: Remarkable growth story for the Indian startup universe in the last decade**




Source: YNOS

From a low base in 2016, the growth in the number of recognized startups has been phenomenal. This has catapulted India into the top 3 global startup ecosystems. Startups have emerged to address pain points across sectors and India has now become a vibrant location for startup activity.

The impressive growth in the startup ecosystem can be seen from the fact that the number of startups registered in 2022 were three times more than the number of startups in 2016. More recently, despite a challenging environment for startups (globally and in India) between 2021 and 2024, 2024 saw over two times of the number of startups registered in 2016. This indicates a structural growth story for Indian startups.

## Over ₹6 trillion of capital have been invested in Indian startups[10]

Availability of capital is one of the most critical inputs for a startup. Total investments in DPIIT recognised startups in India have been over ₹ 6.3 trillion of capital over the years, with ~70 percent of the capital coming via equity. Debt has become increasingly available for the older startups, with about 90 percent of the secured loans being taken up by startups that were established in 2020 or earlier. This has been consistent with expectations, given the higher risk profile of early-stage start-ups.

Government funding has been most relevant in the early stage of startups. This is a justified approach as the government is better placed to focus on the stages that need capital the most (even if at smaller ticket sizes) and let the private sector take over once the startup becomes self-sustaining.

**Figure 2.3: Investment in DPIIT recognised startups (Feb 2025)**


Source: YNOS

[10] https://www.ynos.in/products/insight/ *accessed on February 04, 2025. Startups refer to only DPIIT recognised start-ups.*

## 2.3. Support levers from the government are key enablers

The set of incentives and other support levers from the government has played a key role in enabling the Indian startup universe to reach its present size and significance. Support from the government spans financial as well as non-financial aids.

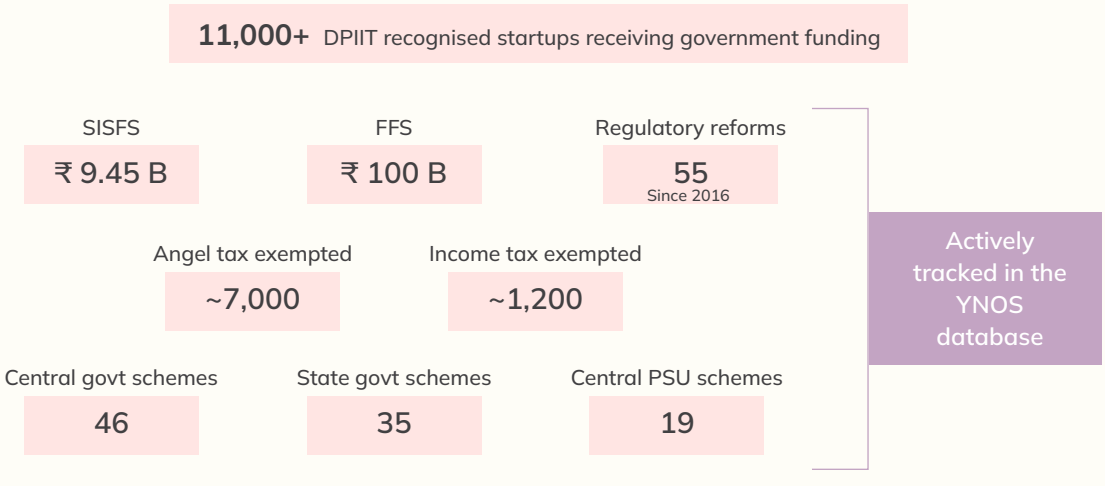
Many of the government schemes and initiatives are tracked actively in the YNOS database and startups benefitting from individual schemes are uniquely monitored.

**Figure 2.4: Summary of government schemes for startups**

| | | |
|---|---|---|
| Startup India Action Plan & way Ahead, Startup India Hub, Showcase, Atal Innovation Mission (AIM) | Startup India Seed Fund Scheme (SISFS), Fund of Funds for Startups (FFS), Credit Guarantee Scheme for Startups (CGSS) | Regulatory Reforms, Self certification, faster exit for startups |
| Exemptions: From Income Tax for 3 years, Section 56(2) | Support for Intellectual Property Protection, Innovation Week, International Patents | International Market Access to Indian Startups |
| National Startup Advisory Council, Awards, Startup Champions | States' Startup Ranking Framework | Startup India Investor Connect Portal, National Mentorship Portal (MAARG) |
| MeitY Start-up Hub (MSH), TIDE 2.0 Scheme | Domain-specific Centres of Excellence | SAMRIDH Scheme, Next Generation Incubation Scheme (NGIS) |

Source: PIB

**Figure 2.5: Snapshot of benefits accruing to startups**




Source: PIB, YNOS

The government schemes have beem aimed at supporting diverse aspects of strategy and operations of startups – from raising funds to compliance with taxation laws to skilling team members to developing patents and innovation for the business.

## 2.4. Financial and non-financial support from the ecosystem have supported rapid growth

Growth in the number of investors underlines the potential and attractiveness of the investment opportunity in Indian start-ups. The simultaneous growth in the number of start-ups and investors has created a virtuous investment cycle. Similarly, on the debt side, startups have received loans from government as well as private financial institutions.

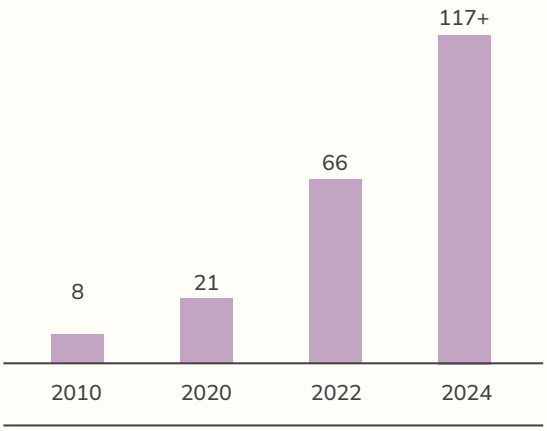
## 2.5. Impressive performance of startups in India

### Valuations have been the most prominent indicator of the Indian startup success story

Financial value has been created by entrepreneurs across sectors and industries in India, over the years. InMobi, a future mobile marketing and advertising platform, was the first in India to achieve unicorn status in 2011, marking a significant early milestone in the evolution of the Indian startup ecosystem. By 2013, Mu Sigma, a big data analytics company, became the tenth unicorn, underscoring the potential of tech-driven Indian startups. By April 2021, Urban Company, a technology platform for at-home services, emerged as the fiftieth unicorn, illustrating the scalability of service-based startups in India. In April 2022, financial innovation from India came to the fore when Open Financial Technologies, a neobanking platform, became the hundredth unicorn, reflecting the growth potential and investor interest in India's fintech sector.

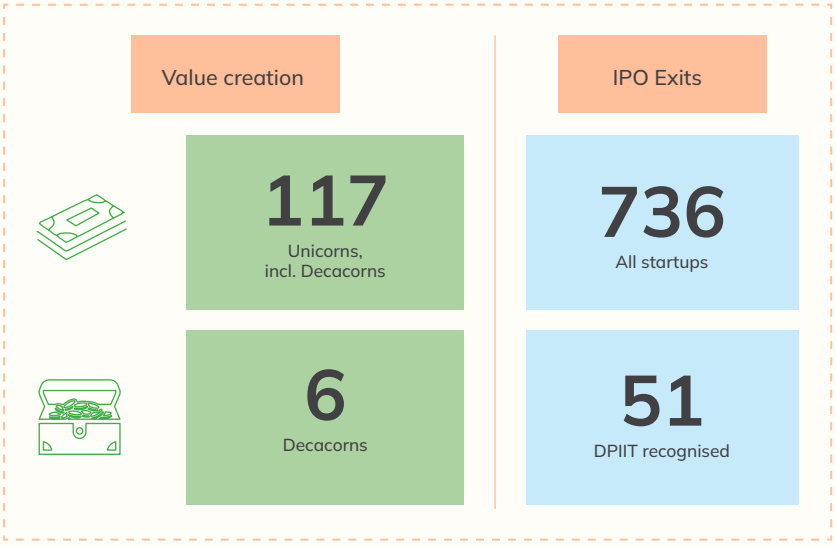
Continuously rising valuations have led to exponential growth in the number of Indian unicorns over the years. That has also led to entrepreneurs and investors exiting the firms (in part or in full) after unlocking value by public listing of the companies via IPOs. Over 700 startups have seen IPO exits in the last decade, more specifically in the recent 3-4 years.

**Figure 2.6: Growth in unicorns among Indian startups**




+ indicates there may be more unicorns created, that may have subsequently lost value

**Figure 2.7: Financial value creation by startups in India**



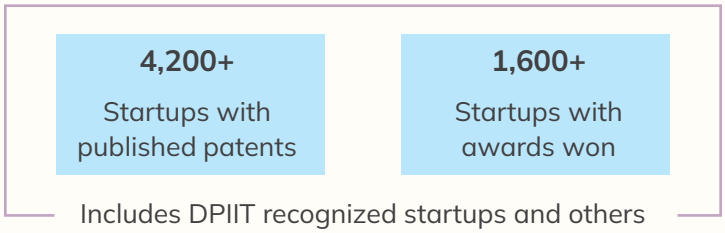

Source: YNOS, news reports, CREST IITM Analysis

## Innovative startups have gained patents, trademarks and awards

Startups have democratized the culture of innovation in even small companies and a key indicator of innovation is the filing of patents. As of Jan 2025, there were 4,200 startups that have published patents. More than one third have published three or more patents, and about 350 startups have published more than 10 patents.

Of the 1,600 startups with awards won, 650+ startups have won awards from government or government-related entities.

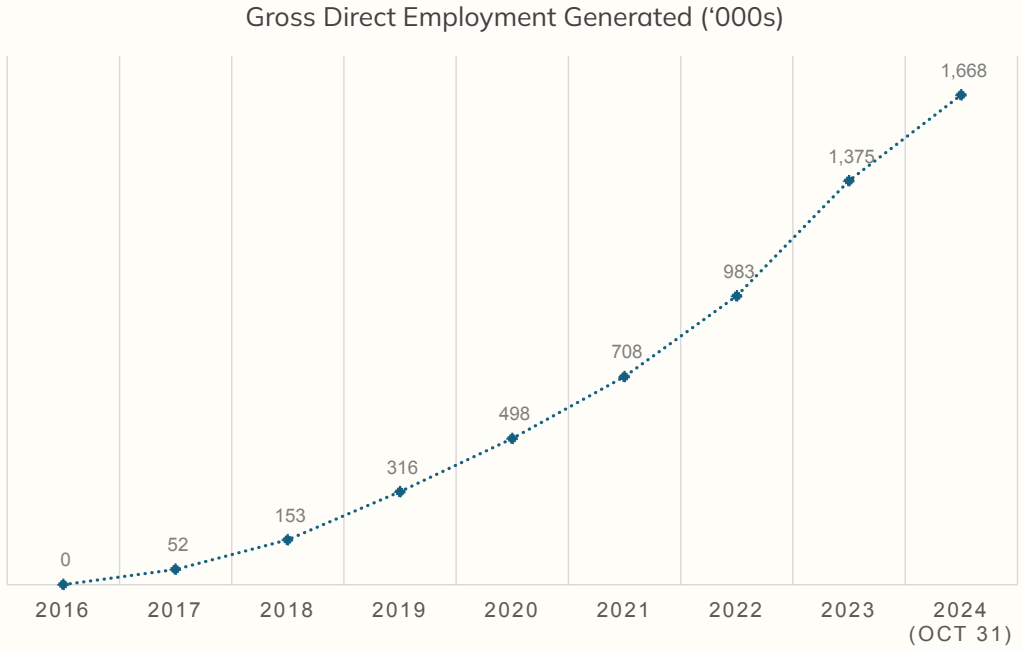
**Figure 2.8: Startups with published patents and awards**




Source: YNOS

## Over 1.6 million direct jobs have been generated by DPIIT recognised startups since 2016

**Figure 2.9: Growth in gross direct employment generated by startups**




Source: PIB

At an average of 10-11 employees per startup, the 150K+ DPIIT recognised startups have created over 1.5 million direct jobs since 2016.

As of October 2024, this number has gone up to 1.66 million direct jobs, reflecting the job generation potential of startups.

## 2.6. Summary

Indian startups have experienced stellar growth over the past decade, driven by over ₹6 trillion in investments, and more than 157K start-ups has made the country the third largest startup ecosystem globally. Financially, over a hundred startups had attained the 'unicorn' status, with more than 50 taking the IPO route. Beyond financial metrics, these startups have created 1.6 million direct jobs and contributed to innovation, with over 4,200 publishing patents, showcasing their broad impact on both the economy and technology landscape. A major characteristic that distinguishes the Indian start-up ecosystem from those of others has been the significant number of ventures created even in non-technology sectors. An encouraging policy environment has supported venture creation across sectors to usher in the needed innovation and growth.

# 3. Startups in the Textiles Sector

Startups can be the threads of transformation that the Textiles sector has needed for several years. Bringing in the right mix of innovation, agility and connection to the grassroots, startups can catalyse the much-needed transformation in the textiles sector. It is not surprising that the government has started focusing on startups while looking to transform the Textiles sector.

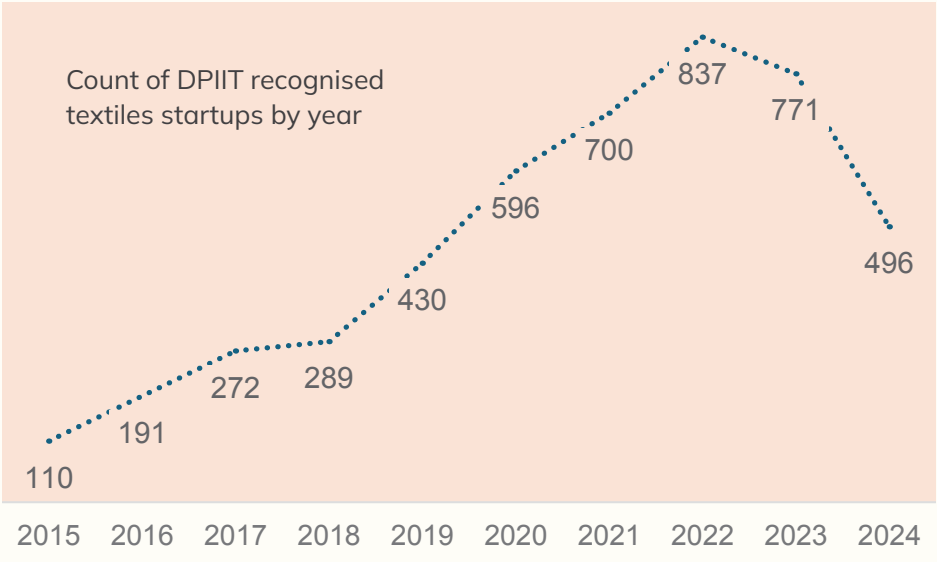
## 3.1. Over 4,800 startups operate in the Textiles sector

As of February 2025, there were 4,849 startups in the textiles sector[11]. More than half of them emerged in the last 4 calendar years (2021-2024).

Consistent with domestic and global trends, the number of textile startups grew rapidly till 2022. However, "funding winter" hit the startup world post 2022, as interest rates globally, started to increase. Sentiment for startup investments was impacted as higher interest rates limited availability of equity capital for early-stage investing and made debt more expensive. As a result, the annual pace of addition has almost halved in 2024 as compared to the peak addition of 837 textile startups added in 2022. Despite the slowing pace of addition in textile startups, the new textile startups created in 2024 were more than twice of the startups added in 2016. Similar to the story of the Indian startup universe, the growth story of textile startups is structural in nature. The number of new textile startups recognised by DPIIT annually is about 3 percent of the number of the total DPIIT recognised startups in India.

Review of information on DPIIT recognised startups indicates Private Limited Company as the main company incorporation type, with almost 80 percent of them incorporated as private limited companies. Typically, this legal setup is suitable for companies to raise equity funding from VCs or other investors and hence, is on expected lines.

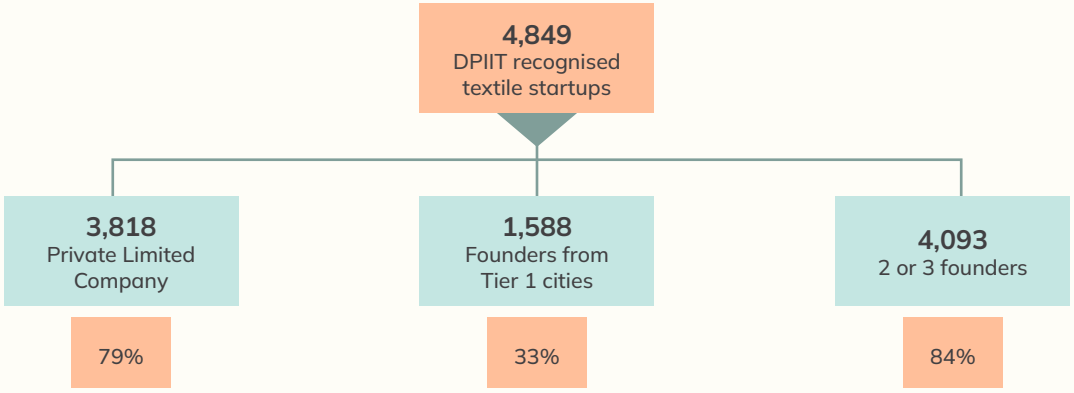
**Figure 3.1: Growth in creation of Textiles startups in India**




Source: YNOS

[11] *These include only the DPIIT recognised startups. If we consider startups whose DPIIT recognition is not available, then the number of textiles related startups increase to more than 6800.*

**Figure 3.2: Salient aspects of DPIIT recognised textile startups**



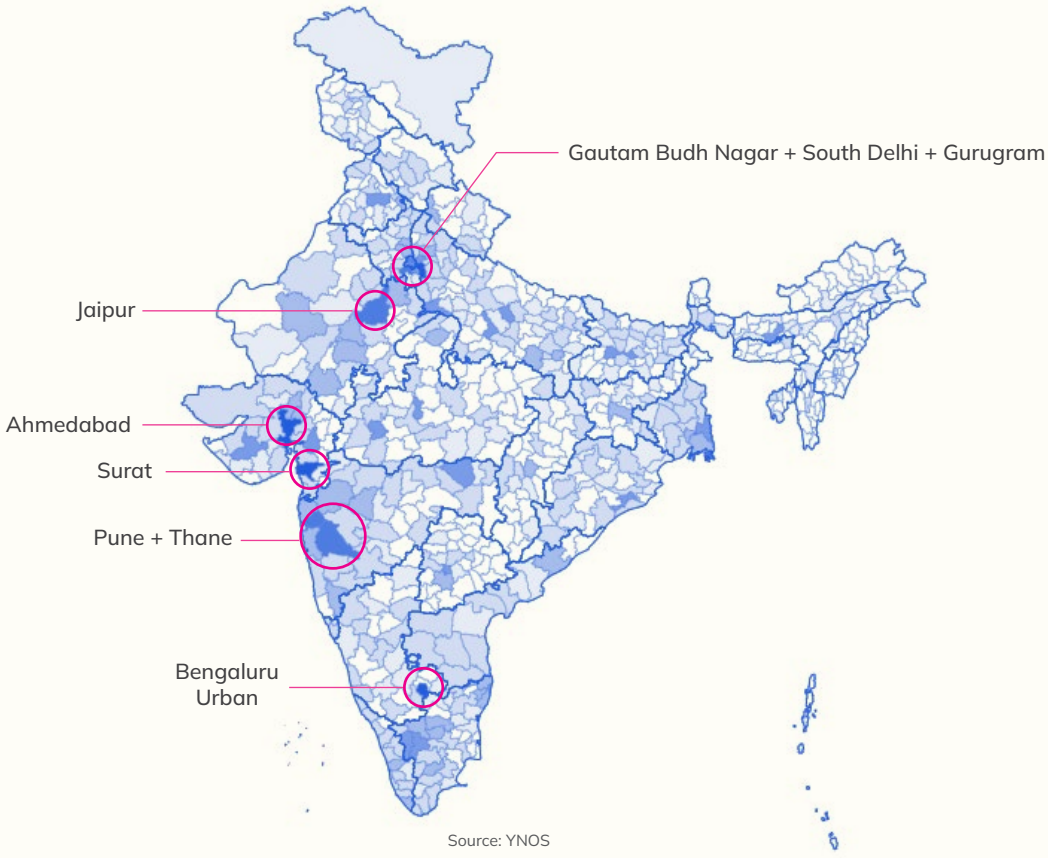

Source: YNOS

When we look at the founder profiles, it is interesting that almost 84 percent of the textile startups have either 2 or 3 founders.

About one third of the founders of textile startups are from Tier 1 cities, which is lower than the overall percentage of startups in Tier 1 cities. This indicates that a majority of start-ups in textiles are in Tier 2 and 3 cities, thereby contributing to the growth and development of smaller cities.

## 3.2. Bengaluru is the top cluster for Textile startups in India

**Figure 3.3: Distribution of Textile startups, February 2025**




Source: YNOS

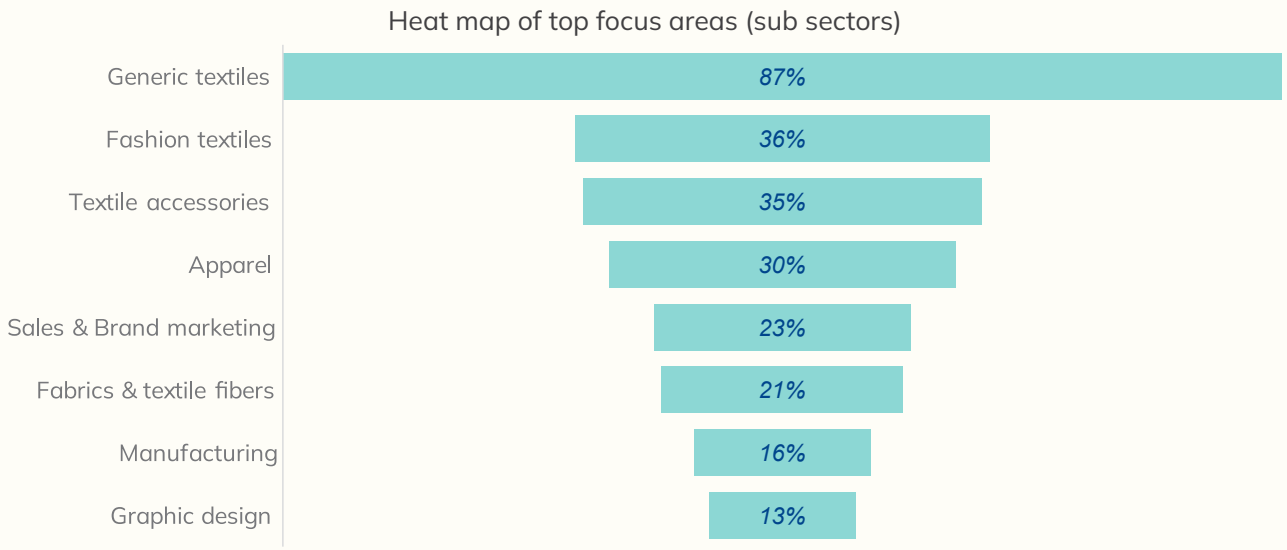
Bengaluru Urban leads India as the largest cluster of textile startups as of February 2025, with over 350 startups. Surat follows next with over 200 textile startups. Clusters near to NCR – Gautam Budh Nagar, Gurugram and South Delhi, each have about 150-180 textile startups. Similarly, Ahmedabad cluster has 180+ textile startups. Jaipur, Pune, and Thane have between 100-150 startups.

## 3.3. Several focus areas and sub-sectors exist for Textile startups

Based on the classification of sub-sectors for textile startups, it is clear that most startups focus on solutions that straddle multiple areas or sub-sectors.

Key sub-sectors for textile startups are fashion textiles, textile accessories and apparel, in addition to generic textile solutions.

**Figure 3.4: Key sub-sectors for Textile startups**




Source: YNOS

## 3.4. Over ₹330 billion of capital has been invested in Textile startups in India

**Figure 3.5: Funding mix for Textile startups**


Source: YNOS

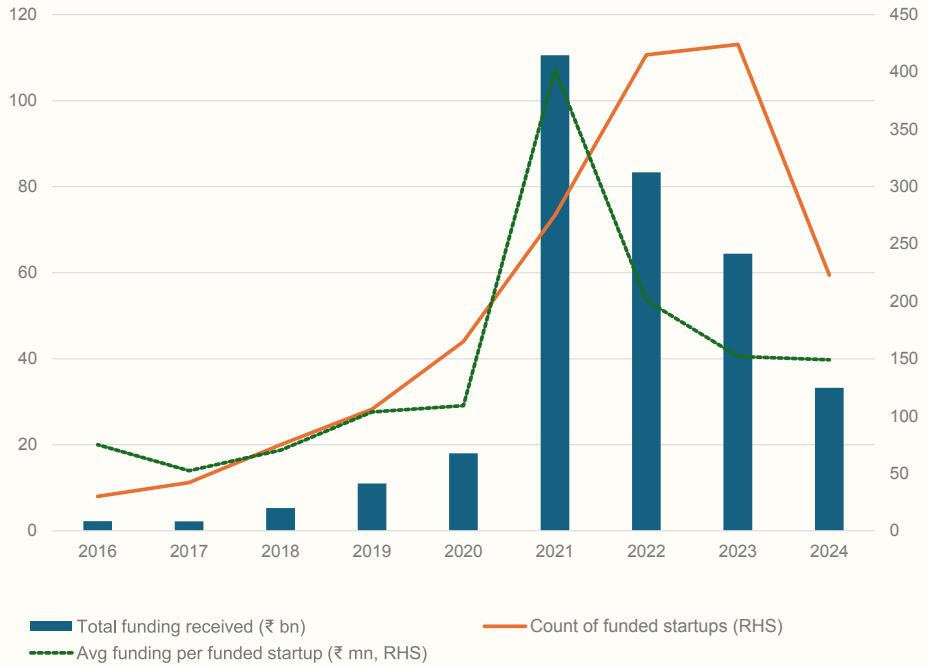
Aligned with the creation of textile startups, the year 2022 was among the peak years for the number of textile startups that got funded, with over 400 new ventures added to the textile startups. In value terms, the year 2021 saw the highest flow of capital (debt and equity) into textile startups, with over ₹100 billion of investments. Cumulatively, the textile startups have seen an investment of over ₹330 billion, till the year 2024, with ~60 percent being the share of equity in the total capital.

While the quantum of debt has been lower than equity funding, it is still significant. This underlines the important contribution of banks and other financial institutions in the development of startups in textiles.

Per funded startup, the average capital flow in recent years (2022-2024) has been around ₹100-200 million.

This is significantly higher than the pre-COVID-19 averages in the ₹50-100 million range.

**Figure 3.6: Flow of capital into Textile startups**

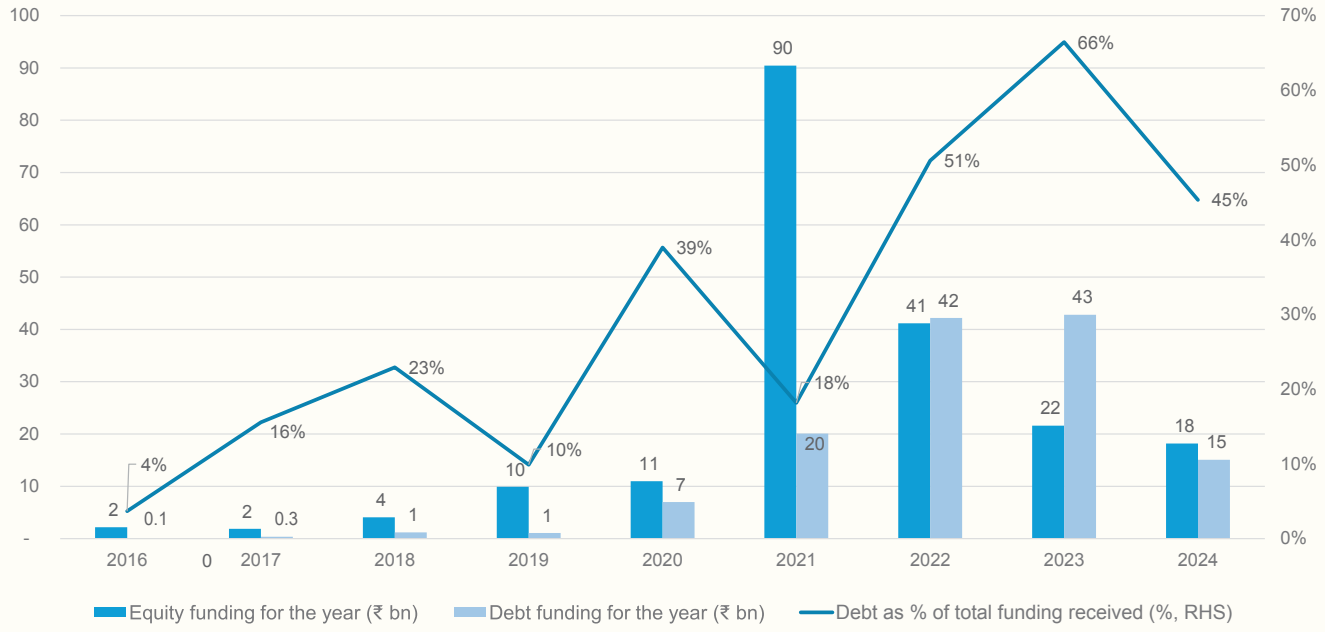



Source: YNOS

Based on capital structure, the years 2022-2024 saw debt amounting to roughly half of the total capital raised. Historically, the funding mix had been tilted towards equity, as early-stage startups are not well suited for debt funding in the initial years.

As some of the early startups grew and matured into larger entities, debt funding started going up for textile startups in the 2022-2024 period. Over 70 percent of the total debt funding received by textile startups went to startups incorporated in 2019 or earlier.

**Figure 3.7: Textile startup funding by type of capital and year**

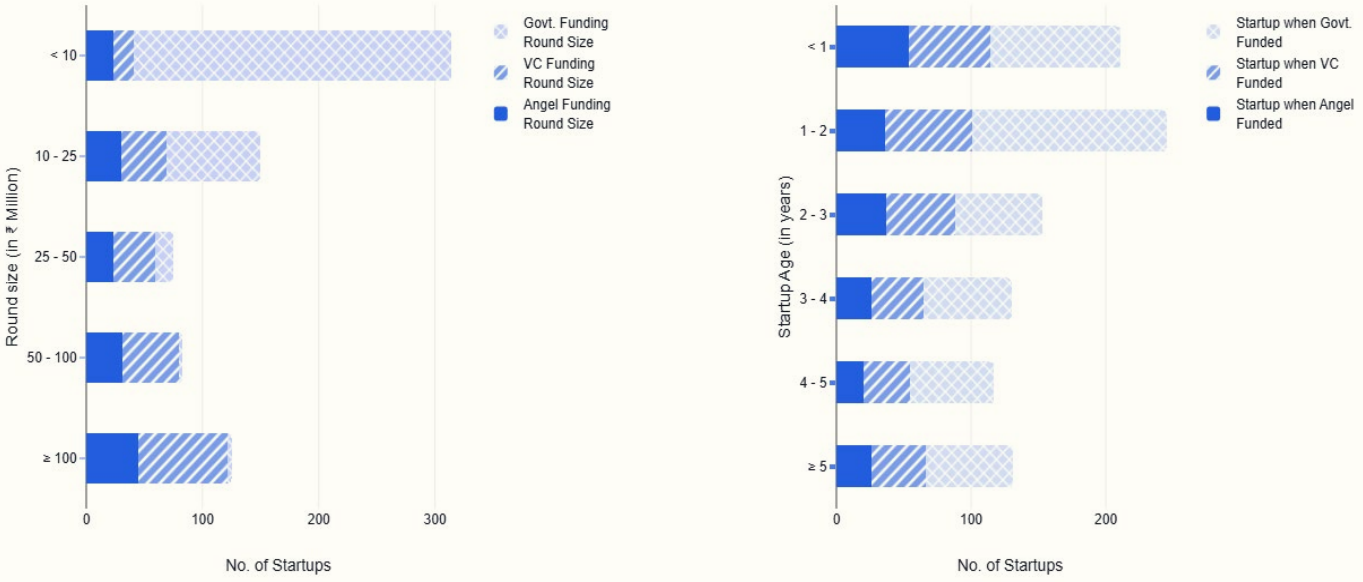



Source: YNOS

Analysis of equity funding for textile startups indicates domination of VCs and Angels in funding equity rounds in excess of ₹50 million. Conversely, for smaller ticket sizes, government funding has been very relevant for rounds lesser than ₹25 million.

Similarly, equity raised by textile startups in their initial two years of operations depended significantly on government funding. Government funding has been less sensitive to the age of startups in comparison to the size of the funding round, as government funding has been observed in older startups too.

**Figure 3.8: Analysis of Equity funding**



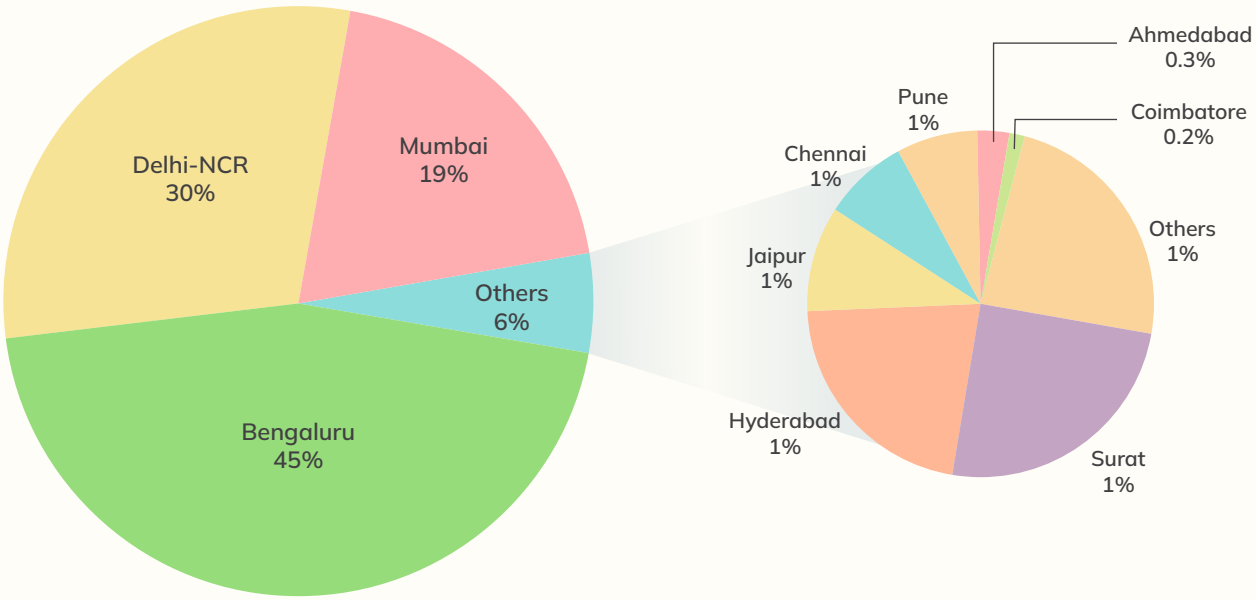

Source: YNOS

## 3.5. Debt funding is distributed more widely (vs. equity)

The top 3 clusters in India account for over 94 percent of the total equity (Angel & VC funding) funding received by textile startups. Bengaluru alone received over ₹90 billion of equity capital from Angels and VCs, of the total ₹200 billion of equity capital at India level.

Delhi-NCR and Mumbai occupy the second and third positions, respectively. Beyond the top 3 clusters, equity capital has been distributed across the other cities in a much smaller scale in comparison to the top 3 cities.

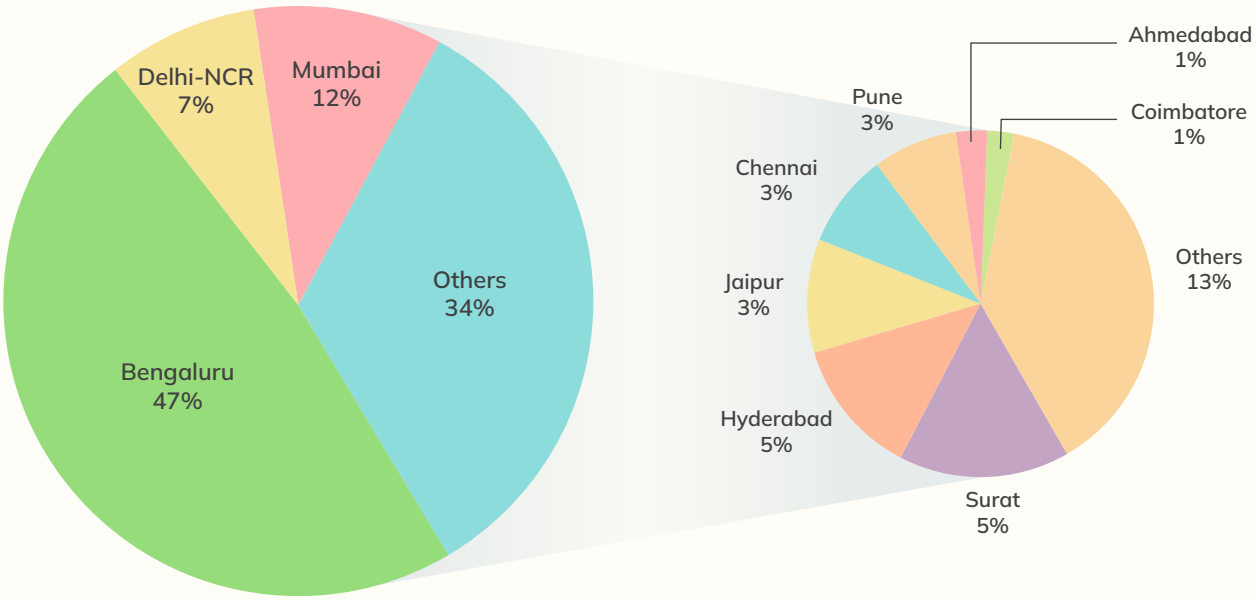
**Figure 3.9: Geographical distribution of equity capital**




Source: YNOS

In comparison to equity capital, debt capital is distributed more widely across cities in India. Though still high, the top 3 clusters account for just about two-thirds of the total debt capital distributed to textile startups. Bengaluru is still the dominant city at over 47 percent share of the total debt capital, receiving over ₹60 billion of the total ₹130 billion received at pan India level. However, unlike equity, cities other than Bengaluru, Delhi-NCR and Mumbai also account for a meaningful share of the total debt capital.

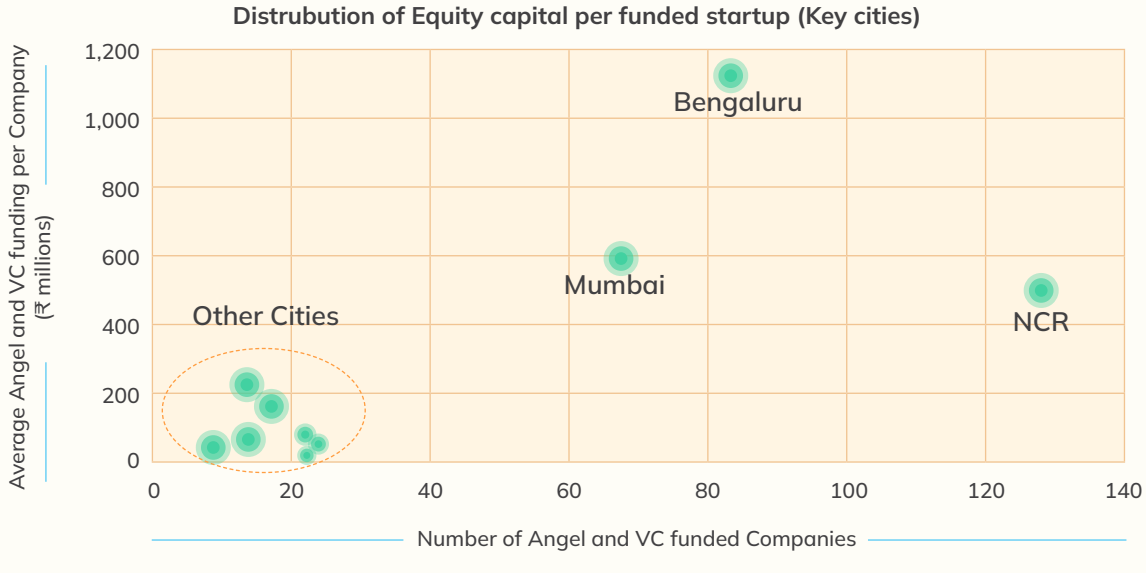
**Figure 3.10: Geographical distribution of debt capital**




Source: YNOS

Analysis of capital invested per funded startup by city shows similar observations. Bengaluru received an average of ₹1,100 million of equity capital per funded textile startup. Equity funded textile startups in Mumbai and NCR received about half of that amount. The other cities received far less equity capital on a per funded startup basis.

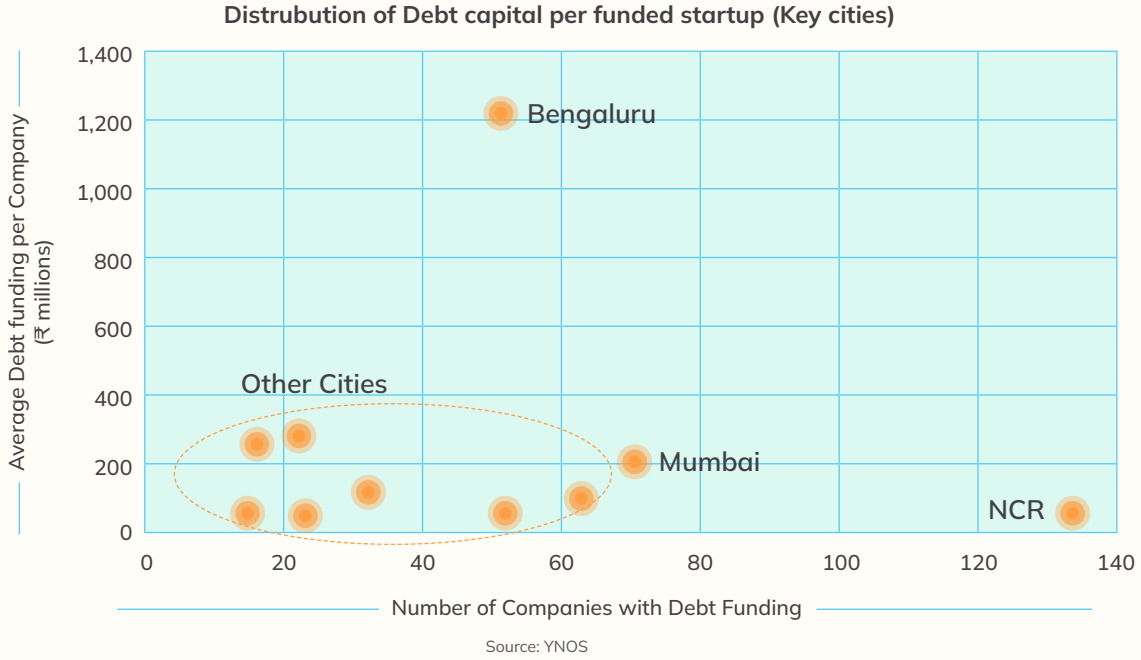
**Figure 3.11: Equity capital per funded startup and by city**




Source: YNOS

In terms of debt capital, funded textile startups in Bengaluru dominated with over ₹1,200 million of debt capital received. However, on a per funded startup basis, the other cities were in broadly comparable ranges.

**Figure 3.12: Debt capital by funded startup and by city**



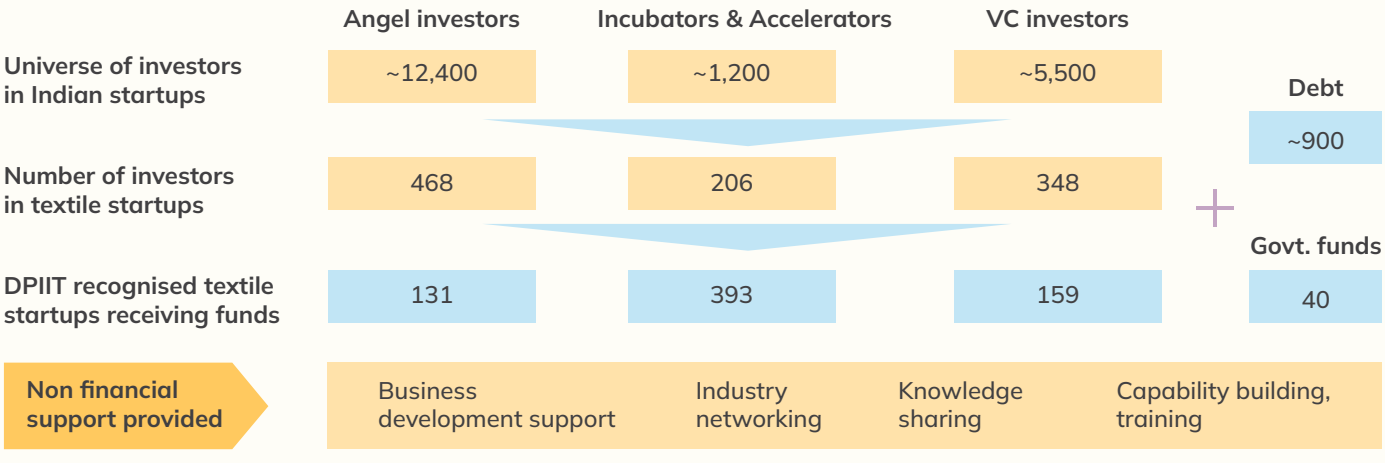

Source: YNOS

## 3.6. Financial and non-financial support from the ecosystem

Textile startups are significantly enabled by the larger ecosystem, benefiting from financial and non-financial support mechanisms. In terms of financial support, equity funding for textile startups has happened from hundreds of angel investors and VC investors, all part of the larger universe of startup investors. Debt from banks and financial institutions and grants from relevant government funds offer further financial support for textile startups.

Beyond financials, the ecosystem supports the startups with business development, capability building, industry networking and knowledge sharing, further adding value to startups.

**Figure 3.13: Ecosystem support for Textile startups**




Source: YNOS

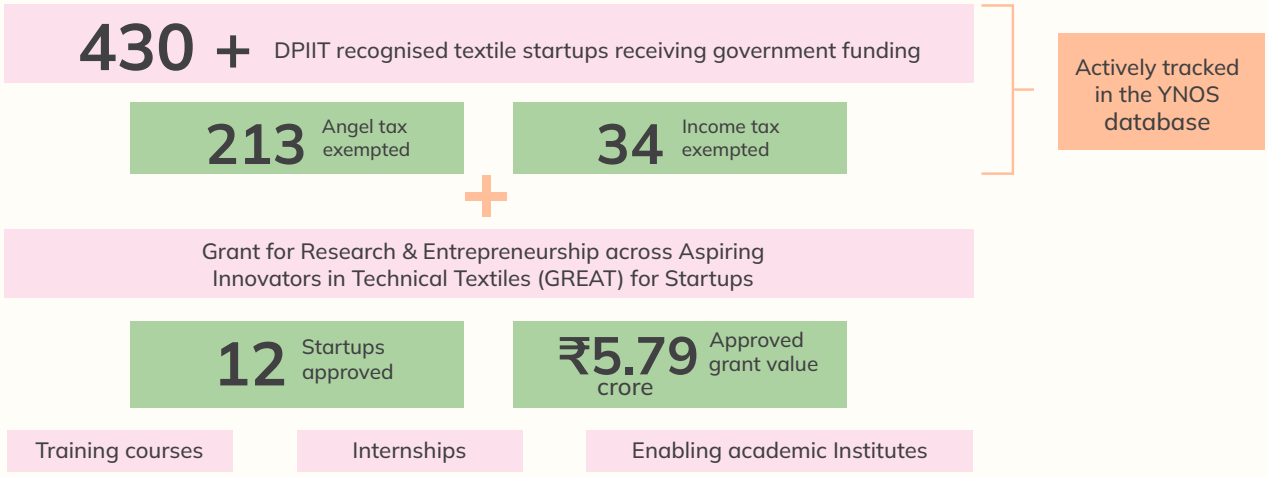
## 3.7. Textile startups benefit from several government interventions

Government schemes are significant enablers for textile startups and play an important role in making available financial and non-financial support to textile startups.

Textile startups benefit from three types of government schemes.

- One, policies that are aimed specifically at textile startups. The Grant for Research and Entrepreneur ship Across Aspiring Innovators in Technical Textiles (GREAT) is a scheme that makes available grants for selected startups. Similarly, the Textiles Innovation Challenge incentivizes startups to win at innovation.
- Then, there are policies aimed at the textiles sector where startups can also participate, based on suitability. For instance, the NTTM schemes support startups, as relevant.
- Lastly, there are startup or MSME oriented policies such as Startup India Seed Fund or credit guarantee or capital subsidy schemes where textile startups can participate.

**Figure 3.14: Summary of government support to Textile startups**



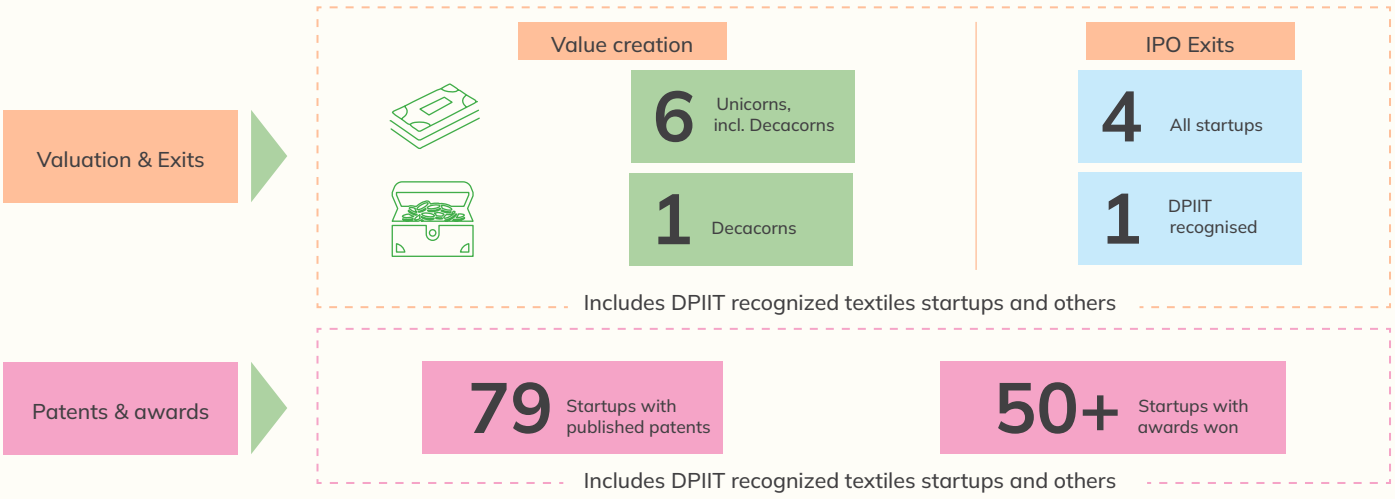

Source: YNOS, NTTM Compendium

## 3.8. Textile startups have created financial value while innovating

With one decacorn and five other unicorns, successful textile startups have created significant financial value for their investors and the larger ecosystem from the growth. Four textile startups have provided exits for their initial investors too, via the IPO process. Other than financial value, 79 textile startups have published patents that further the innovation agenda for the Indian textiles sector.

These are the foundations on which profitable and innovative textile corporations can emerge in the longer term for India. Other than patents, textile startups have won numerous awards from various government and non-governmental organizations.

**Figure 3.15: Key achievements of Textile startups**




Source: YNOS

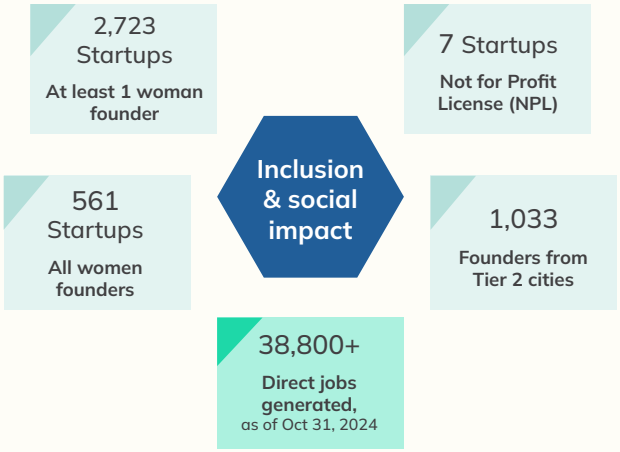
## 3.9. Social impact indicators from Textile startups are promising

With over half of the DPIIT recognised textile startups having at least one woman founder, textile startups promise meaningful inclusion and social impact. Interestingly, over 10 percent of the textile startups have been founded by all women team of founders.

Over 20 percent of the founders of textile startups originate from tier 2 cities of India. This can play a key role in empowering youth from the less developed parts of India to dream big and achieve professional success from startups.

Lastly, as per the PIB[12], over 38,800 direct jobs have been generated by textile startups, as of October 2024. This represents over 2 percent of the total direct jobs generated by startups in India till October 2024.

**Figure 3.16: Inclusion and social impact indicators**



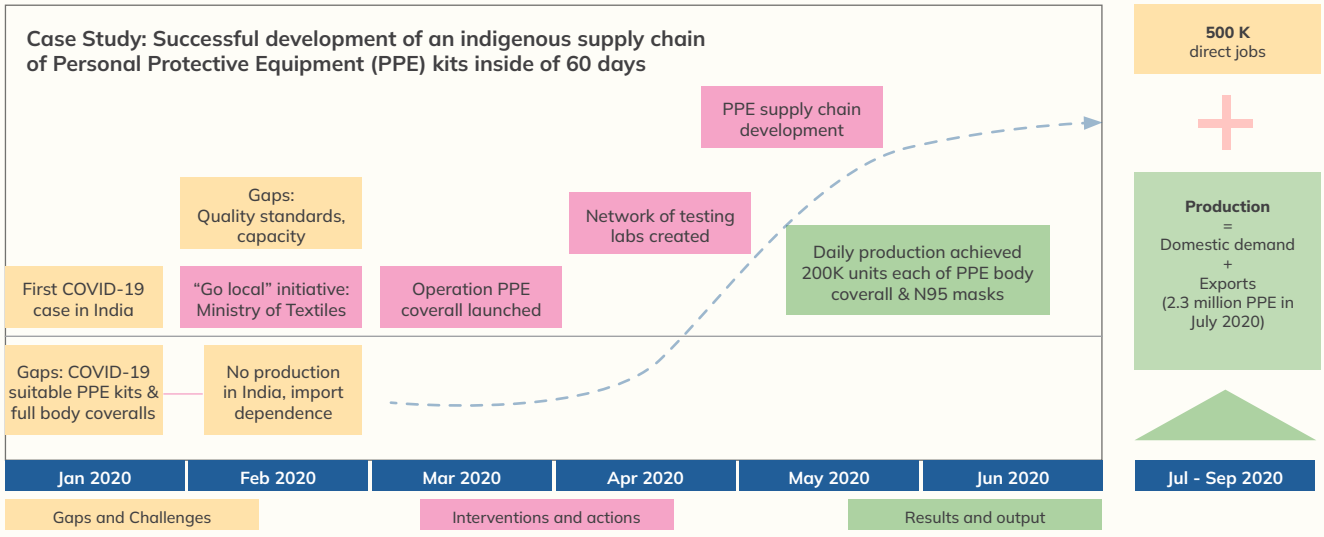

Source: YNOS, PIB

## 3.10. The story of PPE manufacturing in India can inspire all stakeholders

As of January 2020, when the first case of COVID-19 reached India, there was no domestic production of Personal Protective Equipment (PPE) in India. The country was dependent on imported PPE kits and full body coveralls. With the rapid rise in the growth of COVID-19 cases and the global supply of PPE becoming impacted, 'Operation PPE coverall' was launched in March 2020, around the time of the nationwide lockdown for COVID-19.

Within the next 2-3 months, the PPE manufacturing supply chain in India went through a dramatic transformation. India transformed from a net importer of PPE to among the largest exporters of PPE within a single year. This recent success story can be the inspiration needed by the startup ecosystem in textiles and beyond.

**Figure 3.17: The PPE success story in India**




Source: PIB, economictimes.com

[12] https://pib.gov.in/PressReleasePage.aspx?PRID=2081538

**What were the key challenges?**

As of January 2020, India did not have a domestic manufacturer base that could comply with specifications relating to class 3 protection levels needed for COVID-19. When export restrictions kicked in gradually, the availability for PPE kits in India came under risk. On deeper evaluation, it was discovered that there were gaps in quality standards, production capacities, availability of testing labs across the country and the overall PPE supply chain. This was against the estimate of Niti Aayog of the daily requirement of 20,000 PPE kits and 400,000 H-95/FFP-2 class masks.

**The solution – Mission mode problem solving and collaborative execution**

Under the guidance of the GoI, the Ministry of Health and Family Welfare (MoHFW) and Ministry of Textiles (MoT), together studied the supply chain gaps and potential approaches to address the challenges. Based on the gaps and solutions identified, "Operation PPE Coverall" was launched in March 2020. This was followed by active collaboration between government departments (including DRDO, BIS), research associations (led by SITRA) and several private sector entities. The objective was to develop the supply chain to develop fabrics to withstand Synthetic Blood Penetration Test in accordance with ISO 16603:2004 (Class-3 exposure) specifications.

**The results - India joined the list of top PPE exporters**

Thanks to the newly developed indigenous network of PPE fabric and garment manufacturers, within 2 months, by May 2020, India could manufacture 4.5 lakhs pieces of body coveralls[13] and 2.5 lakhs N-95 masks per day. More importantly, India also began exporting PPEs to the US, the UK, Senegal, Slovenia, and UAE. By December 2020, the N-95 manufacturing capacity reached 32 lakh per day with 200 manufacturers. In addition, over five lakh direct jobs[14] were also created in the economy.

**The key takeaway – 'Mission mode' of working works!**

*"India produced 60mn PPEs, 150mn N-95 masks till Oct from zero in March", said the then Union Textiles Minister Smriti Irani in December 2020.*

'Mission mode' of working, against steep challenges, has enabled stakeholders in the Indian textiles ecosystem to achieve impressive results. Clearly, the startup ecosystem can get inspired and get to solve the major constraints limiting growth in the textiles space. Time to unleash the crouching tiger!

## 3.11. Summary

Over the past decade, more than 4,800 textile startups have emerged in India, supported by investments exceeding ₹330 billion. These firms maintain a balanced funding structure, with 40 percent comprising debt, enhancing financial stability. Significant achievements include the emergence of six unicorns and four IPOs, contributing to the vitality of the startup ecosystem. Additionally, these startups have generated 38,800 jobs and demonstrated social impact, with 79 start-ups having published patents and over half featuring at least a woman founder.

Government support continues to play a crucial role, bolstering the sector's growth and inspiring further innovation, exemplified by India's success in becoming a leading exporter of PPE during the COVID-19 pandemic. The accompanying online resource to this report, VIBGYOR, the dashboard on textile startups provides more trends and also features a compendium of start-ups and investors: https://www.ynos.in/vibgyor/

[13] https://pib.gov.in/PressReleasePage.aspx?PRID=1680059

https://economictimes.indiatimes.com/industry/healthcare/biotech/healthcare/indias-successful-journey-to-self-sufficiency-in-ppe-kits/articleshow/78658109.cms?from=mdr

[14] https://www.hindustantimes.com/india-news/india-produces-60-million-ppes-150-million-n-95-masks-till-october-from-zero-in-march-irani/story-dv9NrJZDfwMW0KsX6uxweP.html

# 4. Spotlight: Case studies on Textile start-ups

## 4.1. Dejunk Private Limited: Upcycling thread waste

*Winner, Textile Innovation Challenge 2024*

It was thanks to his research on sustainability and a dissertation on sustainable practices in the textiles industry that helped Ashwajeet Singh start his company, Dejunk Private Limited based in New Delhi. Dejunk was started to tackle the problem of discarded thread waste in the textile industry. According to Singh, while studying the fast fashion waste crisis, he realised that discarded thread waste could be upcycled into meaningful products.

After researching sustainable alternatives and collaborating with artisans, Singh started experimenting with ways to repurpose waste threads into high-quality handcrafted products. Dejunk was born as a brand that upcycled thread waste into sustainable home furnishings and fashion pieces, says Singh, who has a background in business management with a good knowledge of sustainability.

The company's focus areas are home furnishings – cushion covers, table runners and other similar furnishings made from upcycled thread waste; zero-waste fashion – fashion accessories and select apparel items created from discarded thread waste; and, circular design solutions – partnering with brands to integrate thread waste upcycling into their production process.

### Can thread waste be productively utilized to empower artisans?

Dejunk hopes to redefine how the industry views thread waste. Its work has a three-fold impact. One, it reduces textile waste. It diverts discarded threads from landfills and gives them a second life. Two, it empowers artisans by creating job opportunities in handloom weaving and upcycling. And three, it promotes the circular economy by encouraging brands and businesses to incorporate waste upcycling into their production process.

**Upcycle thread waste into sustainable home furnishings and fashion pieces**

The company's customers include sustainable lifestyle consumers, who are people looking for eco-friendly home furnishings and fashion accessories; brands and designers, including fashion and home décor brands that are seeking circular solutions; boutiques and concept stores that support ethical and sustainable brands; interior designers and the hospitality business that incorporate sustainable furnishings.

**Promotes the circular economy by incorporating waste upcycling**

Dejunk, says Singh, harnesses technology to enhance distribution, streamline production and empower its weavers. While the basis of its business is rooted in handwoven craftmanship and upcycling, it integrates digital solutions to make the processes more efficient. The company leverages digital platforms, e-commerce and data-driven marketing to connect with a wider audience. It also uses digital tools to help artisans with production tracking, design collaboration and inventory management. Singh's long-term goal has been to expand production, collaborate with sustainable brands and bring upcycling into the mainstream, making circularity the norm rather than the exception.

## 4.2. Incipient Materials - Smart textiles for health

*Grant for Research and Entrepreneurship Across Aspiring Innovators in Technical Textiles (GREAT) supported venture*

Incipient Materials is a company started by Prof. Ashwini Kumar Agrawal of the Department of Textiles and Fibre Engineering, IIT Delhi, aimed at bringing decades of research conducted on smart and functional textiles at SMITA Research Lab, a Centre of Excellence in Smart Textiles, to the market for various applications. The company focusses on bio-medical applications. According to Agrawal, the lab has been developing various deep tech technologies in the healthcare area. The company has been working on various products, some of which are ready for commercial launch. One of the products is a smart sock that can detect and measure the gait pattern of a person based on which that person's ailment can be figured out.

### Making health management easy and smart

The prototype has been developed, and the company has been in the process of validating the data with the help of the GAIT Lab at AIIMS Delhi. These socks are made of normal socks material but have sensors that are made up of textiles.

Normally, sensors are made of silica, or they are plastic based, and they cannot be integrated with soft material because people will not be comfortable using them as they walk. The socks can be used any number of times and can be washed in a washing machine like any other piece of clothing. The smart socks will be a low-cost alternative to using a machine at a gait lab, of which there are few in the country.

Another product the of the venture is a surgical simulator for training of paediatric surgeons. These are synthetic simulators. The company has created this model with AIIMS Delhi. This product simulates the properties of the tissues of a baby or small child. The doctor practising on this model gets the same feeling as doing an operation. The goal of the simulator is to significantly bring down the time taken to perform real surgeries.

**Smart socks integrating sensors with textile materials**

According to Agrawal, they are developing a few other models for medical applications, particularly simulators that can be used in medical colleges to give students a real-life simulation rather than depending on theoretical lessons alone. The company has mixed various polymers, resins and additives for these simulators and has filed for patents. It is also working on a synthetic corneal graft that can be used in persons who have suffered injuries to their corneas.

## 4.3. Nanospin technologies LLP: The promise of nano-fibres

*Grant for Research and Entrepreneurship Across Aspiring Innovators in Technical Textiles (GREAT) supported venture*

Naman Bharot, who has a Bachelor's in Mechanical Engineering and over a decade's experience in textile research, started Nanospin Technologies LLP in May 2020 to establish nanofiber technology in India and make it commercially feasible and scalable on an industrial level. Nanofiber technology, according to him, has tremendous potential to solve many critical challenges in the areas of filtration, technical textiles and in the medical field. However, due to the high cost of adoption, lack of scalable options and gaps in infrastructure, it was proving difficult to commercialise, he adds. Therefore, he and Neel Panchal took it upon themselves as a challenge to bridge this gap and founded Nanospin Technologies.

Based in Ahmedabad, the venture is into the manufacturing of proprietary electrospinning plants for making nanofibers ranging from laboratory scale to industry scale at an affordable price. He explains that a unique, yet simple mechanism consists of positive electrodes precisely designed and developed and a collecting negative electrode both having high voltage power supply to generate a strong electric field. This attracts polymers to form nano range of fibres from a variety of polymers, including synthetic and bio polymers that not only provide high accuracy and production rates but is also easy to scale up at industrial scale.

### Can innovative nanofibers unlock a $100 billion market opportunity?

There is a huge demand for next generation filters, whether it is air or water filters. There is latent demand for non-invasive drug delivery in the medical sector and for light weight yet mechanically durable composites. The market potential for these sectors is estimated to be more than $100 billion. Moreover, by adopting this technology India will be in a position to reduce dependency on imports and strengthen indigenous technology and supply chain. This will help the Indian technical textile sector compete in the global market.

**Nano range of fibres from varied polymers including synthetic and bio polymers**


The company's customers include filtration industries, technical textile manufacturers and pharmaceutical companies.

## 4.4. SahiFab Private Limited

### Recycling industrial hemp

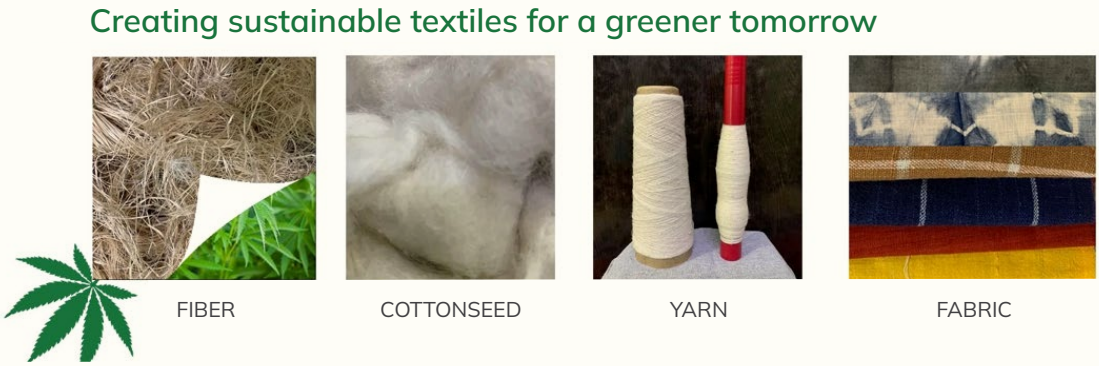
*Grant for Research and Entrepreneurship Across Aspiring Innovators in Technical Textiles (GREAT) supported venture*

It was during one of her trips to Uttarakhand that Dr. Namrata Sahi noticed that the stem of industrial hemp plants was either thrown away or burnt. She wanted to do something that would ensure that the waste was not discarded, and the environment not polluted. The seed of the industrial hemp is primarily used for medicinal purposes. The plant can be cultivated only under licence.

A PhD in Geography, Sahi had worked for a few years in textile processing and took it up as a challenge to ensure that the stem of the industrial hemp plant is put to better use. She also learnt that in other countries, the stem was processed for making fibres that found use in the textile industry. Sahi then approached a few institutions, including IIT Delhi to work on using the industrial hemp stem for better purposes.

By collecting the fibre from the stem, SahiFab was not only contributing to a circular economy but was also ensuring that the hemp farmers earn more, as they get to sell the stem instead of throwing it away or burning it.

According to SahiFab, the proprietary decorticator machine splits the fibres and hurds. Hurds form hempcrete with lime and fibres after being treated with enzymes find use in the textile industry. Hemp, she adds, is a high strength and long bast multi-cellular fibre. There are no herbicides and pesticides used in growing industrial hemp, while there is very limited use of fertilisers. Besides the textile industry, the hemp fibre finds use in other applications such as specialty papers and hemp concrete.




She founded SahiFab Private Limited in 2022 to work on converting the stem into fibres for use in the textile industry. SahiFab made a Decorticator machine to first extract the fibre from the hemp stem.

The extracted fibre was then treated with enzymes and alkali after which the treated fibre was carded. It can then be processed in a number of ways. The fibres are used to make yarn. The fibre can also be used to make non-woven textiles and textile composites.

**Decorticator machine to first extract the fibre from the hemp stem**

**Needs 70 percent less water when compared with traditional cotton**

Based in New Delhi with a production unit in Ghaziabad, SahiFab can process about 1.5 tonnes of hemp a month. Its customers include Natural Textile Solutions USA; The Himalayan Hemp, Kangra; Himgiri Exports, Jaipur; and Chandra Prakash & Co, Jaipur.

On social and environmental impact, SahiFab says that work on sustainable textiles reduces water pollution. The fibre needs 70 percent less water when compared with traditional cotton.

The farmers earn more now and there is no crop waste or burning thanks to the stem being processed.

## 4.5. Silpakarman: Wealth from bamboo

*Winner, Textile Innovation Challenge 2024*

Akshya Shree always had an inclination towards entrepreneurship but was not clear what she wanted to do. Thanks to travelling across the country with her family, she was drawn towards doing something with rural artisans. She was interested in the home décor space and what better material than bamboo that was abundantly available across the country as raw material for her business. She teamed up with her sisters – Dhwani Shree and Taru Shree – and formed TAD Udyog Pvt. Ltd in 2016. The company's name comes from the first letters of the names of the three sisters. Akshya graduated in Business Economics from Delhi University and followed it up with a post-graduate diploma in Corporate Law Management and a certificate programme in import-export management from IIFT.

She knew she had to engage with the local community and artisans to do anything with bamboo. She had to combine traditional knowledge with the latest technical know-how to build and grow the business. She worked in Assam, Tripura and Nagaland with bamboo growers and artisans and exported bamboo products for the first two years, before looking at the domestic market. In 2018, she launched a brand called Silpakarman, derived from Sanskrit to mean handcrafted, to get into the domestic D2C home décor space with bamboo products.

### India is a leading importer of cellulose. Can bamboo fill the gap?

When her younger sister Dhawni Shree joined Akshya in 2019 and suggested that they look at nutraceutical products from bamboo, they decided to make bamboo tea. They collaborated with IIT Guwahati for that project and created a unique blend of different species of bamboo leaves to launch bamboo tea under the brand BeYouTea in 2021. They also got incubated at IIM Bangalore. Bamboo tea, according to Akshya, has a vital nutrient silica that is good for skin, hair and nails. After the successful launch of bamboo tea, they have been working on other nutraceutical products.

**Eco-friendly cellulose sheets from bamboo for fabrics and other textiles**

Furthermore, they wanted to do something more with bamboo. India has been a leading importer of cellulose and one of the top manufacturers of fabric and clothing. They wanted to make cellulose out of bamboo in an eco-friendly manner, for which TAD Udyog worked with the South India Textile Research Association (SITRA). SITRA helped them come up with a closed-loop technology, the advantage of which has been the chemical that is used in the process, would get de-ionised resulting in a byproduct of nitrate fertiliser.

They chose one species of bamboo, balcooa bamboo, available in the North East, Bihar, Jharkhand and West Bengal. Their plan has been to manufacture cellulose sheets and sell to textile and fabric manufacturers.

They have 250+ SKUs in bamboo products and 10-12 SKUs in bamboo tea. The company works with 350 artisans, 80 per cent of whom have been women. It has five clusters in Tripura. Silpakarman products are available on 19 online platforms and through seven store partners.

## 4.6. Tetrel Innovations (Project Hexagon): Graphene based smart textiles

*Grant for Research and Entrepreneurship Across Aspiring Innovators in Technical Textiles (GREAT) supported venture*

After doing his Bachelor's in Mechanical Engineering and a postgraduate programme in Business Entrepreneurship, Neel Panchal teamed up with Khushboo Patel, who has a Master's from NID Ahmedabad, to start Tetrel Innovations in 2019 to come up with nanomaterial-based smart textile products.

The venture is using Graphene, a nano material known for its versatility, strength (stronger than steel), high surface area, thermal and electrical conduction properties. According to Panchal, the company has developed its own technology to produce this material and from this material it is making conductive nanomaterial-based ink and yarns, which it uses to make smart textiles under the brand name Project Hexagon. Smart textiles in India has been at a nascent stage. "We are developing different kinds of textile-based sensors and flexible heaters with graphene by using it in the form of inks and yarns," says Panchal.

While the thermal jacket was one of the end products, the company's focus has been more on the technology which can be incorporated into textiles for different products. There has been an absence of any scalable technology available for smart textiles. "We are developing the processes and intermediaries such as inks and yarns, which could be incorporated into the textiles", says Panchal.

**Nanomaterial-based ink and yarn involving graphene sensors and flexible heaters**

### Scaling smart textiles up one application at a time

The company's business model is to continuously develop the technology in such a way it can be scalable with the existing infrastructure.


Thanks to one of their mentors who had good connections with the armed forces, they got a challenging assignment from the armed forces to make flexible thermal jackets out of this material, which is light weight and has good functionalities. They developed the prototype in 2019, won a few competitions and got an opportunity to highlight the product to the Prime Minister of India.

The thermal jacket was a proof-of-concept to make the industry understand that the kind of versatile and functional products that can be made using smart textiles. Its main products will be the nanomaterial-based conductive yarns and the inks, from which they can develop multiple products such as flexible heaters and sensors, including temperature sensors, pressure sensors, motion sensors.


**About IIT Madras**

Indian Institute of Technology Madras (IITM) was established in 1959 by the Government of India as an 'Institute of National Importance.' Recognised as an Institution of Eminence (IoE) in 2019, IITM has been ranked No.1 in the 'Overall' Category for the sixth consecutive year in India Ranking 2024 released by the National Institutional Ranking Framework, Ministry of Education, Govt. of India. The Institute has also been ranked No.1 in the 'Engineering Institutions' category in the same Rankings for nine consecutive years – from 2016 to 2024. IITM was also adjudged as the 'Top innovative Institution' in the country in the Atal Ranking of Institutions on Innovation Achievements (ARIIA) in 2019, 2020 and 2021. ARIIA Ranking was launched by the Innovation Cell of the Ministry of Education.

**About CREST**

The Centre for Research on Start-ups and Risk Financing (CREST), an Institute of Eminence-Research Centre at IITM was launched in June 2021 with the vision of becoming globally recognised as a leading research centre in start-ups, venture capital, innovation, and related areas. A major contribution of CREST has been the development of India's most comprehensive information platform on the Indian start-up ecosystem. The platform integrates scattered information from highly credible sources and has for the first time brought together the various entities of the start-up ecosystem, viz., start-ups, founders, incubators, angel investors, VCs, government funding, and debt funding in a single location. The platform has significantly contributed to reducing the unequal access to information among different stakeholders.

**Knowledge Partner - YNOS**

YNOS Venture Engine, an IIT Madras incubated start-up has been founded with the objective of transforming and creating efficiencies in the start-up and innovation ecosystem in India. YNOS leverages technology, advanced data sciences techniques and marker analytics to provide customized insights and recommendations to start-up founders, venture investors, and other stakeholders engaged with start-ups. As a result of bringing the key entities of the start-up ecosystem in a single location, the YNOS information platform has become the gateway to the vibrant Indian start-up ecosystem.

**VIBGYOR: The Dashboard of Textile Startups**
A single point information resource on startups and investors in the Textile sector.

www.ynos.in/vibgyor/

Centre for Research on Start-ups and Risk Financing

ynos VENTURE ENGINE
www.ynos.in