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MAKING INDIA'S TECHNICAL TEXTILE INDUSTRY GLOBALLY COMPETITIVE: A STRATEGIC APPROACH

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ABSTRACT

Compared to conventional textiles, technical textiles have better performance characteristics in terms of durability, functionality, ergonomics, moisture wicking, temperature maintenance etc. which leads to their increased usage in areas like protective clothing used during exposure to fire, chemicals and severe weather conditions; applications in agriculture, real estate and public infrastructure construction due to the safety, comfort and sustainability associated with these textile products. Coupled with this factor like urbanization, industrialization and advancements in healthcare, automotive and technology space have given a further boost to this sector.

KEYWORDS: Textile Industry, Ergonomics, Moisture Wicking, Sustainability, Industrialization.

Introduction

Technical textiles are textile goods engineered with the primary focus on technical performance and functionality rather than just aesthetics. These goods are used in a variety of industries, like construction, agriculture, aerospace, automotive, healthcare, sports, defence, protective gear, and home care. The technical textile products are manufactured using natural as well as man-made fibres such as Nomex, Kevlar, Spandex, Twaron and the like; that exhibit enhanced functional properties such as higher tenacity, excellent insulation, improved thermal resistance etc.

The global technical textiles market size was valued at USD 239.01 billion in 2024 and is projected to grow from USD 252.80 billion in 2025 to USD 391.75 billion by 2032, at a CAGR of 6.5% during the period. The Asia Pacific technical textiles market dominated the global technical textiles market at 47.0% of global revenue in 2024 with China being one of the major players. Indutech, Mobiltech, Packtech, Buildtech and Hometech together represent 2/3rd of the global market in value.

Countries are aligning their industries to leverage the growth in technical textiles. This shift is evident in India's textile sector as well with both the government and private organizations investing in capacity building, research and innovation for boosting the exports and worldwide competitiveness. The Indian technical textiles market is the fifth largest globally and is experiencing rapid growth, with a compound annual growth rate (CAGR) of 8-10%.

Out of India's total textile and apparel market, technical textiles has a share of approximately 13% and while contributing 0.7% to India's GDP. The market is estimated at \$ 19 Bn. But the usage and consumption of technical textiles in India is only at 5-10% against 30-70% in the advanced countries that are leaders in the field of technical textiles. Further, while India has a stronghold in exports in the conventional textile sector, the technical textile industry is still largely dependent on imports.

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152 Inspira- Journal of Modern Management & Entrepreneurship (JMME), Volume 15, No. 02, April-June, 2025

Technical textiles became even more relevant to India during the Covid-19 crisis when the global supply chains were disintegrated and export ban was imposed which made import of N95 face masks and protective gears nearly impossible while India was entirely import dependent for PPE kits. During the first wave of Covid-19, India was manufacturing 0 PPE kits in March. But soon India started manufacturing 2.5 lakh kits a day and within 60 days, it became the second largest manufacturer of PPE kits after China, a feat that was reached in record time frame. Currently, India has the production capacity of around 4.5 lakh PPEs and 1.5 crore masks per day.

Exports of technical textile based products from India grew from USD2.21 billion in 2020-21 to USD2.85 billion in 2021-22, at an exemplary growth rate of 28.4 per cent (YoY).

Literature Review

The primary segments of Technical Textiles in India are Agrotech, Buildtech, Clothtech, Geotech, Hometech, Indutech, Meditech, Mobiltech, Packtech, Protech and Sportech. Multiple factors are driving the demand for technical textiles. The trend towards sustainable production process aligned with environmental concerns and eco-conscious consumption is boosting the growth of this sector. This trend also aligns with the global movement towards circular economies favouring sustainable manufacturing practices. Rapid advancement in technology has been a significant enabler for the production of innovative technical textiles with multifunctional properties. Smart textiles integrated with sensors and electronic components are being increasingly used in healthcare for patient monitoring and in sportswear for performance tracking.

With the backdrop of the current geopolitical situation, international market kinetics, and investment in advanced manufacturing infrastructure, India has the potential to solidify its stance as a global leader in the field of technical textiles

Focused approach towards capacity building by boosting research and development activities, advancements in manufacturing and streamlining processes and systems to bolster cost competitiveness; can bring India at par with the advanced countries in the world. The Indian manufacturers are making significant investments in the development of biodegradable and recyclable technical textiles to meet the growing environmental concerns and stringent regulations of the policy makers.

Indian government has recognized technical textiles as a Sunrise sector. The government has undertaken multiple initiatives for advancement and growth of this sector in line with the Make In India philosophy.

The National Technical Textiles Mission (NTTM) set up under the Ministry of Textiles

Aims to achieve a growth rate of 15-20%, thereby increasing in the domestic market size of to \$ 40-50 Bn by the year 2025. The main objectives of NTTM are to increase the usage of technical textiles across different industries, creating trained manpower by upgradation of skills of workforce, broadening the use of technical textiles in key mega projects and development of original products, machinery and equipment in line with the 'Make in India' initiative in the domestically. NTTM aims to achieve industry competitiveness and position India as a global leader. There are four key components of the initiative, namely, a) Research, Development & Innovation, b) Promotion & Market Development, c) Export Promotion and d) Education, Training and Skill Development. Under this initiative, 89 research projects amounting to Rs. 265 crore have been approved in different areas of technical textiles applications such as Geotech, Agrotech, Specialty fibres, Protech, Sportech, Sustainable Textiles etc. by January 2023.

The Indian Technical Textile Association (ITTA) is an association of the Technical Textile Industry in India whose activities encompass the 13 segments associated with Technical Textiles. The office of the Textile Commissioner, MoT, Gol facilitated the formation of ITTA in January 2010. The objective of ITTA is to bolster the sector by providing support for raising awareness and increasing production leading to increased consumption and export of technical textiles in order to strengthen India's dominance in the sector.

ITTA currently has over 300 members comprising of representatives from every part of the supply chain that add value to the sector; including representation from product creators, machinery and equipment providers to academic institutes and research organizations. ITTA has undertaken various activities for promoting and strengthening the sector like arranging seminars and workshops for information sharing, participating in exhibitions (both domestic and international) for showcasing new product developments and existing range of products, playing an instrumental role in aligning govt.

Dr. Lipi Choudhury: Making India's Technical Textile Industry Globally Competitive: A Strategic Approach

schemes with the industry and market needs and resolving operational and strategic challenges faced by the textile units with Govt. agencies. ITTA also provides inputs for policy formulations for the growth of the industry, focusing on building transparency in the system and fast tracking the growth in the sector by recommending fiscal and non-fiscal norms.

India has several strategic enablers like rapid economic growth resulting in increasing GDP, global influence in the geo-political spectrum and a lucrative investment destination for international giants due to its market potential. This current reality, however, necessitates a proactive focused attention towards addressing challenges of availability of skilled manpower through training and capacity building for developing a cutting-edge research base, production of innovative materials and highly competent professionals that can establish India as a prime and robust manufacturing hub. With this backdrop, it becomes pertinent to bolster the existing curriculum of textile engineering colleges that are offering textile technology courses and are closely associated with various projects in this field. Existing MoUs of these colleges with foreign institutes need to be leveraged for providing training and internships to students to equip them with practical learning and hands on experience.

Various R&D initiatives have been undertaken by Ministry of Textiles for the development of this sector. National Technical Textiles Mission (NTTM) is the flagship scheme under which 24 pilot R&D projects are being managed. The main objectives of the scheme are to increase the usage and consumption level of technical textiles, upgradation of the workforce via customized training programmes, develop indigenous products, machineries and equipment for technical textiles sector thereby boosting the 'Make in India' initiative.

Ministry of Textiles is parallelly working with the Bureau of Indian Standards (BIS) for developing and standardizing specialized products that are benchmarked against strict regulatory parameters. Till date more than 500 Indian standards have been developed by BIS. The Ministry of Textiles is also in the process of developing a framework for the issuance of QCOs (Quality Control Orders) on periodic basis to ensure the production of standard products while adherence to stringent quality norms to ensure the availability of high-quality products for the user.

Production Linked Incentive (PLI) scheme was launched to promote domestic production of technical textiles,

PM Mega Integrated Textile Regions and Apparel Parks (MITRA) Scheme was launched to boost the overall textile sector and its value chain.

The aim of all these various initiatives is to ensure that the technical textiles products produced in India are globally competitive by aligning the quality standards, compliance norms and regulatory framework with international standards.

Research Methodology

Qualitative Research technique was used to emphasize on the respondents experiences, perceptions and individual interpretations. Qualitative Research techniques are well suited for finding the perspectives of the respondents associated with events, processes and developments in the current context.

With the help of Discussion Guide, the final round of Personal Interviews were conducted with key stakeholders comprising of fashion brand executives (2 nos.), textile manufacturers (2 nos.), head of research institutions (2 nos.), faculty members of academic institutions (2 nos.) and policymakers (2 nos.) to identify areas for fostering collaboration and accelerating innovation in technical textiles. The opinions shared were then grouped together based on the similarity of responses and analysed through an iterative process to derive meaningful insights.

The Delphi method was used for arriving at insights. The participants were selected based on their expertise on Technical Textiles who qualified to answer the questions. The researcher's interpretation of the responses of the participants was further validated by the respondents to ensure that the chances of misinterpretation and misrepresentation of data is avoided. The Delphi method also provides inherently richer and layered insights due to the multiple iterations based on incorporating feedback.

The questions were emailed to each participant. Anonymity was maintained among the participants. The participants were given 1 week to complete the questionnaire. The responses received via email were then analysed, consolidated and sent again via a second email to all respondents for

154 Inspira- Journal of Modern Management & Entrepreneurship (JMME), Volume 15, No. 02, April-June, 2025

validation. The respondents were requested to re-examine their responses and make necessary modifications, if any. They were given a time frame of one week to send their revised responses. In order to ensure better clarity and transparency and remove ambiguity, the final draft of the responses received from participants was sent to them before the personal interview.

Homogeneous and criterion sampling was used. Homogenous sampling reduced variation between the samples and simplified the analysis phase. All the participants were actively involved in the technical textile sector . Criterion sampling ensures that only those participants who meet the set criteria are selected. For the purpose of this study, participants who had an active exposure of minimum 5 years in the technical textile sector were only selected. Personal Interviews with the help of Discussion Guide were used for data collection. The data collected was manually analysed by transcribing followed by inductive coding using In Vivo coding method. The codes were then grouped into themes to arrive at key insights.

Objectives

- To study the current landscape of Technical Textiles sector in India
- To identify the challenges faced by the key stakeholders in the sector
- To suggest steps for creating a robust skill development framework for Technical Textiles sector.

Following are the Key Findings of the Research

Discussion Pointers used during the In-depth Interviews:

- Strengthening the existing curriculum of colleges for developing high-quality trained human resources.
- Development of curriculum and R&D infrastructure in line with global standards in technical textiles.
- Developing specialized courses in latest areas of technical textiles.
- International Collaborations for Curriculum Development, Skilling, and Capacity Building.
- The courses and programmes in the institutes need to be updated to make technical textile training a significant part of modern textile engineering and technology education.
- Continuous Learning through Upskilling or reskilling at all levels of the workforce engaged in technical textiles industry.
- Faculty development programmes through International exposure ToTs and technical collaborations.
- Lack of entrepreneurship culture and absence of skill-training for entrepreneurship makes it difficult to attract investment. Curating customized, industry relevant short-term courses based on scientific Training Need Assessment will motivate the students to gravitate towards entrepreneurship.
- Conducting of industry-oriented short-term courses and programmes to encourage and support entrepreneurship.
- Setting up of incubation centres, by providing initial and scaling up funding support by providing
 access to cheaper sources of fund to players associated with the different parts of the value
 chain like startup units, textile innovators and entrepreneurs.
- Infrastructural and mentoring support to startups for R&D on affordable technical textile based products.

Ecosystem

Academic

- Consortium/ Conferences/ Technical Sessions/ Collaborative Research by academic institutes for sharing of information and best practices
- Mapping of research facilities across industries /universities and make the them accessible based on merit of the proposal to facilitate experiments and innovation across the value chain.

Dr. Lipi Choudhury: Making India's Technical Textile Industry Globally Competitive: A Strategic Approach

Setting up of a Centre of Excellence in technical textiles which will act like a knowledge hub and a focal point for exchange and dissemination of latest knowledge about technical textiles. These institutions should be fully equipped with Exhibition hall & product display centre, training centre, testing centre and laboratory.

155

Industry

- Currently, there is no reliable and transparent mechanism to collect pan-India data on the production capacity of different technical textile products. This makes it difficult to calibrate with certainty the production output and the market demand. Therefore, alignment of incentives and the corresponding items with market potential becomes a challenge. Hence, setting up a transparent and reliable data collection mechanism for getting authentic data is important for strategic interventions.
- Lack of information sharing between Supplier-Manufacturer and Customer leads to misalignment of information due to lack of transparency and visibility resulting in ineffective decisions which further compromise the value chain and leads to unnecessary wastage. A mechanism for seamless information flow can significantly improve the efficiency of technical textile industry is India.
- Lack of alignment of technical textile products manufactured in India with globally accepted quality criteria, makes it difficult for Indian manufacturers to match their products with international standards that leads to low are acceptance thereby reducing the global competitiveness. International standardisation to meet the demands of global market needs to be adopted.
- Due to inadequate testing facilities for technical textiles, the Indian manufacturers are forced to send their samples to international laboratories which results in higher cost and greater delays in the product development phase of the product. This in turn affects the speed to market for the new product innovations and thereby increases the competitive threat. Infrastructure investment for setting up of world class testing laboratories is crucial.
- International exposure for key stakeholders through participation in trade shows, exhibitions, workshops, conferences for updating their knowledge about latest developments and leveraging business opportunities.
- Adopting the Public Private Partnership (PPP) Model for encouraging research and bolstering production capacity.

Policymakers

- The policymakers should emphasize the mandatory usage of technical textiles across different ministries and departments. This initiative will ensure the increase in consumption of technical textiles in the domestic market. The various departments under the ministries need to constantly review existing standards, specifications, codes, guidelines and Special Ordering Rules to identify such areas where the mandatory use of technical textiles may be emphasized across various Government projects.
- Constant upgradation of Quality Benchmarks to align the Indian Technical Textiles with global standards.
- Building a transparent system to ensure the technical textiles are sourced from the best producer.
- Facilitating the setting up of R&D centres, comprehensive training of manpower to create a competent workforce and launching policies and schemes that make it lucrative for private players to invest in the sector.

Awareness & Promotion

- Organizing Awareness drives and creating campaigns for communicating the benefits and features of technical textiles.
- Demonstration Centres and Kiosks displaying usage of technical textiles application.
- Investment in branding, design development and product diversification to create visibility and demand.
- Creating Global Positioning and Branding for 'Technical Textiles of India'.

156 Inspira- Journal of Modern Management & Entrepreneurship (JMME), Volume 15, No. 02, April-June, 2025

Conclusion

India, today is on the verge of becoming a superpower with a growing economy leading to constantly rising disposable income that is fuelling consumer demand in all sectors. However, the Indian consumer is shifting their preference towards more sustainable, ethical and durable purchases. This shift is further facilitated by growth in technology, automation, AI and IoT which is resulting in innovative product development, process optimization, efficiency gains and cost reduction. The eco-friendly textiles sector is also getting a boost with major awareness creation platforms like Bharat Tex aimed at attracting international players. The global narrative is changing and India is acting as a major influencer shaping this narrative by leveraging digital technology in process improvement, research and development and decision making for staying competitive continuing with its growth trajectory.

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