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A REVIEW PAPER ON RECENT DEVELOPMENTS IN TECHNICAL TEXTILES IN INDIA

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Abstract

- Purpose: This study has focused on shedding light on the fibers and fabrics that have been newly introduced to the industry. It will further talk about the growth, the global and the domestic market that this industry holds.
- Design: Secondary data was used for conducting this study. A thorough thematic analysis has been made depending on the topic of the study.
- Findings: The report has focused on the development of prospects that are associated with technical textiles and their usage in various sections of work.
- Research Limitation: The information that had been collected from secondary research has led to the issues of lack of originality and authenticity in the research.
- Practical Implication: This study provides us with knowledge of the materials used in the technical textile industry. This study also analyzes the methodology used to conduct the research. This study further shows the global market and domestic market of the industry.
- Originality: The data that had been collected from secondary prospects had been done by taking prior permissions from the authors.

Keywords: developments, India, textile, technical textile

1. Introduction

India is one of the world's most important markets for traditional textiles, natural fibers, and materials (Kumar, 2021). Natural textiles and materials are one example. It is the world's second-largest manufacturer of polyester and a prominent player in the $ 19 billion technical textiles market (Sharma et al., 2022). The technical textiles subsector is expanding and is used in a variety of industries. It is advantageous to use technological textiles in the manner mentioned above. This market segment has expanded as a result of India's increasing industrialization and competitive manufacturing sector. Both of these factors have an impact on growth.

Technical textile development in India has lately expanded to roughly 13% of total apparel and industrial production, with a total GDP of approximately 0.7%. This has also resulted in a 30-70% discrepancy in technical fabric consumption across all contexts in recent years. According to Economic Affairs on National Technical Textile Mission, the domestic market's average growth rate has climbed by 15 to 20%, with activities expected to reach $40 to $50 billion by the fall of

2024 (Investment Promotion and Facilitation Agency | Invest India, 2022). As a result, these considerations givecore knowledge of the importance put on managing textile-related foreign affairs. This research will look at all of the new fibers and fabrics that have been introduced in the industry in recent years. This research will go into greater detail on the product's final application and eventual expansion.

2. Literature Review

New fibers in Technical Textiles

There are tailored materials that fulfil a specific purpose. They are made of natural and synthetic fibers with excellent tensile strength, insulation, and thermal resistance, such as Nomex, Kevlar, Spandex, and Twaron. These components have uses other than textiles. Medicine, construction, vehicle industry, aerospace, sports, defence, and agriculture are among the other industries that use them (Sharma et al., 2022). As a result of technical advances, nations are modernizing their industrial systems to produce textiles using more advanced techniques. In its textile sector, India is shifting from producing traditional textiles to producing technical textiles. Because of the growing popularity of technical textiles, this transformation is taking place.

Petrochemicals and carbon dioxide are necessary for the manufacture of each of these fibers. Several textile firms have made technical fabrics utilizing natural and recycled fibers in recent years. These fibers have the potential to make technical fabrics more environmentally friendly. This indicates their environmental care and expands our access to environmentally friendly textiles. Bamboo and organic cotton are two recent examples of eco-friendly textiles.

1. DuPont Apexa fibre: DuPont Apexa is polyester that can be broken down in an industrial composting process without hurting the soil or the environment. DuPont Apexa is a type of polyester that can be composted and breaks down over time. Since the fibre turns into carbon dioxide and water when it breaks down, there is less textile waste and less damage to the environment (www.fibre2fashion.com, 2022). A patented method was used to make the fibre. Polybutylene succinate and polylactic acid can't handle high temperatures as well as Apexa can. It can be added to wool, cotton, or cellulose to make it stronger, more flexible, and less likely to break. Less textile waste is made when this material is used. Goldwin is a Japanese company that makes clothes from apex fibre.

2. DuPont Sorona Fiber: This biobased PTT polyester polymer is made of 37% annually renewable plant-based ingredients, such as corn and corn starch. DuPont was the company that made Sorona. When making Sorona, 30% less energy is used and 63% less CO2 is released than when making Nylon 6. Sorona uses 40% less energy than Nylon 6, and it makes 56% less pollution. Sorona is 56% less expensive to make (www.technicaltextile.net, 2022). It is utilized in the production of clothing, flooring, office and automobile interiors, and car mats. It can be found in homes, businesses, and cars.

3. Jute Cell Fibre: This fibre can be denoted as a new type of fibre that is made of jute and kenaf through a special process developed by Shandong Helon Co. Ltd. this fibre is important as it leads to the segregation of fibers that are bacteriostatic, anti-fungal, and bactericidal in nature. This entire system being sustainable leads the spinning order to manage and be thicker in approach. This fibre

being environment-friendly has led things to be generated in a proper manner and generalizations productions in areas of healthcare, fashion, and other sectors of textiles in this regard. Due to its durability, this textile is important and also leads to ensuring strength and low extension ability in this regard.

4. Avra Fibre: This fibre has been developed by Eastman and is denoted as a revolutionary technology which leads to the development of cent per cent of a post-consumer recycled pet in this regard. Being a proper manager of both weight and others has led to the growth of the standards of work. This has led them to provide excellent drapes and has developed a matured softness which is vital as that would enable the marketers to focus on them. Being an extremely soft material, the products that are developed by them have led the customers to make it easier to proper products as well as feel free to observe the entire aspect (New Sustainable Fibers for Technical Textiles, 2022). They also provide a cooling effect on the body and make it easier for the customers to adjust to the products made from them. The fabrics that are associated with this context are generally used for active wear as that would lead to the development of active and workout costumes in general.

5. Coolmax EcoMade Fibre: This fibre is important as the production of this fibre is developed through 97 per cent of recycled products and plastic bottles that have been developed from the wastes that are generated from landfills. To create this, the plastic bottles that are used are firstly cleaned and then generate a polyester yarn which is important as that is vital for making yarn for apparel (www.technicaltextile.net, 2022). These fabrics that are developed by them have been cool, dry and with moisture which is vital as that would lead to the emergence of the products.

6. EcoSure Pet Fibre: These fibres are made up of 100 per cent recycled post-consumer pet containers. These fibres have been able to develop from eco-sure good strands and other products that are vital as it is made up of 100 per cent polyesters. These have been denoted as staple products with 1.2 -500 deniers (New biodegradable polyester fibre for apparel solutions, 2022). This fibre is used for elements that have focused on the hygiene care and maintenance of the products that are related to the development of non-woven industrial products and others. Along with this, certain other elements that are associated with this regard geotextiles are loose fibres that are important for the entire production. Other apparels that have been denoted as daily wear too have been generated in this regard.

3. New Fabrics in Technical Textiles

The traditional textiles and natural fabrics of India have already gained international recognition and are considered the second largest producer of polyester in the world. With the time with changing consumer preferences and consumer behaviour for the products, the demand for technical textiles has also increased. The adaptation of technical textiles has become widespread and significantly used in different types of industries, such as construction, agriculture, healthcare and sports apparel. Technical textiles are mainly engineered products having the potential for a significant amount of functionality. Developing technical textiles based on several natural as well as man-made fibres have been used, which made them accessible with high tenacity, improved thermal resistance, and excellent insulation as well. In addition to this, these fibres have been found

as an end-use application across multiple non-conventional textile industries, such as construction, sports, defence, aerospace, automobile, healthcare, agriculture and technical fields as well (Mageean, 2022). As a result of the high number of technical adaptations encourage a significant amount of shift in the Indian textile industries, from traditional to highly technical, with higher capacity. The main reason behind such a shift in the textile industry is mainly the increased demand for people due to the increased population rate and increasing competition within the industry as well.

Technical textiles also known as smart textiles are manufactured from a large number of varieties of fibres and filaments in order to increase their lifespan. Rather than only making changes in the traditional textiles, the technical textiles also encourage different changes in offering value to the wearer. By this time, people have increased their concern towards the health benefits and increased their awareness towards healthy wearing. It encourages the textile industry owners to develop fibres that are antibacterial, insect-proof, odorless, and flame retardant, and minimize the chances of any type of external risks for the wearers. In the process of making protective textiles, the management system of the textile industry has mainly emphasized the contamination, impact, temperature and ultraviolet characteristics of the clothes in order to support the people from environmental toxicity and minimize the chances of any type of contamination with harmful diseases (technicaltextile.net, 2022). On the other hand, for making sports textiles the manufacturing and production system mainly emphasized providing a higher amount of support in order to minimize the rate of any type of bodily harm while playing or doing any type of sports-related activities.

Along with this, textiles too could be used for medical purposes like silk, polyesters, cotton, and polyamide. All these concerns are important as the simple bandage that is used is made of polyester textiles which are developed from fibres of seaweed and are able to act as a major element of cure in this regard. Other than this, hospital gowns too are made of smart fabric that is able to transmit wirelessly vital signs and lead to a better understanding of cardiac patterns. Another vital area where textiles are used is that of that wearable tricorder for babies and which can calculate the baby's body temperature. This also leads to a better understanding of the babies' manner of health in general.

Other than medical textiles, e-textiles are also used which are essential for computers in general. The materials that are used in this regard are batteries and LEDs in general and is being made of silver thread or cloth which are essential. These materials are used for smart clothing and for interior designs (Textile Value Chain, 2022). The mature role that the fabrics play in this regard is that of changing the color and embedding monitors and sensors that are associated with this regard. The applications that are used for wearing the products have led to the development of products that are associated with that tech monitor and others. The story of mobile textiles is important as that would lead to several automobile parts which are sun visors and textiles in this regard. Other than this, model fuel tanks and other options have also been developed to maintain the molten fuel tanks and others that are important as that would be important.

The development of phase change materials has led to the management of the products with much deft as well as the ability to manage the temperature and other aspects which are vital as that would lead to a better understanding of the products. This material protects the battery of the car from sunlight and other aspects (Technical textiles weave a strong growth story in India - IndBiz | Economic Diplomacy Division, 2022).Thus, all these materials have been an essential aspect as that has led to the development of special air conditioning systems which have been vital for the betterment of the products. Therefore, proper manufacturing and betterment of the products suggest that the entire management could be able to manage the aspect with much precision.

Growth

In recent years, the global market for technical textiles has increased substantially, paralleling the overall economic boom (Sharma et al, 2022). The space occupied by the earth itself is expanding. The development of new technologies, the growth of the spectrum of end-use applications, cost-effectiveness, durability, user-friendliness, and environmental friendliness may contribute to the increase in demand for technical textiles in worldwide markets. The sector also benefits from the rise of end-use applications and end-user markets. Two-thirds of the market is comprised of Industrial Technology, Mobile Technology, Building Technology, and Home Technology.

With a compound annual growth rate (CAGR) of 4% between 2018 and 2025, the market for technical textiles is predicted to reach $220 billion by 2025. In 2025, the demand for technical fabrics will be doubles that of today. Asia and the Pacific account for forty percent of the global market for technical textiles. Both Western Europe and North America hold a 25% market share (Sharma et al., 2022).

The Asia-Pacific region holds the largest market share and has led this industry's rapid ascent (Indian Market, 2022). This expansion is the result of more people preferring to reside in metropolitan regions and technological advancements in construction, automobiles, and medical. This is more likely to occur if it is easy to build, does not require a large budget for labor, and is supported by government rules.

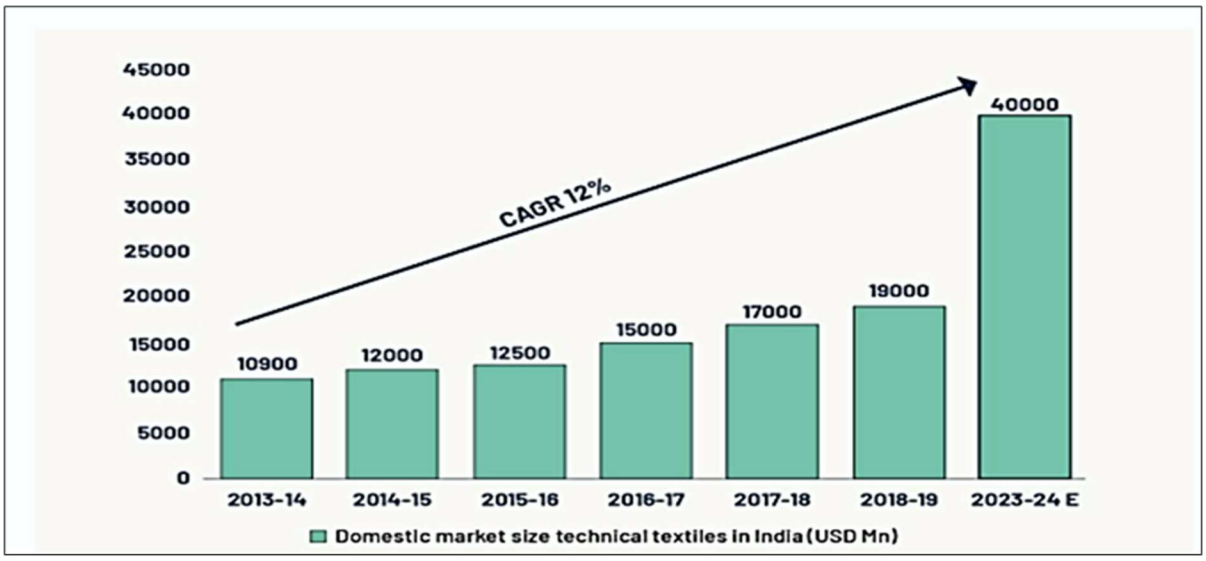

Figure 1: A graph showing the Domestic Market size of technical textiles in India

(Source: Sharma et al., 2022)

Due of Techtex's proximity to several of Europe's biggest automakers, the European Union was Techtex's largest market from 2007 to 2013.(Goworek et al, 2020). Due to the close proximity of Techtex's manufacturing facilities, it was able to do so. Initially, European Techtex products were marketed and sold on foreign export markets as a direct result of the adoption of this strategy. European Techtex manufacturers were able to carve out a substantial market niche because they engaged in R&D and ran their businesses efficiently. Nonetheless, output has declined since 2013, primarily in France and Spain due to a decline in demand from the construction and vehicle industries. In addition to building, the automobile sectors also use concrete.

The Packtech section has been identified as a significant area that focuses on the segmentation of textile products in India, accounting for approximately 36% of the domestic growth share. The current textile market is valued at approximately 41,756 crores, which has contributed to a significant increase in consumption. In India, the products that are eaten can be divided into 12 essential categories that relate to the production of bulk products (Indian Technical Textile Industry, 2022). All of these parity and advancements have contributed to the expansion of the elements linked with the country's fourth-place ranking in terms of purchasing power parity. The emphasis is placed on the rapid expansion of Indian productions and the significance accorded to them.

4. Objectives of the study

- To know about the new fabrics introduced in the Technical Textile industry
- To learn about the new fibres in the Technical Textile industry
- To know about the global market of the Technical Textile Industry
- To know about the domestic market size of Technical Textile Industry in India

5. Research Methodology

This research had been conducted using secondary analysis methods by only focusing on the elements of literature review which had provided amount of information about the topic. The descriptive approach had been done in order to understand the details and take vital areas of information in this regard. The interpretive method has been done to gather information and data according to the necessity (Alharahsheh and Pius, 2020). The data collection process has enabled the researchers to understand the major techniques that are associated with this regard. These notions enabled the researchers to understand the various issues that are associated with the principles as well as maintain the standard of work.

6. Findings

The research study emphasizes the various current developments incurred within the technical textile sector in India. India currently ranks second across the globe in terms of the largest polyester producing and emerging as one of the significant nations in the sector of technical textiles and accounts for up to 19-billion-dollar contribution to the market. The application of end-use products associated with technical textiles could be seen widely in various fields, such as sports apparel, construction, healthcare, agriculture, and several others. Technical textile comprises about 13 percent of the total textile industry of India (Revaiah et al. 2019) and contributes 0.7 percent of the

total GDP of India. In the past few years, this sector has been growing significantly and emerged as a key player in the Indian market. The demand for technical textiles had shown rapid growth in the Indian market at present times.

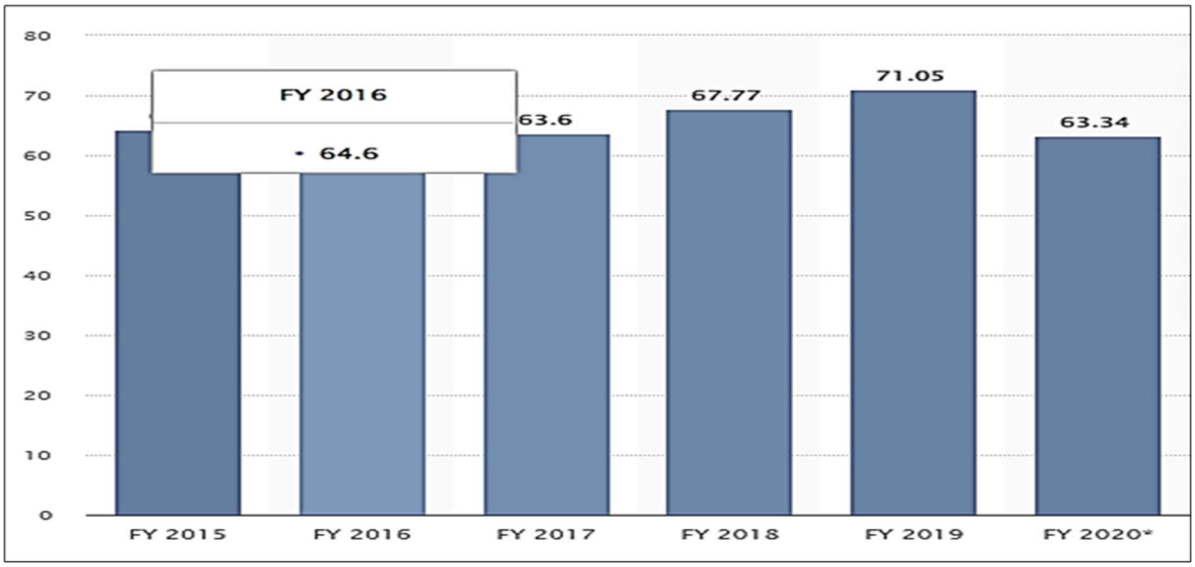

Figure 2: Technical Textile Growth in India
(Revaiah et al. 2019)

Various types of technical textiles are significantly performing better than the products associated with conventional textiles basically as these are consumer-driven products. The technical textiles are used in various agro purposes like gardening, forestry, horticulture, agriculture, cattle farming, and others. In the clothing industry, the usage of technical textiles is also enhancing significantly, such as, in railways, dam construction, hydraulic installation, irrigation purposes, etc. In the construction of buildings, technical textiles are playing a key role nowadays and getting popular in the construction sector in the last 3-4 years (Moazzem et al., 2021). Technical textiles are also useful for the medical sector alongside the industries which deal with the manufacturing of interior and furnishing industry as well as the manufacturing of sportswear and leisurewear.

7. Conclusion

The development of textiles in the Indian context had been an essential area of concern as that would acknowledge the factors that are essential for the overall development of the sectors. The new textiles that have been important in this regard had been majorly discussed in this regard as well as the major sustainable fibres that are associated with the development of the sectors in general. In order to enhance the performance, the various factors and places where fibres are used have been dealt with and have led to a better determination of standards of working. The growth rate that is associated with this context has been an effective one as that would lead to a better adjustment of the standards of working which are necessary to understand the importance related to these sectors. Thus, all these have been analysed and developed in great detail in this regard.

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