From Yarn to Tomorrow: Unearthing Sustainable Textile Practices in India's Past, Present, and Future

Supriti Agrawal*
Kushagra Rajendra**
Vaidehi Binzani***
Ria Ghoshal****

Abstract

Indian textile industry is currently experiencing a shift towards sustainability in response to growing concerns about the environment and social issues. Textile industry is projected to reach a value of US $387.3 billion by 2028 and shows immense potential for adoption of eco-friendly and ethical practices. This research focuses on examining the historical development, current state, and future aspects of the industry. In the past, the industry has been associated with environmental degradation and exploitative labour practices. However, there is now a global movement towards reducing ecological impact and promoting fair working conditions. The objective of this study is to analyse ancient sustainable traditions in India to gain insights into the challenges faced by the apparel industry today. Further, it also explores past and current innovative practices and emphasizes the revival of traditional, eco-friendly techniques. This paper uses descriptive research. It employs a secondary data methodology, and an extensive review was conducted through scholarly literature, reports, and articles.

Keywords: Sustainability, Textile industry, Upcycling, Sustainable development goals, Environmental impact, Textile waste management, Higgs index

* *Associate Professor, Amity Business School, AUH , India*

** *Associate Professor & HOD, Amity School of Earth & Environmental Science, AUH , India*

*** *MBA Student, Amity Business School, AUH, India*

**** *MBA Student, Amity Business School, AUH , India*

https://doi.org/10.53056/njmsr-2024.7.1.008 https://www.nepjol.info/index.php/njmsr/index

1. INTRODUCTION

Indian textile industry is the second largest producer of Man-Made Fibre (MMF) globally, after China, and the third largest exporter of Textiles & Apparel. It plays a crucial role in the national economy, contributing 10.5% to India's total merchandise exports in 2021-22. India's share in global trade for textiles and apparel is 4.6%, with key export destinations being the USA, EU-27, and UK. Same is mentioned by the *Textile Minister of Maharashtra Chandrakant (Dada) Patil, he stated "The launch of Textiles Policy 2023-28 signifies a pivotal step in Maharashtra's journey towards progress. With an ambitious goal of attracting investments worth Rs 25,000 crore and creating job opportunities for 5 lakh individuals, this policy exemplifies our commitment. to the industry's growth and sustainability. It also places critical emphasis on the promising field of Technical Textiles. Furthermore, our policy is firmly rooted in the vision outlined by our Honourable Prime Minister, aligning. with the collective goal of propelling India towards developed nation status by 2047 (Gosh, 2024)."*

This paper explores the opportunities and challenges faced by the global textile industry, and how they manifest in the Indian context, particularly within the cottage industry (Mishra, 2023). The Indian textile cottage industry, often operates on a smaller scale, has the potential to align with Sustainable Development Goals especially SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production). It offers huge employment opportunities to rural areas, women, and marginalized communities, encourages sustainable and ethical practices, and reduces the environmental impact of the textile sector (Raichurkar, 2015).

However, there are many challenges, such as resource inefficiency and inadequate infrastructure, which need to be addressed for the industry in achieving the potential of three SDGs.

Meanwhile, global textile industry is also grappling with a multitude of pressing issues such as environmental sustainability concerns like usage of excessive water, energy consumption and inadequate waste management. It creates havoc to environment.

While labour conditions have shown slight improvement in the broader Indian textile industry, but sometimes it lags in providing fair wages and safe working conditions and therefore raises concerns about the well-being of its workforce. Notable economic disparities persist, and opportunity gap widens between large-scale manufacturers and the small-scale players. Furthermore, the presence of inadequate government policies and regulations hinders the sustainable growth of the textile industry and the attainment of Sustainable Development Goals (SDGs). It emphasizes the need for a more comprehensive and supportive regulatory framework to foster equitable and sustainable development within the industry.

Indian textile industry is facing several major challenges. First one is availability of lower quality raw materials. It highlights the need for comprehensive quality control is require during production process Second one is significant decline in the number of skilled artisans in traditional arts such as zardozi and kantha. Global appeal of Indian textile industry had

https://www.nepjol.info/index.php/njmsr/index https://doi.org/10.53056/njmsr-2024.7.1.008

declined significantly and making skilling essential for job creation. Third one is insufficient compensation is paid to artisans despite the global demand for traditional arts. Fourth challenge is that textile industry is strongly influenced by the phenomenon of fast fashion, characterized by cheap trendy clothes and the influence of celebrity culture, resulting in "limited edition" products that encourage overconsumption and industrial dependence on cheap, toxic dyes contribute to it being one of the main polluters of clean water. Thus, Indian textile industry is struggling with an unfavourable infrastructure that raises production and transaction costs and significantly hinders growth. Need of the hour is to address these multifaceted challenges then only sustainability and prosperity of the Indian textile industry can be restored (Mishra, 2022).

Restoring the traditional practices and embracing innovation is crucial for the growth of sustainable Indian textile and cottage industry. Reusing textiles, upcycling, and promoting sharing within communities can minimize waste. Recycling textile waste and using reclaimed materials reduces damage caused to environment. Recovery involves salvaging value from waste, like extracting natural dyes from plant waste and encouraging textile repair and maintenance. These practices not only reduce environmental impact but also empower artisans and promote economic growth, aligning the industry with achieving sustainability goals (Assomull, 2021).

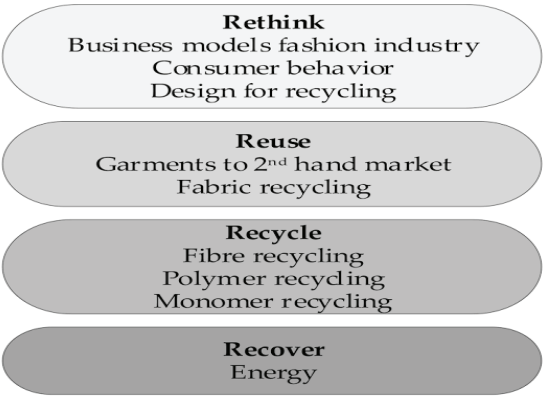

Figure 1: Circular solutions to textiles (Pauline et al 2021)

As mentioned in figure 1, these 4 Rs (rethink, reuse, recycle and recover) play crucial role in fostering equitable and sustainable development in the textile industry. It is imperative to address these multifaceted challenges and then only industry will shift towards sustainable and innovative practices that will be aligned with the goals of achieving economic prosperity and environmental responsibility Chopra & Satyam (2022).

As per Ellen McArthur Foundation report (2017), currently only less than 1 % of the fibres are used for producing recycled clothing. Textile industry uses large amounts of resources and effects environment negatively. Therefore, industry is shifting from linear approach (increases resource demand, consumption, and waste) to circular economy approach (designs durable, reusable, and repairable products utilizing resources that can be recovered and recycled at the End of Life (EOL)). Further, figure 2 indicates the five current approaches

https://doi.org/10.53056/njmsr-2024.7.1.008 https://www.nepjol.info/index.php/njmsr/index

for disposing textile waste management, i.e. recycling, reuse, downcycling, landfilling, and incineration.

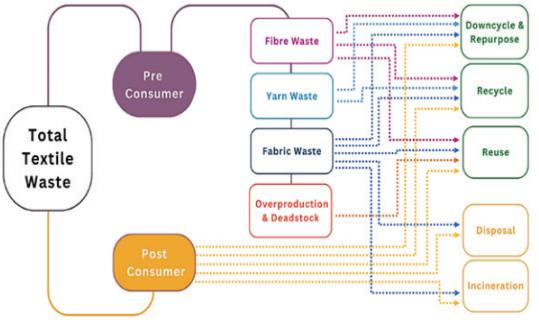

Figure 2 Approaches for disposing Textile Waste Management

Usually, industry players are not aware about the waste utilization techniques, and they dump waste in landfills, and it harms environment a lot. There are various ways by which textile waste can be managed. As shown in table 1 (Dwivedi, 2023), few common methods such as downcycling, recycling, reuse, and disposal are used for disposing this harmful waste in sustainable form. Downcycling is the conversion of waste into a lower quality product, while recycling is converting waste into a new product of the same quality.

Table 1 Techniques for managing Textile Waste in Sustainable way.

Waste Type	End Use	Waste	Application
Fibre Waste	Downcycle & Repurpose	Cotton sweep waste and waste from OE spinning mills	As raw material for allied industries
	Recycle	Comber and Pneumafil waste	As coarser yarn for denim
Yarn Waste	Downcycle & Repurpose	Denim yarn, End bits of Beam	Used to make ropes
	Recycle	Sized yarn	Shredded into fibres
Fabric waste	Downcycle & Repurpose	Blended and mixed colour fibres	Bags
	Recycle	Knitted and woven white and solids cotton cut waste	White and coloured recycled yarn
	Reuse	Clean bigger and medium cut piece	Apparel
	Disposal	Soiled small cut waste	Worn clothes are sent to landfill
	Incineration	Polyester cut waste	As boiler fuel
Overproduction & Deadstock	Reuse	Garments from overproduction	Stock lot sale Stock lot sale Stock lot sale
Post-Consumer Waste	Downcycle & Repurpose	Blended and mixed colour clothes	Bags, filler for mattress and cushion
	Recycle	Knitted and woven white and solids cotton clothes	White and coloured recycled yarn
	Reuse	Outsized clothes	Second-hand apparel
	Disposal	Wipes made from clothes	Sent to landfill
	Incineration	Soiled clothes	Municipal incineration plant

Reuse is using waste products again and again without converting it into a new product and Disposal is sending waste to a landfill or incinerator. Thus, industry can choose any of this method to dispose textile waste in environmentally friendly way and thus can progress towards circular economy with sustainability. Sometimes, this waste is downcycled to other industries such as pulp, automobile, fuel for small businesses, etc. Artificial recycled fibres also come from PET bottles and pre consumer waste too. This recycling of fibre begins predominantly with producing coarse recycled yarn through open-end spinning.

https://www.nepjol.info/index.php/njmsr/index https://doi.org/10.53056/njmsr-2024.7.1.008

Therefore, it is the need of the hour that Governmental and industry players should come together for adopting sustainability practices that will take care of climate change, save finite natural resources, minimize pollution, and prevent supply chain disruptions. Schumacher & Forester (2022).

2. REVIEW OF LITERATURE

Secondary sources were used to review literatures, reports, research papers and publications of national and international origin for this study. The Indian textile industry stands as a diverse and rich sector, spanning a wide range of activities that encompass both traditional and modern facets Loutfy & Shiward (2021). It covers a broad spectrum i.e. ranging from the time-honoured hand-woven craftsmanship to the technologically advanced, capital-intensive mill sector (Kumari, 2021).

It also includes activities in decentralized power looms, hosiery, knitting, handicrafts, and a variety of fibres, such as man-made fibre, cotton, silk, jute, and wool. What sets the Indian textile industry apart from its global counterparts is its profound connection to agriculture and its deep-rooted association with the culture and traditions of the nation D & Lal (2019a). India provides raw material support and exports textiles all over as shown in figure 3 that outlines the raw material support provided by the Indian textile industry.

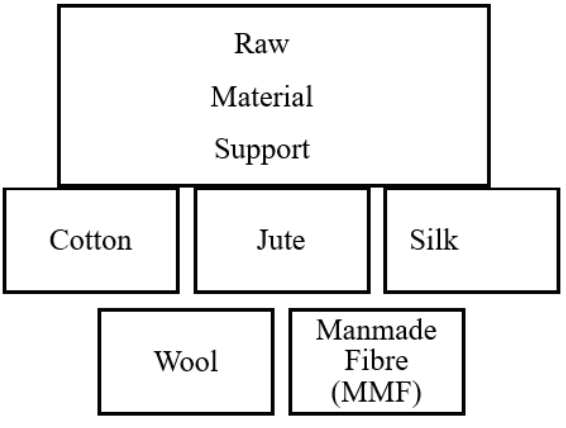

Figure 3 Ministry of Textiles, Annual Report 2022-23

India boasts the world's largest domestic and export-oriented textile and apparel industry. With a history steeped in fine craftsmanship and the commencement of exports in the mid-1960s, this sector has played a pivotal role in driving significant socioeconomic development for the nation over the past four decades (Ketki, 2021).

Presently, the industry is valued at a substantial US$200 billion, making noteworthy contributions to India's gross domestic product (3%), industrial manufacturing (13%), export revenue (12%), and offering direct employment opportunities to approximately 45 million individuals (Khurana, 2022).

India stands as a leading global producer of cotton and jute, and it holds the second position in silk production worldwide. Furthermore, an impressive 95% of hand-woven fabrics across the globe originate from India (Rathee, 2024).

https://doi.org/10.53056/njmsr-2024.7.1.008 https://www.nepjol.info/index.php/njmsr/index

The Indian textile industry has been interwoven with the nation's civilization for centuries, featuring a rich tradition of cottage industries. India was known as "golden bird" harks back to its inclusive societies that prioritized economic equity, although the challenge of rapid population growth has posed a significant hurdle D & Lal (2019b).

As per Indian textile and apparel industry analysis 2023, the textile and apparel sector in India is poised to reach an estimated $190 billion by FY 2026. Besides this impressive growth rate, textile industry is also generating substantial waste and polluting environment. This sector employs over 8,000 chemicals, some of which have been linked to serious health conditions, such as cancer (Vishwakarma, 2022).

Textile industry is characterized by its diversity and heterogeneity and encompasses both traditional textiles and technical textiles. In the category of traditional textile segment, it supplies textile materials for various types of clothing, and they are derived from raw materials like cotton, jute, silk, wool, and others. Further under technical textile segment, it can be categorized into two main segments: the organized mill sector and the decentralized, unorganized sector. The organized sector in the textile industry comprises mills, which can take the form of spinning mills or composite mills (Simi, 2012) and (Chugan,2011).

Huge environmental challenges are linked to cotton production. Cotton cultivation involves the extensive use of chemicals, surpassing the usage in any other crop. Additionally, it also demands substantial water resources and relies on pesticides, which have detrimental effects on freshwater sources, leading to water pollution, as indicated in various studies including Hansen and Schaltegger (2013), Sharma and Narula (2020).

Textile industry also leads to air pollution both before fiber processing and during the spinning and weaving processes, resulting in the emission of dust, cotton lint, and other pollutants. These emissions have a detrimental effect on the working conditions within the industry, as documented by (Blackburn, 2009) and (Allwood, 2008). The textile industry is one of the most water-intensive sectors, using water at every stage, from initial chemical treatment to cloth washing. The effluents produced during textile processing contribute to non-biodegradable waste (Vishwakarma, 2022).

Sustainable development in the modern world of the textile industry can be seen through several strategic practices. Recycling plays a central role: recycling textiles and clothing extends their life cycle and minimizes environmental impact. Recycling also plays a key role, as it involves the reprocessing of product scraps, used clothing and fiber materials, which reduces the generation of waste and the consumption of resources. In addition, global brands increasingly accept a refusal to participate in a fast fashion culture that adheres to sustainable principles and reduces excessive and unnecessary clothing consumption. Finally, a concerted effort to reduce waste in the production process will not only increase efficiency but also reduce the global environmental footprint of the Indian textile industry, ultimately promoting the ideals of a circular economy and sustainable growth (Rahman & Siddiqua, 2022).

https://www.nepjol.info/index.php/njmsr/index https://doi.org/10.53056/njmsr-2024.7.1.008

India's ancient textile practices are deeply rooted in sustainability and environmental friendliness. India and its historical ability to produce natural dyes, including the famous blue and red dyes, remained unmatched until the advent of Western chemical dyes in the 1800s. Natural dyes were generally obtained from readily available natural sources that were cost-effective and biodegradable alternative to synthetic dyes and thus emphasizes environmental friendliness. The tradition of handlooms dating back to the Indus Valley Civilization is still an environmentally friendly, low-emission method of textile production that modern machines avoid. In addition, India has long been dedicated to recycling and favours the transition to a circular economy, using old clothes and reusing them in various products, which significantly reduces waste and promotes sustainability. These ancient practices exemplify the historical commitment to environmentally conscious textile production methods in India (Mishra, 2023).

The textile industry is undergoing a transformative phase, driven by the need for sustainable and environmentally responsible practices, such as utilization of smart textiles, biotechnology, nanotechnology, capacity building in embroidery dying art, and the thriving trend of sustainable fashion (Shah, 2022).

Lot of technological innovations such as AI, automation, robotics are leading to better efficiency and redefining industry standards. It also promotes better transparency and traceability across the industry (Bureau, 2024).

Textiles and garments may face challenges with sustainability throughout their life cycles in the specified dimensions (Bhargava, 2023). The most common challenges are mentioned in Figure 4. Though lot of initiatives are now taken care for minimizing these challenges, still it's a long way to go.

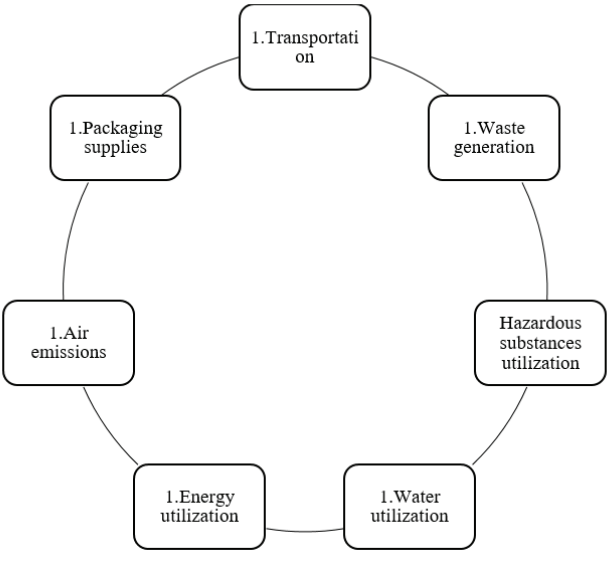

Figure 4 Compiled by author from (Bhargava, 2023)

https://doi.org/10.53056/njmsr-2024.7.1.008 https://www.nepjol.info/index.php/njmsr/index

The textile industry is experiencing a wave of innovation and change in sustainable practices. Smart textiles like Aditya Birla's liva reviva and Coats ecoverde are at the forefront, offering transparency, traceability, and eco-friendly production. Biotechnology using enzymes revolutionizes textile chemical processes and harmonizes with green technology. Nanotechnology strengthens textiles against environmental factors and increases durability and resistance. Capacity building in traditional embroidery and dyeing preserves cultural heritage and empowers skilled artisans (Maity & Mohapatra, 2013) .

In addition, the growing shift towards conservation, especially among eco-conscious Gen Z consumers, diverts clothing from landfill and reduces the demand for new production, a significant step towards a more sustainable textile industry (Harsanto, 2023). Same is highlighted in Mc Kinsey report (2023). As per report, textile industry is changing due to sustainability concerns, impacting sourcing, distribution, and operations. Sustainability is now crucial for textile businesses, driving innovation and competitiveness. It's imperative to recognize the key tools and strategies that will drive positive changes.

Developed by the Sustainable Apparel Coalition (SAC), the Higg Index is a set of standardized tools used by more than 21,000 organizations worldwide to assess and improve their social and environmental sustainability (Temmes, 2017). It consists of five key modules that assess aspects of different value chains. Integrating the Higg Index into materiality assessment enhances transparency, stakeholder engagement, and long-term sustainability, making it a key resource for building sustainability strategies and driving industry-wide change (Jones, 2019).

To maximize this impact, governments and organizations can consider policy recommendations such as supporting information infrastructure for small and medium-sized businesses. providing training and capacity-building programs, encouraging transparency through tax incentives, and promoting industry collaboration to promote widespread adoption and implementation of information (Sri & Sai, 2014).

3. DISCUSSION

This section presents key insights and findings that emerge from this review, shedding light on the challenges and opportunities in textile industry.

Indian textile industry has a deep historical legacy that emphasizes the importance of sustainability Singh and Rani (2021) that was inherited through ancient techniques such as natural dyeing, hand-made weaving, and recycling, deeply rooted in the fabric of land and culture. This legacy had been passed down from past generations.

These ancient practices have enormous potential to promote sustainable and ecological textile production, align them with the goals of Sustainable Development Goal 12 (Responsible Consumption and Production) by promoting environmentally conscious methods, and demonstrate India's commitment to its conservation. rich textile heritage promoting sustainable practices (Yoganandan, 2016).

The contemporary landscape of the Indian textile industry is characterized by formidable

https://www.nepjol.info/index.php/njmsr/index https://doi.org/10.53056/njmsr-2024.7.1.008

challenges that reflect the broader issues facing the global textile industry, such as excessive water and energy consumption, optimal waste management, and inefficient use of resources. (Dwivedi, 2023). Although working conditions have improved, the industry requires continued attention to ensure fair wages and safe working conditions (Ajala, 2014).

Amidst these challenges, the Higgs Index had emerged as a transformative tool, empowering consumers, and catalysing sustainability within the industry by offering transparent data on environmental and social performance. It empowers consumer by providing data on the environmental and social performance of textile products. Thus, industry will not only contribute to responsible consumption and production but also enhance its market appeal. Furthermore, an increased focus on awareness, coupled with the adoption of indices like Higgs, has the potential to lead to a cultural shift toward responsible and sustainable consumption, which is vital for the advancement of SDG 12.

This concerted effort fosters a culture of sustainability among consumers, presenting the Indian textile sector with a unique opportunity to lead by example in driving substantive progress toward ethical and sustainable practices. In addition, the significant economic disparity between large-scale producers and domestic industries can exacerbate socio-economic inequalities.

According to the textile industry report' (2023), demographic profile of the artisans gives an insight for industry as depicted in Table 1.

Table 1 Demographic Profile of Artisans

Female	56.13%
Male	43.87%
Schedule Cast	20.80 %
Schedule Tribe	07.50 %
Other Backward Class	52.40 %
General Category	19.20 %

Source: Ministry of Textiles, Annual Report (2022-23)

56.13% are the female artisans that highlights the involvement of women is more than male artisan. Distribution of artisans across several social categories are backward class category (52.40%), Schedule Castes (20.80%) and Schedule Tribes (7.50%). By understanding these dynamics, diversity of workforce plays crucial role in promoting inclusive growth. In addition, inadequate governmental policies and regulatory frameworks present significant obstacles to industry and the pursuit of sustainability. This highlights the need for comprehensive and supportive measures to effectively respond to these multifaceted challenges (Kumar, 2018). India's textile industry has significant potential to contribute to the achievement of the Sustainable Development Goals (SDGs), especially SDG 8 (decent work and economic

https://doi.org/10.53056/njmsr-2024.7.1.008 https://www.nepjol.info/index.php/njmsr/index

growth)(Kalia, 2023), SDG 12 (responsible consumption and production) and SDG 1 (no poverty) (Gabriel, 2019).This sector promotes job opportunities, especially for women (Karuppannan, 2021)and marginalized communities, in line with the goals of SDG 8 (Sharma & Chaturvedi, 2020).

In addition, it can promote the adoption of sustainable and ethical practices, reducing the environmental impact of the textile industry, which is a decisive factor of SDG 12 (Küfeoğlu, 2022).

At the same time, its support for the livelihood of rural areas corresponds to the aspirations of SDG 1 (Kulkarni, 2020). However, to achieve these SDGs, existing problems such as resource inefficiencies and infrastructure gaps must be addressed to release the full potential of the cottage industry and align with these SDGs (Morton, 2017).

Textile industry can also attain all three sustainable Development Goals (SDGs) i.e. SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production) by working holistically on three dimensions social, economic, and environmental as depicted in figure 4.

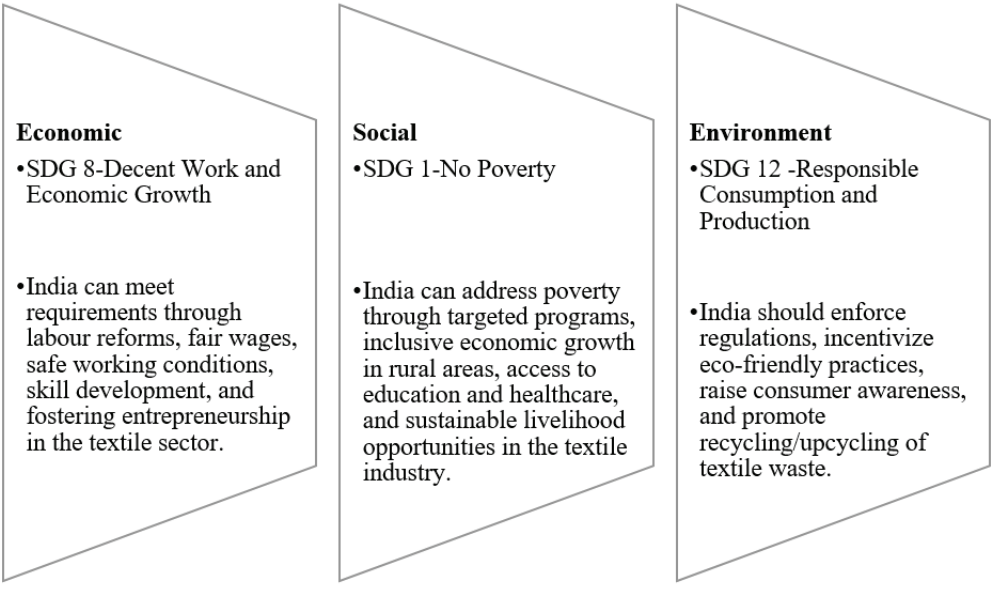

Figure 4 Dimensions of Textile Industry in attaining SDGs

Source: Own Compilation

Innovative sustainable practices are reshaping the textile industry, as evidenced by the emergence of smart textiles (Adak & Mukhopadhyay, 2023), manifested in products such as LIVA REVIVA and Coats ecoverde. These advances demonstrate the transformative power of technology in creating sustainable textile solutions, actively considering environmental aspects, and improving industry and overall sustainability (Abbate, 2023).These innovations

highlight the promising shift towards environmentally conscious and responsible textile production (Editorial, 2022)

A significant change in the behaviour of the consumer, especially of Generation Z, is transforming the fashion landscape characterized by "frugality antiquota; and used clothes. This emerging trend not only diverts clothing from landfills but also actively reduces the demand for new clothing production in line with the Sustainable Development Goals (Grigoreva, 2021). It reflects a growing commitment to environmentally conscious and responsible fashion choices (Kaur, 2023), marking an important step towards a more sustainable fashion industry (Khandual & Pradhan, 2019).

In summation, the findings articulated within the literature review accentuate the unique opportunity within the Indian textile industry to leverage its rich historical legacy, integrating innovative practices, and aligning it with SDGs to confront the complex challenges it is facing. By harnessing traditional eco-friendly techniques while integrating modern innovations, the industry can make substantial contributions to environmental and social sustainability (Azeem, 2019).

Concomitantly, addressing policy gaps and championing equitable working conditions are pivotal to realizing the industry's latent potential for sustainable development (Furferi, 2022).These insights serve as a compass guiding for future research and initiatives aimed at redefining the Indian textile industry into a responsible and sustainable sector (Sri & Sai, 2014).

Spanning from traditional handloom weaving to modern manufacturing, this industry embodies a harmonious blend of heritage and innovation, providing livelihoods for millions. It is interesting to see the connect among industry growth, environmental sustainability, and community well-being in Indian textile cottage industry within the framework of Sustainable Development Goals (SDGs). But resource inefficiency and inadequate infrastructure are a challenge.

Indian government had also launched various programs in this regard as mentioned in table 2.

Table 2 Government schemes for Indian Textile Industry

S. No.	Scheme Name	Year of Establishment	Description
1.	Ambedkar Hastshilp Vikas Yojana (AHVY)	2002	This initiative aims to promote Indian handicrafts by transforming artisan clusters into self-reliant community enterprises through active member participation & collaboration.
2.	Scheme for Integrated Textile Park (SITP)	2005	The Scheme for Integrated Textile Parks (SITP) has been in operation since the 10th Five Year Plan, aiming to offer the textile industry top-notch infrastructure facilities.

https://doi.org/10.53056/njmsr-2024.7.1.008 https://www.nepjol.info/index.php/njmsr/index

3.	Integrated Processing Development Scheme (IPDS)	2013	The IPDS works to enhance the Indian textile industry's global competitiveness through eco-friendly processing standards and technology, assisting textile units in meeting environmental regulations.
4.	Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY)	2015	The PMJJBY offers life insurance coverage for handloom weavers/workers aged 18-50 for one year, renewable annually. In case of death, Rs. 2.00 lakh will be paid out.
5.	Pradhan Mantri Credit Scheme for Power loom Weavers	2017	The Indian Government supports Power loom weavers with timely and adequate financial aid for their credit requirements, including investment and working capital, in a flexible and cost-effective manner.

Source: Ministry of Textiles, Annual Report 2022-23

Rich heritage of ancient Indian practices like usage of natural dyes, handloom weaving, and upcycling are not only reconnecting to eco-friendly alternatives but also aligns with sustainability practices. Transformative power of contemporary innovations like smart textiles, biotechnology, and nanotechnology are propelling the industry towards a greener and more resilient future.

The growing popularity of sustainable fashion, particularly among the environmentally conscious Generation Z, is reshaping the narrative, emphasizing the importance of 'thrifting' to prevent clothing from ending up in landfills.

4. CONCLUSION

Study concludes that Indian textile industry is integrated their traditional practices with various eco-friendly strategies for creating better future where heritage and innovation can coexist harmoniously. Then only tradition can intertwine seamlessly with the yarn of progress.

Considering the in-depth analysis presented in this research, a set of tailored recommendations emerges as a guide to stakeholders, decision-makers, and industry players for more sustainable and ethically sound future for the Indian textile industry.

Economic growth and cultural heritage can be promoted by implementing skill enhancement, training programs, knowledge of marketing and e-commerce in textile industry. Industry should also focus on enhancing the skillset of artisans for creating high-quality and marketable products, In this way, textile industry can contribute to Sustainable Development Goal (SDG) 8, which focuses on decent work and economic growth. Furthermore, these programs empower artisans, particularly women and marginalized communities, by providing them with the skills and knowledge they need to secure meaningful employment, reducing poverty (SDG 1). Prioritizing worker welfare is not only a moral imperative but also a crucial factor in the industry's long-term sustainability and it is also aligned with SDG 8.

https://www.nepjol.info/index.php/njmsr/index https://doi.org/10.53056/njmsr-2024.7.1.008

Ensuring fair wages, safe working conditions, and social protection for workers contributes to a healthy and productive workforce. Compliance with labour standards and regulations is not only a legal requirement but also essential for worker well-being. This inclusive approach can help bridge the income and opportunity gap, thereby reducing poverty (SDG 1) and promoting social equity. Additionally, improved labour conditions can enhance the industry's reputation, making it more appealing to consumers who seek ethically produced goods, contributing to responsible consumption and production (SDG 12).

Promoting sustainable practices in the textile industry is pivotal for reducing its environmental footprint and aligning with SDG 12, which emphasizes responsible consumption and production. Sustainable practices, such as resource efficiency, reduced water and energy consumption, and the usage of eco-friendly dyes and materials, can significantly lower the industry's impact on the environment. Encouraging the use of reclaimed and recycled textiles further minimizes waste and contributes to a more circular and environmentally responsible model of production. These practices not only align with SDG 12 but also support the economic growth and longevity of the industry, attracting consumers who are increasingly conscious of the environmental and social impacts of their choices. By adopting sustainability, the Indian textile industry can play a more prominent role in shaping a responsible and inclusive economy in line with SDG 8 and SDG 1.

4.1 Recommendation

Few recommendations such as setting sustainable development policies in sync with the Sustainable Development Goals, promoting craftsmanship through capacity building and financial support, adopting traditional practices such as natural dyes and recycling, embracing technical innovation, increasing consumer education and awareness, developing common systems, and build collaborative capacity can add value to the progressive textile industry. Financial incentive scheme from government, promotion of transparency in supply chains, synergy between the public and private sectors and the introduction of monitoring and reporting mechanisms will further boost momentum of growth in textile industry.

By incorporating these directives, the Indian textile industry is embarking on a journey toward sustainability, aligning its rich heritage with environmental conscientiousness, social justice, and economic resilience. Implementation of these recommendations can benefit not only the industry but contribute to global efforts to address the environmental and social challenges facing the textile industry.

In addition to promoting sustainable practices, raising consumer awareness about the environmental and social impact of their choices can be amplified using indices like the Higgs Index. Such indices provide consumers with transparent and measurable information about the ethical and ecological footprint of the products they purchase, aligning with the principles of responsible consumption and production as per SDG 12. By embracing change, fostering innovation, and staying customer-centric, Indian textile industry can navigate the dynamic currents of the industry and secure a prosperous future in 2024 and beyond.

https://doi.org/10.53056/njmsr-2024.7.1.008 https://www.nepjol.info/index.php/njmsr/index

REFERENCES

Abbate, S., Centobelli, P., Cerchione, R., Nadeem, S. P., & Riccio, E. (2023). Sustainability trends and gaps in the textile, apparel and fashion industries. *Environment, Development and Sustainability*. Springer Science and Business Media B.V. https://doi.org/10.1007/s10668-022-02887-2.

Adak, B., & Mukhopadhyay, S. (2023). Smart and functional textiles. *Smart and Functional Textiles*. De Gruyter. https://doi.org/10.1515/9783110759747.

Ajala, E. M. (2014). *Working conditions, grievance procedures and fringe benefits as determinants of labour turnover in selected industries.* Oyo State, Nigeria.

BAR (2023). Approaches for circular textile and apparel industry in India. *Baseline Assessment Report* (2023).

Assomull, S. (2021, January 15). Learning from India's ancient take on upcycling. *Vogue Business.*

Azeem, M., Iqbal, N., Mir, R. A., Adeel, S., Batool, F., Khan, A. A., & Gul, S. (2019). Harnessing natural colorants from algal species for fabric dyeing: a sustainable eco-friendly approach for textile processing. *Journal of Applied Phycology*, *31*(6), 3941–3948. https://doi.org/10.1007/s10811-019-01848-z.

Bhargava, A. (2023). *Indian Textile Industry and Sustainability: a Literature Review, 11.* www.ijcrt.org.

Bureau, B. online. (2024, January 2). India-centric shift in global textile dynamics. *Bw Businessworld .*

Chopra, N., & Satyan, D. (2022, July). Mapping the extent of circularity in Indian fashion & textiles industry using ReSOLVE framework. *IFFTI India 2021: Fashioning Resurgence – Our Time Is Now@ Pearl Academy*.

Dwivedi. S., Kshirsagar.M, Arora.K., Pandey. P, Arole. J, Fernandes. M., & Venugopal. K. (2023) https://www.ceeindia.org/pdf_files/Baseline%20Assessment%20Report%20(Digital%20Version).pdf.

Editorial, S. G. (2022, March 11). How Birla Cellulose is scaling its circular liva reviva fibers. *Sourcing Journal.*

Furferi, R., Volpe, Y., & Mantellassi, F. (2022). Circular economy guidelines for the textile industry. *Sustainability (Switzerland), 14(17).* https://doi.org/10.3390/su141711111.

Gabriel Marisa, L. D. L. M. (2019). Sustainable development goal 12 and its relationship with the textile industry. *The UN Sustainable Development Goals for the Textile and Fashion Industry .*

Grigoreva, E. A., Garifova, L. F., & Polovkina, E. A. (2021). Consumer behavior in the information economy: Generation Z. *International Journal of Financial Research*, *12*(2), 164. https://doi.org/10.5430/ijfr.v12n2p164.

Gosh.A (2024). *https://www.indianretailer.com/article/retail-business/trends/textile-industry-targets-5-pc-gdp-share-2030-doubling-current.*

Harsanto, B., Primiana, I., Sarasi, V., & Satyakti, Y. (2023). Sustainability innovation in the textile industry: A systematic review. *Sustainability (Switzerland), 15 (2).* MDPI. https://doi.org/10.3390/su15021549.

Hasanuzzaman, & Bhar, C. (2016). Indian textile industry and its impact on the environment and health: A review. *International Journal of Information Systems in the Service Sector, 8 (4),* 33–46. IGI Global. https://doi.org/10.4018/IJISSS.2016100103.

IBEF Report (2023) Indian textiles and apparel industry analysis. *https://www.ibef.org/industry/textiles.*

Jones, L., Demirkaya, M., & Bethmann, E. (2019). Global value chain analysis: Concepts and approaches. *United States International Trade Commission. Journal of International Commerce and Economics*.

Kalia, P., Singla, M., & Kaushal, R. (2023). Human resource management practices and employee retention in the Indian textile industry. *International Journal of Productivity and Performance Management*. https://doi.org/10.1108/IJPPM-01-2022-0057.

Karuppannan, A. (2021). Sustainability of employment for women in Indian textile industry. *Journal of XI an University of Architecture & Technology*.

Kaur, R. (2023). Impact of circular economy on sustainable fashion: Opportunities and challenges. *International Journal for Research in Applied Science and Engineering Technology, 11(9)*, 59–63. https://doi.org/10.22214/ijraset.2023.55602.

Ketki. (2021, May 10). Sustainable textile and clothing practices from traditional indian culture: Curiosity Saves. *The Planet*.

Khandual, A., & Pradhan, S. (2019). *Fashion brands and consumers approach towards sustainable fashion,* 37–54. https://doi.org/10.1007/978-981-13-1268-7_3.

Khurana, K. (2022). The Indian fashion and textile sector in and post COVID-19 times. *Fashion and Textiles, 9(1).* https://doi.org/10.1186/s40691-021-00267-4.

Küfeoğlu, S. (2022). *SDG-12: Responsible Consumption and Production*, 409–428. https://doi.org/10.1007/978-3-031-07127-0_14.

Kulkarni, P. (2020, April 23). How adoption of sustainable practices by companies can rebuild nature. *BW Business World*.

Kumar, N. S., & Pugalendhi, S. B. (2010). Indian textile industry: Sea of potential opportunities. *Munich Personal RePEc Archive*.

Kumar R, S. (2018). Indian textile industry: Opportunities, challenges and suggestions. *Trends in Textile Engineering & Fashion Technology, 2(3)*. https://doi.org/10.31031/tteft.2018.02.000538.

Kumari, M. (2021). Understanding Indian textile industry. *International Research on Medical Management Science Turkish Online Journal of Qualitative Inquiry (TOJQI)*, 12. https://www.researchgate.net/publication/361903352.

Loutfy, M., & Shiward, D. (2021). Indian textile industry & world economy. *Turkish Online Journal of Qualitative Inquiry , 12(8)*.

Maity, S., & Mohapatra, H. (2013). Nanotechnology in fibres and textiles. *International Journal of Recent Technology and Engineering (IJRTE)* (2). https://www.researchgate.net/publication/276062034.

Mckinsey & Company. (2023, November 29). *The state of fashion 2024: Finding pockets of growth as uncertainty reigns*. *Ministry of Textiles, Government of India , Annual Report*. (2023).

Mishra, A., Mohapatra, C. K., Pattnaik, P. K., & Satpathy, , Swayam Prabha. (2022). Issues and challenges of the Indian handloom sector: A legal perspective. *Rupkatha Journal on Interdisciplinary Studies in Humanities, 14(3),* 1–11.

Mishra, D. P., & Mishra, S. P. (2023). Cottage industry and handicrafts sectors in eastern India: Ticking the right boxes for socio-economic development. *The Institute of Social and Cultural Studies Bi-MonthlyPurvodaya:The Rise of Opportunities, 3(5).*

Mishra, Y. (2023, June 1). The vibrant world of natural dyes: Exploring India's colourful heritage. *PeepulTree.*

Morton, S., Pencheon, D., & Squires, N. (2017). Sustainable development goals (SDGs), and their implementation. *British Medical Bulletin, 124 (1),* 81–90. Oxford University Press. https://doi.org/10.1093/bmb/ldx031.

Naskar.V. (2024). Outlook 2024 : *India's moment of reckoning.* https://indiantextilejournal.com/outlook-2024-indias-moment-of-reckoning/.

Pankaj, D., & Lal, R. C. (2019a). A critical analysis of Indian textile industry: Insight into inclusive growth and social responsibility. *Russian Journal of Agricultural and Socio-Economic Sciences, 88(4),* 53–61. https://doi.org/10.18551/rjoas.2019-04.08.

Pankaj, D., & Lal, R. C. (2019b). A critical analysis of Indian textile industry: Insight into inclusive growth and social responsibility. *Russian Journal of Agricultural and Socio-Economic Sciences, 88(4),* 53–*61. https://doi.org/10.18551/rjoas.2019-04.08.*

Pandey. P (2023). *Approaches for circular textile and apparel Industry in India.* https://www.ceeindia.org/pdf_files/Baseline%20Assessment%20Report%20(Digital%20Version).pdf.

Rahman, S. S., Siddiqua, S., & Cherian, C. (2022). Sustainable applications of textile waste fiber in the construction and geotechnical industries: A retrospect. In *Cleaner Engineering and Technology,* 6. Elsevier Ltd. https://doi.org/10.1016/j.clet.2022.100420.

Raichurkar, P. (2015). *Recent trends and developments in textile industry in India*. https://www.researchgate.net/publication/284027876.

Rathee Bhavna. (2024, March). *India - knitting the future India is among the world's largest producers of textiles and apparel*.

Schumacher, K., & Forster, A. (2022), Textiles in a circular economy: An assessment of the current landscape, challenges, and opportunities in the United States. *Frontiers in Sustainability,* [online], https://doi.org/10.3389/frsus.2022.1038323, https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=935125.

Shah, M. A., Pirzada, B. M., Price, G., Shibiru, A. L., & Qurashi, A. (2022). Applications of nanotechnology in smart textile industry: A critical review. *Journal of advanced research*, 38, 55–75. Elsevier B.V. https://doi.org/10.1016/j.jare.2022.01.008

Shamsi, M. A., Anwar, I., Chaudhary, A., Akhtar, S., & Ahmad, A. (2023). Sustainable transition through circular textile products: An Empirical Study of Consumers' Acceptance in India. *Sustainability, 15(18),* 13656. https://doi.org/10.3390/su151813656.

Sharma, A., & Narula, S. A. (2020). What motivates and inhibits Indian textile firms to embrace sustainability? *Asian Journal of Sustainability and Social Responsibility*, *5*(1). https://doi.org/10.1186/s41180-020-0032-8.

Sharma, H. P., & Chaturvedi, A. (2020). *The performance of India in the achievement of sustainable development Goals: A way forward*.

Singh, S., & Rani, J. (2021). Traditional Indian textile techniques used to upcycle and recycle textile waste. *Textile and Leather Review*, *4*, 336–353. https://doi.org/10.31881/TLR.2021.29.

Sri, S. T., & Sai, S. (2014). *The textile industry in India looking for reforms*. https://www.researchgate.net/publication/291148269.

Sustainable Apparel Coalition Issues Summary on the Higg Index Tools Analysis and Compliance Initiatives. (2023, November 22).

Temmes, A., & Farsang, A. (2017). *The HIGG Index-a Global Value tool showcase*. https://doi.org/10.13140/RG.2.2.29738.11203.

Textiles, M. (2023). *Annual report ministry of textiles. https://texmin.nic.in/documents/annual-report.*

Vishwakarma, A., Meena, M. L., Dangayach, G. S., & Gupta, S. (2022). Identification of challenges & practices of sustainability in Indian apparel and textile industries. *Lecture Notes in Mechanical Engineering*, 149–156. https://doi.org/10.1007/978-981-16-5281-3_14.

Yoganandan G. (2016). *Growth of Textile Industry in India*. https://www.researchgate.net/publication/344314815.