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The Analysis of Sustainable Fashion in India

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ABSTRACT

This research paper examines sustainable fashion in India by exploring two key aspects: consumer awareness and perception of sustainability in the fashion industry, as well as the sustainability practices adopted by fashion brands in alignment with Indian norms. The study employs a mixed-methods approach, integrating primary and secondary data collection to provide a comprehensive analysis. Primary data is gathered through a survey questionnaire conducted in Noida and surrounding regions to assess consumer awareness, attitudes, and purchasing behavior related to sustainable fashion. Secondary data is sourced from research journals, articles, and industry reports to analyze how fashion brands in India implement sustainability initiatives and comply with environmental and ethical norms. Additionally, the research incorporates literature reviews, case studies, and stakeholder perspectives to offer a well-rounded understanding of the sustainability landscape within the Indian fashion industry. The findings highlight the extent to which consumers are aware of sustainable fashion, their willingness to adopt sustainable purchasing habits, and the challenges that influence their decisions. Furthermore, the study evaluates the degree to which Indian fashion brands integrate sustainability into their business models, including their approach to ethical sourcing, waste management, and regulatory compliance. The research provides valuable insights for fashion brands, policymakers, and educators, offering recommendations to bridge the gap between consumer expectations and industry practices. By addressing these critical aspects, the study aims to contribute to the ongoing discourse on sustainable fashion and promote the adoption of more responsible practices within India's fashion sector.

Introduction

The global fashion industry has emerged as one of the most environmentally destructive forces of our time, second only to oil in terms of its ecological footprint. Accounting for a staggering 10% of annual carbon emissions and nearly 20% of industrial wastewater worldwide, the sector's environmental impact has reached crisis proportions. This devastation has been dramatically accelerated by the rise of fast fashion—a business model built on breakneck production cycles, exploitative labor practices, and a culture of disposable clothing that encourages rampant overconsumption. (*Fashion Industry, the Second Largest Polluter after Oil*, n.d.)

Against this troubling backdrop, India presents a fascinating paradox: as a civilization with an unbroken 5,000-year textile heritage rooted in sustainable practices, the country now stands at a critical crossroads in its fashion evolution. This comprehensive analysis explores India's complex journey toward sustainable fashion through four interconnected lenses: the devastating environmental consequences of contemporary textile production; India's remarkable legacy of eco-conscious handloom traditions; the shifting attitudes of Indian consumers, and the policy interventions needed to harmonize these competing forces while preserving both planetary health and cultural heritage.

The environmental catastrophe unfolding across the global fashion supply chain manifests with particular severity in India, the world's second-largest textile producer. Conventional cotton farming, which dominates 95% of India's textile fiber production, is extraordinarily water-intensive, requiring approximately 5,000 gallons of water to manufacture just one T-shirt and pair of jeans. In water-stressed regions like Maharashtra and Rajasthan, this has led to catastrophic groundwater depletion, with water tables dropping by 4-6 feet annually in some cotton-growing districts. The synthetic alternatives that have proliferated in recent decades, while less water-intensive, bring their ecological nightmares. Polyester and other petroleum-based fabrics shed microplastics with each wash, accounting for 35% of all ocean microplastic pollution—a particularly alarming statistic for coastal nations like India.

The dyeing and finishing processes represent perhaps the most visible environmental violations, utilizing about 20,000 different chemicals that frequently end up in waterways. In India's major textile hubs—Tirupur, Ludhiana, Surat—this pollution has reached crisis levels, with 93% of manufacturing clusters failing to meet wastewater treatment standards. (*Textile Transformation: India's Strategic Weave Into The Future | Textile World*, n.d.)

The consequences are visible in ecological disasters like the Noyyal River in Tamil Nadu, once a thriving waterway now declared "ecologically dead" due to textile effluent, or the Yamuna River in Delhi, where thick blankets of toxic foam from dye chemicals regularly choke the water's surface. These local catastrophes mirror global patterns seen in Bangladesh's Buriganga River or Indonesia's Citarum River, both rendered biologically dead zones by uncontrolled industrial pollution from textile factories.(Johnpaul et al., 2024)

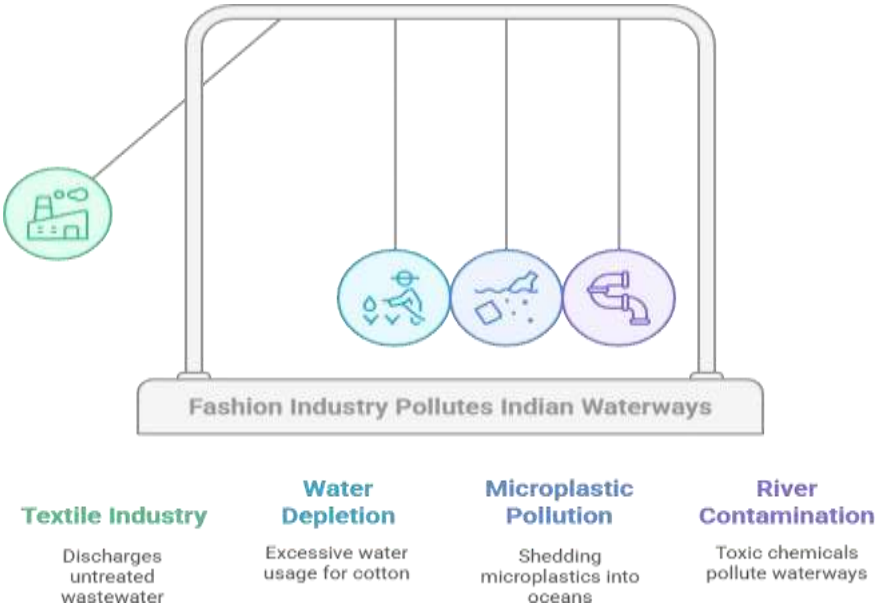

Figure 1 Fashion Industry pollutes the Indian Waterway

India's position as a textile powerhouse—with the sector contributing 2.3% to GDP and employing 45 million people—makes these environmental challenges particularly consequential. The rise of fast fashion has dramatically intensified these pressures over the past two decades. Since 2000, global clothing production has doubled, with much of this growth concentrated in South Asia. In India, the fast fashion market now exceeds $50 billion annually, driven by domestic giants like Reliance Trends and international players like Zara and H&M establishing ever-larger footprints. This explosive growth has created a waste management crisis of unprecedented scale—India currently discards about 1 million tonnes of textiles each year, with less than 1% being properly recycled according to the Central Pollution Control Board. The human costs are equally disturbing, with garment workers in India's sprawling textile hubs routinely facing hazardous working conditions, wage theft, and severe health impacts from prolonged chemical exposure. These grim realities stand in stark contrast to India's ancient textile traditions, which for millennia perfected sustainable practices that modern industry has recklessly abandoned in pursuit of profit and convenience.

India's handloom heritage offers a powerful antidote to fast fashion's environmental destructiveness—a living testament to how textile production can harmonize with ecological balance. Archaeological evidence from Mohenjo-Daro (2500 BCE) reveals remarkably sophisticated natural dyeing techniques using indigo, madder root, and turmeric—all plant-based, biodegradable colorants that created vibrant hues without toxic runoff. Excavations have uncovered dye vats and fabric fragments demonstrating that Indus Valley dyers mastered complex techniques using mordants like myrobalan and pomegranate peel to fix colors without synthetic chemicals. The civilization developed equally advanced spinning and weaving technologies using locally-sourced cotton, wool, and wild silk, establishing India as the global leader in textile innovation for three continuous millennia. These traditions were not merely technical achievements but reflected a profound philosophical orientation—what we might today call sustainability ethics. The use of renewable plant fibers, natural dyes, and manual production methods created a closed-loop system with minimal environmental impact. Mahatma Gandhi recognized this civilizational wisdom in the early 20th century when he made khadi (handspun cloth) the symbol of India's independence movement, framing sustainable textile production as both an economic strategy against colonial exploitation and a moral imperative for self-reliance. Today, India's handloom sector remains the world's largest cottage industry, employing 3.5 million artisans according to the 2019-20 Handloom Census, predominantly women in rural areas who preserve these ancient techniques through intergenerational knowledge transfer. Contemporary brands like FabIndia, Good Earth, and Raw Mango have successfully commercialized these traditions for urban markets, while social enterprises like Doodlage and Ka-Sha demonstrate how upcycling textile waste can create high- fashion garments with minimal ecological impact.

The tension between these sustainable traditions and fast fashion's growing dominance reflects deeper contradictions in India's development path—a microcosm of the global struggle to reconcile economic growth with environmental responsibility. On one hand, recent surveys indicate 65% of Indian consumers now express a preference for sustainable products, with Gen Z and millennial shoppers particularly receptive to eco-friendly alternatives, according to a (2022 McKinsey report.) Social media has dramatically amplified this consciousness, with influencers like Diipa Büller-Khosla promoting #SlowFashion and viral campaigns exposing fast fashion's environmental and labor abuses, reaching millions of young Indians. Urban centers have seen a proliferation of vegan fashion brands, organic cotton startups, and clothing rental platforms that cater to this growing demand for responsible alternatives. However, significant structural barriers prevent this consciousness from translating into widespread behavior change. (Amit Chakrapani, 2015) Price sensitivity remains the foremost obstacle—sustainable fashion's premium pricing (a FabIndia khadi kurta typically costs 5-10 times more than a fast fashion alternative) puts it out of reach for the vast majority of Indian consumers. The lack ofreliable certification systems enables rampant greenwashing, with brands making exaggerated sustainability claims without substantiation—a problem highlighted (Fashion Revolution India in 2021). Most fundamentally, fast fashion has successfully positioned itself as a symbol of aspirational modernity through aggressive marketing, while sustainable fashion struggles to shed its elitist, "old-fashioned" image among youth—a perception gap that represents perhaps the greatest challenge for the sector's growth.

Addressing these complex challenges requires bold, multi-dimensional policy interventions that reshape India's entire fashion ecosystem. First and foremost, India needs stringent enforcement of existing environmental regulations, particularly regarding wastewater treatment in textile manufacturing clusters—an area where current compliance stands at a dismal 7% according to the Centre for Science and Environment.

The government could implement Extended Producer Responsibility (EPR) laws requiring brands to manage post-consumer textile waste, similar to successful policies in the EU that have increased recycling rates to over 50% in some member states. Second, targeted support for India's handloom sector—including subsidies for organic cotton farmers, artisan welfare programs, and export promotion—could help level the playing field against fast fashion's economies of scale.

The government's recent #VocalForLocal initiative represents a step in this direction, though much more comprehensive support is needed. Third, consumer education initiatives—potentially integrated into school curricula nationwide—could foster long-term mindset shifts about clothing consumption and care. The private sector has an equally crucial role to play—mainstream brands must invest in circular business models that prioritize durability and reliability, while sustainable labels need to focus on affordability and accessibility through innovative design and distribution strategies. Technological innovation, particularly in areas like waterless dyeing and biodegradable synthetics, could help bridge the gap between sustainability and scalability, an area where Indian research institutions like the National Institute of Fashion Technology are beginning to make important advances

Figure 2 Balancing Economic Growth and Sustainability in Indian Fashion

India's fashion future hangs in the balance between these competing visions—a tension that reflects broader global debates about sustainable development. On one path lies the continued dominance of fast fashion—with its ecological devastation, worker exploitation, and cultural homogenization reducing clothing to disposable commodities. On the other path lies the revitalization of India's sustainable textile heritage, adapted to modern contexts through innovation and policy support to create an alternative model of production and consumption. The choice India makes will resonate far beyond its borders, offering either a cautionary tale or an inspiring model for other developing nations. This analysis argues that by leveraging its unique civilization strengths—traditional knowledge systems, artisan networks, and growing environmental consciousness—India can pioneer a third way that reconciles economic growth with ecological responsibility. The solutions exist in India's past; the challenge lies in adapting them for the future through creativity, political will, and collective action. As the world grapples with the climate crisis, India's fashion sector offers a microcosm of our planetary dilemma—and potentially, a road-map for transformation that other nations might follow.

Indian handlooms are among the world's oldest. India boasts a 4000 BC India has a 4000 BC tradition of producing cotton thread, colored cloth is mentioned as early as 2500 BC, and highly precious mention is made of woven cloth during the Vedic and Post-Vedic era. (Menon, n.d.) Dye vats, woven and madder-dyed cotton fabric wrapped around a silver vessel, were found in Mohenjo-Daro (2500 to 1500 BCE). Spindles and spindle whorls were found in Indus Valley Civilization homes, which means spinning of cotton and wool was common. (Menon, n.d.)

Other than wool and cotton, discoveries of wild native species of silk moths at Mohenjo-daro and Harappa indicate the manufacture of silk in ancient India during the 3rd millennium BCE. India had a world monopoly in the production of cotton textiles for nearly 3,000 years from 1500 BC to 1500 AD. (Menon, n.d.) The clothes were so valued that silver and gold were exchanged for them. Besides silk, wool and cotton native people all over India employ a range of fibers to make clothing. (Menon, n.d.) Hemp, jute, bamboo, banana, nettle and several other plants and reeds were used to obtain fibers.

Even today, the Indian subcontinent is rich with varied fibers, techniques of weaving, implements, color, techniques of dyeing, and ornaments. (Menon, n.d.) Vegetable Dyes like Indigo (Indigofera Tinctoria) and madder (Rubia cordifolia) were used in ancient India since Mohenjo-Daro times.

Turmeric, henna, and safflower were not only natural dyes but also traded mordants, binding agents, and fixes. Another training substance, such as myrobalan, gallnuts, pomegranate rind, and gum Arabic from the acacia, other regions such as Central Asia, East Asia, and Egypt, which implies madder was imported into Egypt and Mesopotamia. Indigo, also known as blue gold, was widely traded through both land routes and maritime routes to the western, central, and eastern Asian regions. (Menon, n.d.)

Other than natural dyes, other substances were also used as a tree was used as fixes. Certain tree reins were used to impart gloss or luster to colored cloth. Beeswax or vegetable waxes were used to resist dye penetration in specific patterns in resist dyeing techniques.

These natural ingredients and processes were integral to ancient Indian dyeing techniques, enhancing the color vibrancy, durability, and aesthetic appeal of dyed textiles. They demonstrate the sophisticated knowledge and skill of ancient dyers in manipulating natural materials to achieve desired colors and effects on fabrics, maintaining a reverence for nature and her resources.

However, this is not the case with the modern textile industry, which is the second-largest polluting industry after oil, producing about 1.7 billion tons of carbon emissions annually. The international fashion industry is placed by the World Economic Forum at 10% of the planet's carbon footprint and second highest in the use of fresh water. (*Environmental Sustainability in the Fashion Industry – Geneva Environment Network*, n.d.) The dyeing and treatment process of textiles contributes 20 percent of industrial water pollution and uses about 20,000 different chemicals. (Bick et al., 2018)

Compared to the modern textile industry, Indian Handloom Traditions are much less polluting due to their reliance on natural elements for dyeing, use of locally available fibers, and use of non-mechanized tools. It also includes traditions of recycling to design innovative products.

A hundred years ago, Mahatma Gandhi brought back to remembrance his nation, then battling to remove colonial rule, that the world produced enough for the needs of the whole world, but not enough for anyone's greed. It was in this spirit that Gandhi moved hand-spinning and hand- weaving into the center of a movement for political and social freedom. It was his reminder to a nation imagining its future of the inevitable tension between resources needed to improve the quality of life for the majority of citizens and the respect essential to sustain the well-being of nature's systems upon which the planet depends. This brought about a revamp of the handloom industry, and presently, in India, the handloom industry stands as the largest cottage industry.(*Rise of Handloom to a Global Industry | Ministry of Micro, Small & Medium Enterprises*, n.d.-a) According to the 2019- 20 Handloom census, with more than 3.5 million handloom workers, it is the largest employment-generating sector in rural areas, after agriculture. The scale of creative and cultural activity in India and indeed throughout the subcontinent is unequaled, with a unique potential for influencing the global quest for a future in which the needs of people and the earth are held in a sustainable balance.

The sustainable fashion movement in India is gaining momentum as the textile industry, one of the largest contributors to the economy, shifts towards environmentally friendly and socially responsible practices. A combination of government policies, consumer awareness, technological innovation, and global market demands is driving this transformation.

The Indian government has been instrumental in promoting sustainable fashion through various initiatives. The Technology Upgradation Fund Scheme (TUFS) provides financial assistance to textile manufacturers for upgrading to energy-efficient and low-waste technologies. Similarly, the Production Linked Incentive (PLI) Scheme encourages investment in sustainable materials like man-made fibers (MMF) and technical textiles, which have a lower environmental impact compared to traditional cotton. Additionally, the establishment of eco-friendly textile parks, such as those under the SusTex initiative, promotes sustainable production by integrating renewable energy, water recycling systems, and waste reduction techniques. These parks serve as models for the industry, demonstrating how large-scale textile manufacturing can be both profitable and planet-friendly.

Consumer demand is another key driver of sustainable fashion in India. With increasing awareness about environmental issues, Indian shoppers, especially younger generations, are seeking ethically produced clothing. Domestic and international brands are responding by incorporating organic cotton, recycled fabrics, and natural dyes into their collections. (Zaremohzzabieh et al., 2021) The rise of e-commerce has further accelerated this trend, enabling small and sustainable fashion brands to reach a wider audience without relying on traditional retail chains. Online platforms also promote transparency, allowing consumers to trace the origins of their garments and verify sustainability claims.

However, challenges remain, particularly in scaling up sustainable practices across the entire supply chain. Many Indian textile manufacturers still rely on water-intensive processes and chemical dyes, which contribute to pollution. To address this, industry stakeholders are investing in green technologies, such as waterless dyeing, digital printing, and biodegradable textiles. Skill development is also crucial—training programs focused on sustainable textile production that can empower workers, particularly in rural areas, to adopt eco-friendly techniques.(Zaremohzzabieh et al., 2021)

India can, shortly, emerge as a global leader in an eco-friendly way. Events like Bharat Tex 2025 showcase the country’s innovations in eco-friendly textiles, attracting international buyers and investors. By aligning economic growth with environmental responsibility, India can strengthen its position in the global textile market while contributing to a more sustainable future. The journey towards sustainable fashion is not just a trend but a necessity, ensuring that the industry thrives without compromising the well-being of people and the planet.

Aim

The study aims to determine consumer awareness and perception of sustainable fashion in India.

Objective

1. Consumer Awareness and Perception:

To evaluate the level of consumer awareness and perceptions regarding the sustainability practices of various fashion brands, and to understand how these perceptions influence purchasing decisions.

2. Sustainability Standards and Techniques:

To identify, compare, and analyze the different sustainability standards and techniques employed by fashion brands, with a focus on assessing their effectiveness in reducing environmental impact and promoting ethical practices.

Literature Review

Sustainable fashion represents a transformation approach to clothing design, production, and consumption that prioritizes environmental stewardship, social equity, and economic viability. Rooted in the principles of circularity and ethical responsibility, it challenges the dominant fast-fashion paradigm by advocating for high-quality, durable garments that minimize harm to ecosystems and communities. The Indian textile industry, with its millennia-old heritage of sustainable practices, stands at a pivotal juncture, grappling with the tension between its artisan traditions and the pressures of globalization. Historically, Indian textiles were synonymous with sustainability, employing natural fibers like cotton, silk, and wool, dyed with plant-based colorants such as indigo and turmeric, and woven using manual techniques that left a negligible ecological footprint.

The Indus Valley Civilization's mastery of natural dyeing and spinning, as evidenced by archaeological finds from Mohenjo-Daro, underscores this legacy. Mahatma Gandhi's promotion of khadi during the independence movement further cemented the link between textile production and sustainability, framing it as both an economic and moral imperative. Today, India's handloom sector, the world's largest cottage industry, sustains 3.5 million artisans, predominantly women in rural areas, while contemporary brands like FabIndia and Raw Mango bridge tradition and modernity. (Menon, n.d.) However, the rise of fast fashion, with its reliance on synthetic fibers like polyester, a petroleum byproduct responsible for microplastic pollution and toxic dye runoff, has disrupted these sustainable systems.

The environmental costs are stark: conventional cotton farming depletes groundwater, while textile dyeing contaminates rivers like the Noyyal and Yamuna. Consumer behavior adds complexity; while 65% of Indians express a preference for sustainable fashion, price sensitivity, green-washing, and perceptions of handloom as "elitist" or "outdated" hinder adoption. (Johnpaul et al., 2024) The Theory of Planned Behavior (TPB) offers a lens to understand this attitude-behavior gap, highlighting the roles of social norms, perceived control, and affordability. Policy interventions, such as Extended Producer Responsibility (EPR) laws and subsidies for organic cotton, aim to recalibrate the industry, yet enforcement remains weak. Technological innovations—waterless dyeing, biodegradable synthetics, and circular models like up-cycling hold promise but require integration with traditional methods.

The challenge lies in scaling sustainability without diluting cultural authenticity, a balance that demands interdisciplinary collaboration. By leveraging its artisan heritage, India can redefine global fashion, proving that ecological responsibility and economic growth need not be mutually exclusive. The journey demands systemic change: from revitalizing handloom economies to reshaping consumer mindsets, ensuring that sustainability transcends trendiness to become an enduring ethos.

The global fashion industry has emerged as the second-largest environmental polluter after oil, contributing significantly to ecological degradation through its substantial carbon footprint and water pollution. According to the World Economic Forum, the sector accounts for 10% of annual carbon emissions and 20% of industrial wastewater worldwide. This environmental crisis has been dramatically accelerated by the rise of fast fashion, characterized by its linear production model, exploitative labor practices, and culture of possibility that encourages rampant over consumption. Within this global context, India presents a unique paradox - as a civilization with an unbroken 5,000-year textile heritage rooted in sustainable practices, it now faces critical challenges in balancing its rich artisan traditions with the demands of modern industrialization and global market forces.

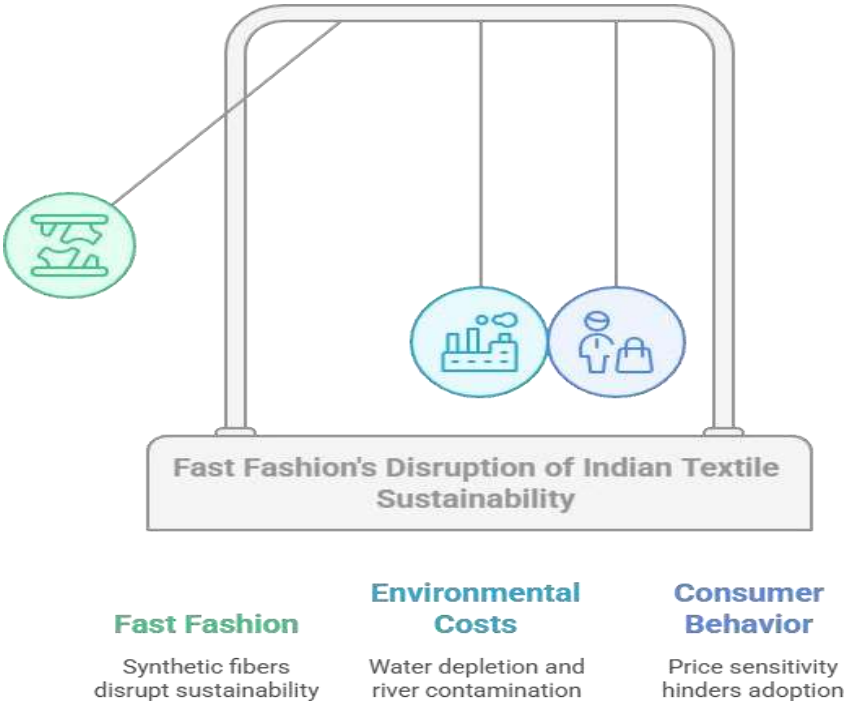

Figure 3 Fast Fashion Disruption of Indian textile sustainability

The environmental impact of contemporary textile production in India reveals alarming consequences. As the world's second-largest textile producer, India's conventional cotton farming, which dominates 95% of the country's textile fiber production, is extraordinarily water- intensive, requiring approximately 5,000 gallons of water to manufacture just one T-shirt and pair of jeans. This has led to catastrophic groundwater depletion in water-stressed regions like Maharashtra and Rajasthan, with water tables dropping by 4-6 feet annually in some cotton- growing districts. (*Rise of Handloom to a Global Industry | Ministry of Micro, Small & Medium Enterprises*, n.d.-b) While synthetic alternatives like polyester are less water-intensive, they bring their ecological nightmares, contributing to 35% of global microplastic pollution - a particularly alarming statistic for coastal nations like India. The dyeing and finishing processes represent perhaps the most visible environmental violations, utilizing about 20,000 different chemicals that frequently end up in waterways. In major textile hubs like Tiruppur, Ludhiana, and Surat, 93% of manufacturing clusters fail to meet wastewater treatment standards, resulting in ecological disasters such as the Noyyal River in Tamil Nadu being declared "ecologically dead" and the Yamuna River in Delhi being regularly choked by toxic foam from dye chemicals. (Johnpaul et al., 2024)

In stark contrast to these modern environmental challenges stands India's remarkable sustainable textile heritage. Archaeological evidence from Mohenjo-Daro (2500 BCE) reveals sophisticated natural dyeing techniques using indigo, madder root, and turmeric - all plant- based, biodegradable colorants that created vibrant hues without toxic runoff. Excavations have uncovered dye vats and fabric fragments demonstrating that Indus Valley dyers mastered complex techniques using mordants like myrobalan and pomegranate peel to fix colors without synthetic chemicals. India maintained a global monopoly over cotton fabric production for nearly 3,000 years (1500 BCE to 1500 CE), with these fabrics being so highly valued they were traded for gold and silver. Beyond cotton, indigenous communities across India utilized diverse fibers including hemp, jute, bamboo, banana, and nettle, with natural dyes being traded as far as Egypt and Mesopotamia. Mahatma Gandhi revived these sustainable traditions in the early 20th century through the khadi movement, making handspun cloth both a symbol of India's independence struggle and a model of sustainable production. Today, India's handloom sector remains the world's largest cottage industry, employing 3.5 million artisans (according to the 2019-20 Handloom Census), predominantly women in rural areas who preserve these ancient techniques through intergenerational knowledge transfer.

The fast fashion market now exceeds $50 billion annually, driven by domestic giants like Reliance Trends and international players like Zara and H&M, resulting in about 1 million tonnes of textile waste every year, with less than 1% being properly recycled. This stands in sharp contrast to traditional sustainable practices like kantha (upcycled quilts made from old sarees) and zero-waste draping techniques seen in garments like sarees and dhotis. While recent surveys indicate 65% of Indian consumers now express a preference for sustainable products, with Gen Z and millennial shoppers particularly receptive to eco-friendly alternatives, significant structural barriers prevent this consciousness from translating into widespread behavior change. Price sensitivity remains the foremost obstacle, with sustainable fashion's premium pricing (a FabIndia khadi kurta typically costs 5-10 times more than a fast fashion alternative) putting it out of reach for most consumers. (*A Snapshot of Indian Consumers - Newsweek*, n.d.) The lack of reliable certification systems enables rampant greenwashing, while fast fashion's aggressive marketing has successfully positioned it as a symbol of aspirational modernity, leaving sustainable fashion struggling with an elitist, "old-fashioned" image among youth.

In response to these challenges, the Indian government and private sector have implemented various policy and technological interventions. The Technology Upgradation Fund Scheme (TUFS) provides financial assistance for adopting energy-efficient technologies, while the Production Linked Incentive (PLI) Scheme encourages investment in sustainable materials like man-made fibers and technical textiles. The establishment of eco-friendly

textile parks under the SusTex initiative demonstrates how large-scale manufacturing can integrate renewable energy, water recycling systems, and waste reduction techniques. The #VocalForLocal campaign represents an effort to support artisans and traditional industries. Technological innovations like waterless dyeing and biodegradable synthetics, developed by institutions like the National Institute of Fashion Technology, offer promising solutions, while circular economy models gain traction through brands like Doodlage and Ka-Sha that specialize in upcycling textile waste into high- fashion garments. (*A Snapshot of Indian Consumers - Newsweek*, n.d.)

Understanding consumer behavior remains crucial for advancing sustainable fashion in India. The Theory of Planned Behavior (Ajzen, 1991) provides a valuable framework for analyzing the persistent gap between environmental awareness and purchasing behavior. Key factors influencing this gap include subjective norms (shaped by social media influencers like Diipa Büller-Khosla promoting #SlowFashion), perceived behavioral control (affected by affordability and accessibility), and various psychological barriers. Harris etal. (2016) identify four primary consumer obstacles: lack of transparent supply chain information, higher price points, time constraints in ethical shopping, and limited style variety compared to fast fashion's constantly changing offerings. These challenges are compounded by fast fashion's successful positioning as convenient, trendy, and affordable, while sustainable alternatives are often perceived as requiring more effort, time, and financial investment.

Figure 4 Sustainable Fashion in India: Challenges and Solutions

The path forward for sustainable fashion in India requires a multi-dimensional approach that addresses these complex challenges. Strengthening policy implementation, particularly in enforcing environmental regulations and Extended Producer Responsibility (EPR) laws, is crucial. Technological integration, through innovations like blockchain for supply chain transparency and AI for demand forecasting, could bridge the gap between sustainability and scalability.

Consumer education initiatives, potentially integrated into school curricula, could foster long- term mindset shifts, while robust certification systems could combat greenwashing. Perhaps most importantly, rebranding sustainable fashion to appeal to younger consumers through designer-artisan collaborations and contemporary marketing strategies could help overcome perceptions of traditional textiles as outdated. As India navigates these challenges, its unique position, with its unparalleled textile heritage, vast artisan workforce, and growing technological capabilities, offers an opportunity to create a model of sustainable fashion that other developing nations might follow, proving that ecological responsibility and economic growth can indeed coexist.

Research Gaps

The important information concerning consumer perceptions and industry behaviors about sustainable fashion in India, a few urgent research gaps fall short. The concerns on the paucity of comparison studies focusing on the regional variations concerning sustainable fashion practice across the multiform socio-economic and cultural settings found in India.

The present work is heavily predicated upon Noida-dwelling urban consumers and is silent concerning whether rural inhabitants or other geographical contexts adopt the terms and principles related to sustainable fashion.

The price sensitivity is the primary hindrance to sustainable and socio-cultural determinants of the existing gap between consumer attitudes and purchase behavior. More research is needed to clarify how cultural values, perceived self-efficacy, and social norms influence Indian consumers' sustainable fashion consumption.

The government initiatives like TUFS and the PLI scheme, without seriously examining their true efficacy on the ground to cause industry-level changes in sustainability. There is an urgent requirement for empirical studies of policy implementation gaps, measuring actual environmental impact reductions, and exploring the cost feasibility of such programs for small and medium enterprises.

India's extensive handloom culture is being sustainable practice, but it does not go on to explore how exactly such traditional systems could be fruitfully incorporated within current circular economy models and digital technologies.

Identifying how emerging technologies like blockchain for supply chain tracking, sustainable design enabled through AI, and scale-up business models for upcycling may be addressed within the Indian scenario.

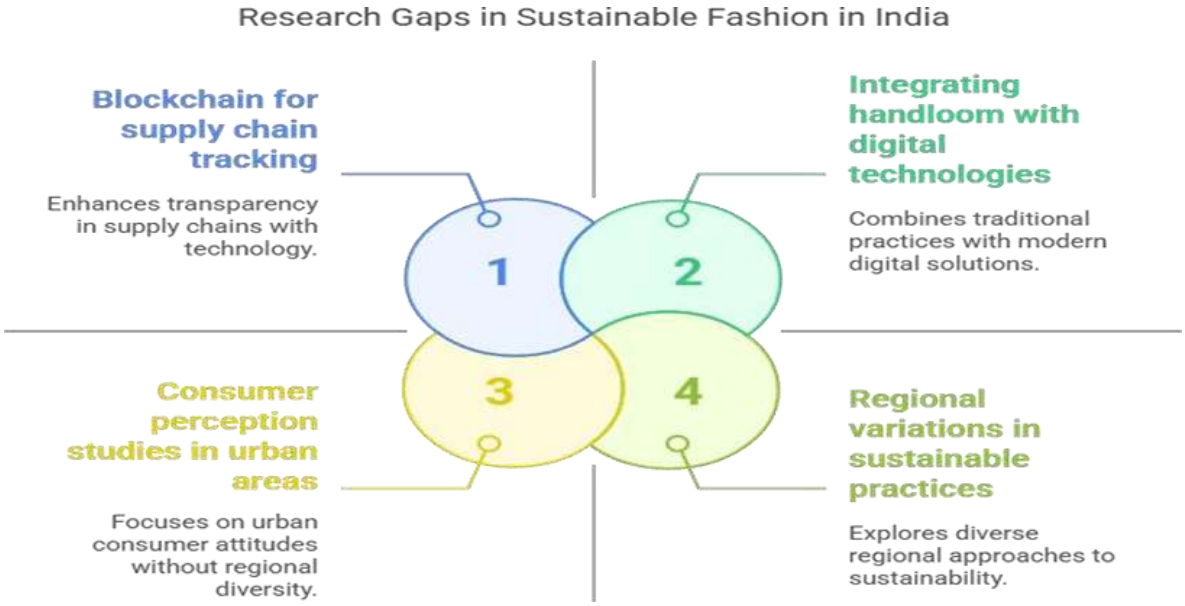

Figure 5 RESEARCH GAPS

Data Analysis

Frequency and Demographic Analysis

The authors carry out demographic and frequency analyses, descriptive and reliability analyses, and assess the internal consistency of the questionnaire. After ensuring internal consistency, authors conduct a normalcy test. Following the normalcy test, the relevant approach and technique will determine the hypothesis for examination.

Table 1 Demographic information (gender)

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	29	27.1	27.1	27.1
Female	78	72.9	72.9	100
Total	107	100	100	

The above table provides demographic information for the respondents. This study has 53 total respondents. The proportion of male respondents is 45 percent, while female respondents account for 78 percent. Therefore, the frequency for male respondents is 29, and for female respondents, it is 78. Thus, the total sample size is 107.

Table 2 Demographic Information (age)

Age	Frequency	Percent	Valid Percent	Cumulative Percent
18-24	44	41.1	41.1	41.1
25-34	12	11.2	11.2	52.3
35-44	10	9.3	9.3	61.6
45-54	39	36.4	36.4	98.1
55+	2	1.9	1.9	100
total	100	100	100	

The frequency and percent weight of each respondent with respect to the age level has been provided in table 2. The frequency of respondents between the age of 18 – 24 is 41.1 with 41.1 percent weight. Likewise, the frequency for the age level of 25 – 34 is 11.2 with a weight of 11.2 percent. The

frequency for the age level of 35-44 is 9.3 with a weight of 9.3 percent. The frequency for the age level of 45-54 is 36.4 with a weight of 36.4 percent. The frequency for the age level of 55+ is 1.9 with a weight of 1.9 percent. Therefore, the highest contribution of the respondent falls between the ages of 18 – 24.

Table 3 Demographic Information (education)

Education	Frequency	Percent	Valid Percent	Cumulative Percent
High School	3	2.8	2.8	2.8
Diploma	2	1.9	1.9	4.7
Bachelor's Degree	30	28	28	32.7
Master's Degree	68	63.6	63.6	96.3
Others	4	3.7	3.7	100
Total	100	100	100	

The frequency and percent weight of each respondent concerning education level have been provided in Table 3. The frequency of respondents' High School is 2.8 with a 2.8 percent weight. Likewise, the frequency for the respondent's education level for the Diploma is 1.9 with a weight of 1.9 percent. Similarly, respondents having a Bachelor's Degree are represented with a frequency of 28, with 28 percent. As well as, the respondent's education level for the Master's Degree is represented with a frequency of 63.6 with 63.6 percent. Finally, Respondent's holding Others has a frequency of 3.7 with a weight of 3.7 percent. Therefore, the highest contribution of the respondent falls for the respondents having a master's degree.

Table 4 Demographic Information (occupation)

Occupation	Frequency	Percent	Valid Percent	Cumulative Percent
Student	43	40.2	40.2	40.2
Working Professional	25	23.4	23.4	63.6
Entrepreneur	18	16.8	16.8	80.4
Homemaker	17	15.9	15.9	96.3
Others	4	3.7	3.7	100
total	100	100	100	

The frequency and percent weight of each respondent concerning occupation level have been provided in Table 4. The frequency of respondents' Student is 40.2 with a 40.2 percent weight. Likewise, the frequency for the respondent's occupation level for the working professional is 23.4 with a weight of 23.4 percent. Similarly, respondents who are entrepreneurs are represented with a frequency of 16.8 with 16.8 percent. As well as, the frequency for the respondent's occupation level for the homemaker is 15.9 with a weight of 15.9 percent. Finally, Respondent's holding others has a frequency of 3.7 with a weight of 3.7 percent. Therefore, the highest contribution of the respondent falls for the respondents having a student occupation level, after that, a working professional, then an entrepreneur, then a homemaker, and finally the respondent holding others has the lowest representation.

Table 5 Head of sustainable fashion

Have you heard of the term "Sustainable Fashion" before?	Frequency	Percent	Valid Percent	Cumulative Percent
YES	84	78.5	78.5	78.5
NO	23	21.5	21.5	100
TOTAL	107	100	100	

When the respondents were asked about the term sustainable fashion before. They responded that 100 respondents heard about sustainable fashion, with 78.5 percent weight, and 21.5 respondents said that they hadn't heard the sustainable fashion term before, which accounted for 21.5 percent weight.

Normality Test

A normality test has been performed to see whether the selected variables are normally distributed or not. If the variables are normally distributed, then the parametric test is to be applied; otherwise, a non-parametric test such as Mann Mann-Whitney U test and the Kruskal-Wallis test. For this purpose, we have used the Kolmogorov-Smirnov and Shapiro-Wilk tests to see the normality in the selected variables. The test indicates whether the variables are normally distributed or not, and a decision can be made accordingly for further analysis. However, its results are presented in the table as provided.

Table 6 Mann-Whitney U test for gender (consider yourself a conscious consumer of sustainable fashion)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig
Do you consider yourself a conscious Consumer when it comes to Sustainable fashion?	FEMALE	78	58.13	4534.00	-2.397	0.017
	MALE	29	42.90	1244.00		
	Total	107				

The Mann-Whitney U test results show a significant difference in considering themselves a conscious consumer when it comes to sustainable fashion regarding gender, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a z value of -2.397, and sig of 0.017.

Table 7 Mann-Whitney U test for gender (repurpose/repair old clothing)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig
Do you repair or repurpose old clothing instead of discarding them?	Others	78	56.34	4394.50	-1.329	0.010
	Total	29	47.71	1383.50		
	Total	107				

The Mann-Whitney U test results show a significant difference in repair or re-purposing old clothing instead of discarding, regarding gender, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a z value of -1.329, and sig of 0.010.

Table 8 Mann-Whitney U test for gender (using sustainable product)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
Applying sustainable products and consumption	FEMALE	78	55.26	4310.00	-0.738	0.004
	MALE	29	50.62	1468.00		
	Total	107				

The Mann-Whitney U test results show a significant difference in applying sustainable products and consumption concept in their lifestyle regarding gender, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a z value of -0.738, and sig of 0.004.

Table 9 Mann-Whitney U test for gender (impact of social media/celebrities on consumer)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
How do you think social media influencers and	FEMALE	78	52.65	4107.00	-0.799	0.002
	MALE	29	57.62	1671.00		
	Total	107				

The Mann-Whitney U test results show a significant difference in social media influences and celebrities' impact on consumer attitudes towards sustainable fashion in India regarding gender, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a z value of - 0.799, and sig of 0.002.

Table 10 Mann-Whitney U test for gender (willingness to pay for sustainable product)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
Would you be willing to paymore for clothing that is	FEMALE	78	53.77	4194.00	-0.131	0.060
	MALE	29	54.62	1584.00		
	Total	107				

The Mann-Whitney U test results show a significant difference in willingness to pay more for clothing that is sustainably produced regarding gender, rejecting the alternative hypothesis, as indicated by a z value of -0.131, and sig of 0.060.

Table 11 Mann-Whitney U test for gender (Indian textile craft)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
Do you feel Indian textile crafts is a sustainable	FEMALE	78	57.88	4514.50	-2.258	0.024
	MALE	29	43.57	1263.50		
	Total	107				

The Mann-Whitney U test results show a significant difference in Indian textile crafts in terms of sustainability regarding gender, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a z value of -2.258, and sig of 0.024.

Table 12 Mann-Whitney U test for gender (environmental impact of clothing purchase)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
Do you consider the environmental impact of your clothing purchase?	FEMALE	78	57.88	4514.50	-2.258	0.000
	MALE	29	43.57	1263.50		
	Total	107				

The Mann-Whitney U test results show a significant difference in the environmental impact of clothing purchase regarding gender, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a z value of -2.258, and sig of 0.000.

Table 13 Mann-Whitney U test for gender (purchase clothes made from sustainable material)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
Have you ever purchased clothing made from Sustainable materials (e.g. Organic Cotton, Recycling Polyester)	FEMALE	78	60.20	4695.50	-3.602	0.272
	MALE	29	37.33	1082.50		
	Total	107				

The Mann-Whitney U test results show a significant difference in the purchase of clothing made from sustainable materials regarding gender, rejecting the null hypothesis, as indicated by a z value of - 3.602, and sig of 0.272.

Table 14 Mann-Whitney U test for gender (policy to promote sustainability)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
Do you think the Indian Government should implement policies to promote sustainable fashion practices	FEMALE	78	55.81	4353.00	-1.099	0.034
	MALE	29	49.14	1425.00		
	Total	107				

The Mann-Whitney U test results show a significant difference in government should implement policies to promote sustainable fashion practices regarding gender, accept the alternative hypothesis, as indicated by a z value of 1.099, and a sig of 0.034.

Table 15 Mann-Whitney U test for gender (buying sustainable clothes from Indian designer/brand)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
Do you prioritize buying clothing from Indian Sustainable Designers or a Brand	FEMALE	78	55.62	4338.00	-0.952	0.292
	MALE	29	49.66	1440.00		
	Total	107				

The Mann-Whitney U test results show a significant difference in prioritizing clothes from Indian sustainable designers or brands regarding gender, accepting the null hypothesis, as indicated by a z value of -0.952, and sig of 0.292.

Table 16 Mann-Whitney U test for gender (price influences purchasing decision)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
How Price influences your purchasing decisions when it comes to clothing	FEMALE	78	52.19	4070.50	-1.055	0.005
	MALE	29	58.88	1707.50		
	Total	107				

The Mann-Whitney U test results show a significant difference in price influences purchasing decision regarding gender, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a z value of -1.055, and sig of 0.005.

Table 17 Mann-Whitney U test for gender (quality influence your decision)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
How Quality influence your purchasing decisions when it comes to clothing	FEMALE	78	54.32	4237.00	-0.190	0.030
	MALE	29	53.14	1541.00		
	Total	107				

The Mann-Whitney U test results show a significant difference in quality influences purchasing decision regarding gender, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a z value of -0.190, and sig of 0.030.

Table 18 Mann-Whitney U test for gender (brand reputation influence your decision)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
How does brand reputation influence your purchasing decisions when it comes to clothing	FEMALE	78	51.65	4029.00	-1.411	0.050
	MALE	29	60.31	1749.00		
	Total	107				

The Mann-Whitney U test results show a significant difference in brand reputation in purchasing decision gender, reject the null hypothesis, as indicated by a z value of -1.411, and sig of 0.050.

Table 19 Mann-Whitney U test for gender (sustainability influence your purchasing decision)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
How does Sustainability influence your purchasing decisions when it comes to clothing	FEMALE	78	50.64	3950.00	-1.945	0.009
	MALE	29	63.03	1828.00		
	Total	107				

The Mann-Whitney U results show a significant difference in sustainability influence in purchasing decisions regarding gender, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a z value of -1.945, and sig of 0.009.

Table 20 Mann-Whitney U test for gender (style influences your decision)

	What is your gender?	N	Mean Rank	Sum of Ranks	Z	Sig.
How Style influence your purchasing decisions when it comes to clothing	FEMALE	78	52.15	4067.50	-1.049	0.012
	MALE	29	58.98	1710.50		
	Total	107				

The Mann-Whitney U results show a significant difference in styling influences purchasing decision regarding gender, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a z value of -1.049, and sig of 0.012.

Table 21 Kruskal-Wallis Test for age (consider yourself a conscious consumer of sustainable fashion)

	What is your age?	N	Mean Rank	Chisquare	Sig.
Do you consider yourself a conscious consumer when it comes to sustainable fashion?	18-24	44	58.01	3.336	0.008
	25-34	12	51.42		
	35-44	10	49.90		
	45-54	39	50.03		
	55 or above	2	79.25		
	Total	107			

The Kruskal-Wallis results show a significant difference in considering themselves a conscious consumer when it comes to sustainable fashion regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a Chi square value of 3.336, and p-value of 0.008.

Table 22 Kruskal-Wallis Test for age (repurpose/repair old clothes)

	What is your age?	N	Mean Rank	Chisquare	Sig.
Do you repair or repurpose old clothing instead of discarding them?	18-24	44	47.66	7.764	0.003
	25-34	12	50.67		
	35-44	10	65.25		
	45-54	39	57.19		
	55 or above	2	95.00		
	Total	107			

The Kruskal-Wallis results show a significant difference in repair or re-purposing old clothing instead of discarding, regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a Chi square value of 7.764, and p-value of 0.003.

Table 23 Kruskal-Wallis Test for age (using sustainable product)

	What is your age?	N	Mean Rank	Chisquare	Sig.
Applying sustainable products and consumption concepts in their lifestyle?	18-24	44	47.70	4.610	0.002
	25-34	12	60.96		
	35-44	10	61.50		
	45-54	39	56.01		
	55 or above	2	74.00		
	Total	107			

The Kruskal-Wallis results show a significant difference in applying sustainable products and consumption concept in their lifestyle regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a Chi square value of 4.610, and p- value of 0.002.

Table 24 Kruskal-Wallis Test for age (impact of social media/celebrities on consumer)

	What is your age?	N	Mean Rank	Chisquare	Sig.
How do you think social media influencers and celebrities impact consumer attitudes towards sustainable fashion in India?	18-24	44	53.85	0.609	0.000
	25-34	12	56.21		
	35-44	10	59.00		
	45-54	39	52.00		
	55 or above	2	58.00		
	Total	107			

The Kruskal-Wallis results show a significant difference in social media influences and celebrities impact consumer attitudes towards sustainable fashion in india regarding education level, rejecting the null hypothesis and accepting alternative hypothesis, as indicated by a Chi square value of 0.609, and p-value of 0.000.

Table 25 Kruskal-Wallis Test for age (willingness to pay for sustainable product)

	What is your age?	N	Mean Rank	Chisquare	Sig.
Would you be willing to pay more for clothing that is sustainably produced?	18-24	44	42.81	12.183	0.160
	25-34	12	68.71		
	35-44	10	52.10		
	45-54	39	62.41		
	55 or above	2	57.50		
	Total	107			

The Kruskal-Wallis results show a significant difference in willingness to pay more for clothing that is sustainably produced regarding education level, rejecting the alternative hypothesis, as indicated by a chi-square value of 12.183, and p-value of 0.160.

Table 26 Kruskal-Wallis Test for age (Indian textile craft)

	What is your age?	N	Mean Rank	Chisquare	Sig.
Do you feel Indian textile crafts is a sustainable practice?	18-24	44	47.36	7.019	0.006
	25-34	12	51.08		
	35-44	10	52.85		
	45-54	39	61.08		
	55 or above	2	85.25		
	Total	107			

The Kruskal-Wallis results show a significant difference in Indian textile crafts in terms of sustainability regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 7.019, and p-value of 0.006.

Table 27 Kruskal-Wallis Test for age (environmental impact of clothing purchase)

	What is your age?	N	Mean Rank	Chisquare	Sig.
	18-24	44	62.25	10.053	0.040

Do you consider the environmental impact of your clothing purchase?	25-34	12	47.92		
	35-44	10	38.40		
	45-54	39	49.05		
	55 or above	2	83.50		
	Total	107			

The Kruskal-Wallis results show a significant difference in the environmental impact of clothing purchase regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 10.053, and p-value of 0.040.

Table 28 Kruskal-Wallis Test for age (purchase clothes made of sustainable material)

	What is your age?	N	Mean Rank	Chisquare	Sig.
Have you ever purchased clothing made from Sustainable materials (e.g. Organic Cotton,	18-24	44	63.13	14.600	0.056
	25-34	12	40.17		
	35-44	10	35.00		
	45-54	39	51.41		
	55 or above	2	81.75		
	Total	107			

The Kruskal-Wallis results show a significant difference in the purchase of clothing made from sustainable materials regarding education level, accepting the null hypothesis, as indicated by a chi-square value of 14.600, and p-value of 0.056.

Table 29 Kruskal-Wallis Test for age (policy to promote sustainability)

	What is your age?	N	Mean Rank	Chisquare	Sig.
Do you think the Indian Government should implement policies to promote sustainable fashion practices	18-24	44	47.51	12.772	0.012
	25-34	12	39.71		
	35-44	10	70.85		
	45-54	39	59.71		
	55 or above	2	87.00		
	Total	107			

The Kruskal-Wallis results show a significant difference in government should implement policies to promote sustainable fashion practices regarding age level, reject the null hypothesis and accepting the alternative hypothesis, as indicated by a Chi square value of 12.772, and a p- value of 0.012.

Table 30 Kruskal-Wallis Test for age (buying sustainable clothes from Indian designer/brand)

	What is your age?	N	Mean Rank	Chisquare	Sig.
Do you prioritize buying clothing from Indian Sustainable Designers or Brand	18-24	44	43.81	16.706	0.220
	25-34	12	63.75		
	35-44	10	62.60		
	45-54	39	62.79		
	55 or above	2	5.25		
	Total	107			

The Kruskal-Wallis results show a significant difference in prioritizing clothes from Indian sustainable designers or brands regarding age level, rejecting the alternative hypothesis, as indicated by a chi-square value of 16.706, and p-value of 0.220.

Table 31 Kruskal-Wallis Test for age (price influence purchasing decision)

	What is your age?	N	Mean Rank	Chisquare	Sig.
How Price influence your purchasing decisions when it comes to clothing	18-24	44	63.48	8.989	0.014
	25-34	12	43.58		
	35-44	10	49.60		
	45-54	39	47.23		
	55 or above	2	62.00		
	Total	107			

The Kruskal-Wallis results show a significant difference in price influences purchasing decision regarding age level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 8.989, and p-value of 0.014.

Table 32 Kruskal-Wallis Test for age (quality influence your decision)

	What is your age?	N	Mean Rank	Chisquare	Sig.
How Quality influence your purchasing decisions when it comes to clothing	18-24	44	52.35	4.036	0.012
	25-34	12	42.08		
	35-44	10	54.30		
	45-54	39	59.78		
	55 or above	2	47.50		
	Total	107			

The Kruskal-Wallis results show a significant difference in quality influences purchasing decision regarding age level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a Chi square value of 4.036, and p-value of 0.012.

Table 33 Kruskal-Wallis Test for age (brand reputation influence your decision)

	What is your age?	N	Mean Rank	Chisquare	Sig.
How brand reputation influence your purchasing decisions when it comes to clothing	18-24	44	53.93	6.810	0.046
	25-34	12	55.42		
	35-44	10	44.80		
	45-54	39	58.36		
	55 or above	2	8.00		
	Total	107			

The Kruskal-Wallis results show a significant difference in brand reputation in purchasing decision age level, rejecting the null hypothesis, as indicated by a Chi square value of 6.810, and p-value of 0.046

Table 34 Kruskal-Wallis Test for age (sustainability influence your decision)

	What is your age?	N	Mean Rank	Chisquare	Sig.
How does Sustainability influence your purchasing decisions when it comes to clothing	18-24	44	38.23	21.225	0.000
	25-34	12	63.29		
	35-44	10	60.80		
	45-54	39	66.14		
	55 or above	2	74.50		

	Total	107			

The Kruskal-Wallis results show a significant difference in sustainability influence in purchasing decisions regarding age level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 21.225, and p-value of 0.000.

Table 35 Kruskal-Wallis Test for age (style influence your decision)

	What is your age?	N	Mean Rank	Chisquare	Sig.
How Style influence your purchasing decisions when it comes to clothing	18-24	44	43.03	12.958	0.011
	25-34	12	59.08		
	35-44	10	50.65		
	45-54	39	65.37		
	55 or above	2	59.75		
	Total	107			

The Kruskal-Wallis results show a significant difference in styling influences purchasing decision regarding age level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a Chi square value of 12.958, and p-value of 0.011.

Table 36 Kruskal-Wallis Test for Education (consider yourself a conscious consumer of sustainable fashion)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
Do you consider yourself a conscious consumer when it comes to sustainable fashion?	High School	3	41.83	3.416	0.007
	Diploma	2	24.00		
	Bachelor's Degree	30	52.27		
	Master's Degree	68	55.59		
	Others	4	64.13		
	Total	107			

The Kruskal-Wallis results show a significant difference in considering themselves a conscious consumer when it comes to sustainable fashion regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 3.416, and p-value of 0.007.

Table 37 Kruskal-Wallis Test for Education (repurpose/repair old clothes)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
Do you repair or repurpose old clothing instead of discarding them?	High School	3	34.00	3.521	0.005
	Diploma	2	42.25		
	Bachelor's Degree	30	58.57		
	Master's Degree	68	52.35		
	Others	4	68.63		
	Total	107			

The Kruskal-Wallis results show a significant difference in repairing or repurposing old clothing instead of discarding it regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 3.521 and a p-value of 0.005.

Table 38 Kruskal-Wallis Test for Education (applying sustainable product in their lifestyle)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
Applying sustainable products and consumption concepts in their lifestyle?	High School	3	57.83	6.237	0.021
	Diploma	2	86.00		
	Bachelor's Degree	30	59.18		
	Master's Degree	68	49.66		
	Others	4	70.00		
	Total	107			

The Kruskal-Wallis results show a significant difference in applying sustainable products and consumption concept in their lifestyle regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 6.237, and p-value of 0.021.

Table 39 Kruskal-Wallis Test for Education (impact of social media/celebrities on consumer)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
How do you think social media influencers and celebrities impact consumer attitudes towards sustainable fashion in India?	High School	3	39.00	9.393	0.050
	Diploma	2	95.50		
	Bachelor's Degree	30	44.50		
	Master's Degree	68	57.46		
	Others	4	57.00		
	Total	107			

The Kruskal-Wallis results show a significant difference in social media influences and celebrities' impact on consumer attitudes towards sustainable fashion in India regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 9.393, and a p-value of 0.050.

Table 40 Kruskal-Wallis Test for Education (willingness to pay for sustainable product)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
Would you be willing to pay more for clothing that is sustainably produced?	High School	3	39.67	13.657	0.847
	Diploma	2	57.50		
	Bachelor's Degree	30	66.13		
	Master's Degree	68	47.29		
	Others	4	86.13		
	Total	107			

The Kruskal-Wallis results show a significant difference in willingness to pay more for clothing that is sustainably produced regarding education level, rejecting the alternative hypothesis, as indicated by a chi-square value of 13.657, and a p-value of 0.847.

Table 41 Kruskal-Wallis Test for Education (Indian textile craft)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
Do you feel Indian textile crafts is a sustainable practice?	High School	3	15.17	12.118	0.016
	Diploma	2	97.00		
	Bachelor's Degree	30	60.95		

The Kruskal-Wallis results show a significant difference in Indian textile crafts in terms a sustainability regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 12.118, and a p-value of 0.016.

Table 42 Kruskal-Wallis Test for Education (environment impact of clothing purchase)

	What is your highest level of education? (If you doing master's select a masters)	N	Mean Rank	Chisquare	Sig.
Do you consider the environmental impact of your clothing purchase?	High School	3	9.17	17.853	0.001
	Diploma	2	83.50		
	Bachelor's Degree	30	43.13		
	Master's Degree	68	60.74		
	Others	4	39.75		
	Total	107			

The Kruskal-Wallis results show a significant difference in the environmental impact of clothing purchase regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 17.853, and a p-value of 0.001.

Table 43 Kruskal-Wallis Test for Education (purchase product made of sustainable material)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
Have you ever purchased clothing made from Sustainable materials (e.g. Organic Cotton, Recycling Polyester)	High School	3	68.17	1.731	0.785
	Diploma	2	44.50		
	Bachelor's Degree	30	50.43		
	Master's Degree	68	55.43		
	Others	4	50.63		
	Total	107			

The Kruskal-Wallis results show a significant difference in the purchase of clothing made from sustainable materials regarding education level, accepting the null hypothesis, as indicated by a chi-square value of 1.731, and a p-value of 0.785.

Table 44 Kruskal-Wallis Test for Education (policy to promote sustainability)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
Do you think the Indian Government should implement policies to promote sustainable fashion practices	High School	3	58.67	2.930	0.009
	Diploma	2	87.00		
	Bachelor's Degree	30	54.08		
	Master's Degree	68	52.58		
	Others	4	57.50		
	Total	107			

The Kruskal-Wallis results show a significant difference in government should implement policies to promote sustainable fashion practices regarding education level, reject the null hypothesis, and accept the alternative hypothesis, as indicated by a Chi square value of 2.930, and a p-value of 0.009.

Table 45 Kruskal-Wallis Test for Education (buying sustainable clothes from an Indian designer/brand)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
	High School	3	23.33	15.262	0.419

Do you prioritize buying clothing from Indian Sustainable Designers or Brand	Diploma	2	33.50		
	Bachelor's Degree	30	64.32		
	Master's Degree	68	49.39		
	Others	4	88.25		
	Total	107			

The Kruskal-Wallis results show a significant difference in prioritizing clothes from Indian sustainable designers or brands regarding education level, rejecting the alternative hypothesis, as indicated by a chi-square value of 15.262, and p-value of 0.419.

Table 46 Kruskal-Wallis Test for Education (price influences your purchasing decision)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
How Price influence your purchasing decisions when it comes to clothing	High School	3	22.17	17.558	0.002
	Diploma	2	20.50		
	Bachelor's Degree	30	42.00		
	Master's Degree	68	62.15		
	Others	4	46.00		
	Total	107			

The Kruskal-Wallis results show a significant difference in price influences purchasing decision regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 17.558, and a p-value of 0.002.

Table 47 Kruskal-Wallis Test for Education (quality influence purchasing decision)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
How does Quality influence your purchasing decisions when it comes to clothing	High School	3	46.67	11.807	0.019
	Diploma	2	11.50		
	Bachelor's Degree	30	66.17		
	Master's Degree	68	49.96		
	Others	4	58.25		
	Total	107			

The Kruskal-Wallis results show a significant difference in quality influences purchasing decision regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 11.807, and a p-value of 0.019.

Table 48 Kruskal-Wallis Test for Education (brand reputation influence purchasing decision)

	What is your highest level of education? (If you doing masters select masters)	N	Mean Rank	Chisquare	Sig.
How brand reputation influence your purchasing decisions when it comes to clothing	High School	3	61.00	3.919	0.040
	Diploma	2	42.50		
	Bachelor's Degree	30	53.80		
	Master's Degree	68	52.56		
	Others	4	80.50		
	Total	107			

The Kruskal-Wallis results show a significant difference in brand reputation in purchasing decision education level, rejecting the null hypothesis, as indicated by a chi-square value of 3.919, and a p-value of 0.040

Table 49 Kruskal-Wallis Test for Education (sustainability influence purchasing decision)

	What is your highest level of education? (If you doing master's select master's)	N	Mean Rank	Chi square	Sig.
Does sustainability influence your purchasing decisions when it comes to clothing	High School	3	39.67	14.021	0.007
	Diploma	2	43.50		
	Bachelor's Degree	30	67.90		
	Master's Degree	68	47.24		
	Others	4	80.63		
	Total	107			

The Kruskal-Wallis results show a significant difference in sustainability influence in purchasing decisions regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 14.021, and a p-value of 0.007.

Table 50 Kruskal-Wallis Test for Education (style influence purchasing decision)

	What is your highest level of education? (If you doing master's select a master's)	N	Mean Rank	Chisquare	Sig.
How does Style influence your purchasing decisions when it comes to clothing	High School	3	43.17	10.729	0.030
	Diploma	2	28.00		
	Bachelor's Degree	30	66.07		
	Master's Degree	68	48.93		
	Others	4	70.88		
	Total	107			

The Kruskal-Wallis results show a significant difference in styling influences purchasing decisions regarding education level, rejecting the null hypothesis and accepting the alternative hypothesis, as indicated by a chi-square value of 10.729, and a p-value of 0.030.

Discussion

The main point of the findings of this research is that Indian consumers are well aware of the subject of sustainable fashion, and the survey also unearths the contributors to this behavior. The facts on the gender gap about the sustainable fashion initiative are also striking, with women showing a stronger inclination towards discovering their role as conscious consumers than men. This is consistent with the general movement of society, where women are usually the ones more environmentally aware and more likely to spend ethically.

According to the results, the young segment of the consumer population particularly, those whose ages are within 18 to 24, are now more educated and are expressing intention and willingness to participate sustainably, leaving no doubt that education of the young and a change in the generations are the main changes in people's mindsets. But despite this, value for money is to date the first obstacle because most of the consumers are price-driven and not eco- conscious, hence one has to make a lot of playing the essential role in distributing fashion that has a human being in it.

The other main topic was the role of influencers, such as social media and celebrities, in the attitude of the end-user toward sustainable fashion. The research suggests that those platforms are most significant in terms of impacting purchase behaviors, especially among the youth generation, through the channel of initiatives that promote environmental consciousness and make eco-friendly activities societal norms. However, there is still a gap between intention and action, as people often confess to pro-ecology but still prefer to spend.

Figure 6 Sustainable fashion awareness and Behavior

Implications

The implications of this research are significant for players in the Indian fashion industry, including brands, policymakers, educators, and consumers. The prevalence of women's and youths' awareness of sustainable fashion translates into a growing market for green apparel.

The persisting awareness-consumption gap, driven by price responsiveness and affordability, suggests that brands must focus on affordable and innovative business models, like rental sites, up-cycled collections, and installment purchases, to popularize sustainable fashion.

Policymakers, the research emphasizes stricter enforcement of environmental standards in textile production, particularly regarding water pollution and the use of chemicals. Subsidy on green inputs- organic cotton, recycled fibers, and Extended producer responsibility (EPR) legislation can make brands greener.

Government support to the Indian handloom sector in the form of schemes for artisans' welfare, silk development, and international market promotion can also ensure the survival of traditional craftsmanship while bringing it into the mainstream of contemporary fashion supply chains.

Public awareness campaigns can induce long-term behavioral change, making consumers aware of the environmental and social implications of fast fashion. The potential for India to become a world leader sustainably by combining its rich textile tradition with technological innovation. By aligning consumer demand, industry practice, and policy frameworks, India has the potential to set the pace for a fashion industry that serves both planetary health and economic growth. The path forward is for all stakeholders to move together to bring sustainability from a niche aspiration to a mainstream expectation.

Future Directions

Consumer behavior over time could provide deeper insights into how awareness translates into consumer purchasing habits, particularly as sustainable fashion becomes mainstream.

Studies between Indian regions would allow the identification of cultural and socio-economic determinants of sustainability uptake, allowing more targeted interventions. From a business standpoint, more innovation in saleable circular business models, including textile recycling, rental and resale platforms, and zero-waste design, can assist in clothing the affordability gap while lessening the footprint on the environment.

Technology advancement, as AI transparency in the supply chain and block-chain for authentication of ethical sourcing, must be explored for the potential to build and increase trust and accountability sustainably.

Policy focus should assess the effectiveness of current government programs- TUFS, PLI scheme, and suggest new models for encouraging sustainable manufacturing, including tax incentives for green brands or increasing penalties for non-adherence to environmental regulations.

The impact of digital media on consumer attitudes also needs to be explored, especially how it influences, and social campaigns can be used to mainstream sustainable consumption.

Collaborative efforts by designers, environmental scientists, and policymakers on an interdisciplinary platform can lead to innovations in sustainable materials, like biodegradable fabric and low- impact dyes, that will render India fashion industry competitive while meeting global sustainable targets, these can be bridges to help make a stronger and more sustainable fashion industry in India and globally by future studies.

Figure 7 SWOT ANALYSIS

Conclusion

This study presents an integrated description of sustainable fashion in India, consumer attitudes, and industry practice. The study finds that although there is growing awareness of sustainable fashion among women and younger generations, there are still insurmountable obstacles to converting this awareness into routine purchasing behavior.

Price sensitivity, lack of affordable alternatives, and knowledge deficits in consumer education still constrain the practice of sustainable fashion in a large scale.

The importance of Indian handloom culture as a sustainable system, showing how traditional techniques are compatible with the needs of contemporary fashion. Policymakers, companies, and consumers must work together to enable those practices to flourish. Rules, facilitating openness, and penalizing unsustainable production can ensure industry practices meet environmental and ethical requirements.

Indian fashion is poised for a future where it has the potential to become a world leader sustainably by leveraging its heritage of rich textiles, culture of innovation, and inter-sector collaboration. This shift to sustainability is not just a necessity but also an opportunity to re- imagine fashion as a driver of social and environmental well-being and to ensure the cultural heritage for the future.

The development of an entirely sustainable fashion system will involve co-working, constant inquiry, and adaptive tactics. This research is contributing to that ongoing conversation, providing analysis and recommendations to steer primary stakeholders toward a more sustainable and resilient fashion future.

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Annexure

QUESTIONNAIRE

PERSONAL INFORMATION

What is your gender?*

- Male
- Female
- Others

What is your age?*

- 18-24
- 25-34
- 35-44
- 45-55
- 55 or above

What is your highest level of education? (If you doing masters select masters)*

- High School
- Diploma
- Bachelor's Degree
- Master's Degree

- Others

What is your Occupation?*

- Student
- Working Professional
- Entrepreneur
- Homemaker
- Others

SUSTAINABLE AWARENESS

Where do you get information about sustainable fashion?*

- Social Media (Instagram, Facebook, Google)
- Blogs
- News Articles
- friends/Family
- Others

Have you heard of the term "Sustainable Fashion" before?*

- Yes
- No

Do you consider yourself a conscious consumer when it comes to sustainable fashion?*

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

Do you repair or repurpose old clothing instead of discarding them? *

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

Applying sustainable products and consumption concepts in their lifestyle? *

Strongly Disagree

- 1
- 2
- 3
- 4

- 5

Strongly Agree

How do you think social media influencers and celebrities impact consumer attitudes towards sustainable fashion in India? *

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

Would you be willing to pay more for clothing that is sustainably produced?*

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

Do you feel Indian textile crafts is a sustainable practice?*

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

Do you consider the environmental impact of your clothing purchase?*

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

Have you ever purchased clothing made from Sustainable materials (e.g. Organic Cotton, Recycling Polyester) *

Strongly Disagree

- 1
- 2

- 3
- 4
- 5

Strongly Agree

Do you think the Indian Government should implement policies to promote sustainable fashion practices *

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

Do you prioritize buying clothing from Indian Sustainable Designers or Brand*

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

FACTORS AFFECTING PURCHASING DECISIONS

How Price influence your purchasing decisions when it comes to clothing*

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

How Quality influence your purchasing decisions when it comes to clothing*

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

How brand reputation influence your purchasing decisions when it comes to clothing*

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

How Sustainability influence your purchasing decisions when it comes to clothing*

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree

How Style influence your purchasing decisions when it comes to clothing*

Strongly Disagree

- 1
- 2
- 3
- 4
- 5

Strongly Agree