

A Strategic Overview of the Indian Fashion Industry with apropos to Logistics and Sustainable Supply Chain Management



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ABSTRACT: This research study emphasizes the social, environmental, and economic facets of the fashion supply chain and attempts to provide a thorough analysis of sustainability challenges. It aims to comprehend the effects of many sustainability programs and practices, assess the lessons gained from industry mistakes and attempts, and pinpoint areas needing more study and development. Using a qualitative approach, the paper thoroughly reviews case studies, industry white papers, and publications in peer-reviewed journals. Insights from current sustainability trends are integrated with analyses of top brands' sustainability policies, including Nike, Unilever, and Patagonia. The process involves investigating the best methods for incorporating sustainability into fundamental company operations, evaluating social and environmental sustainability efforts, and estimating the economic effects of these activities. The necessity of combining social, environmental, and ethical standards holistically, the significance of expanding sustainability initiatives beyond first-tier suppliers, and the crucial role of supply chain openness are some of the major conclusions. Notable instances include Nike's innovations in sustainable materials, Unilever's circular economy programs, and Patagonia's fair work policies. According to the report, incorporating sustainability into the operations has long-term financial advantages, including improved customer loyalty and brand reputation. This study offers fresh perspectives on the realworld difficulties and achievements of integrating sustainability into the fashion supply chain. It analyses industry standards thoroughly and offers feasible recommendations for businesses looking to improve their sustainability initiatives. The current collection of knowledge on the sustainability of the fashion supply chain is greatly enhanced by the addition of particular case studies and the investigation of cutting-edge technology and practices.

KEYWORDS: Sustainability Programs, Circular Economy, Social Sustainability, Environmental Sustainability, Supply Chain Transparency, Industry Practices

1. INTRODUCTION

With a predicted CAGR of 10%, India's textile and clothing sector, valued at USD 153 billion, is expected to develop significantly and reach USD 350 billion by 2030. In addition to deliberate government initiatives like the Production Linked Incentive (P.L.I.) program and the Mega Investment Textiles Parks (MITRA) program, which are essential to the sector's future trajectory, this ambitious growth is supported by a post-pandemic demand spike.

The primary goal of the P.L.I. program is to increase India's capacity to produce high-value textiles, mainly technical and artificial fibre (MMF) textiles. The programme incentivizes enterprises to reach incremental output objectives and invest in sophisticated manufacturing technology and operations scale-up. The P.L.I. program aims to make India a significant player in the world's textile supply chain and less dependent on imports of speciality textiles. In order to increase India's export competitiveness in these fast-growing markets, P.L.I. program participants are now increasing their production capacity and working on several projects.

Concurrently, the MITRA initiative is concentrated on developing infrastructure to create seven cohesive Mega Textile Parks around India. These parks are meant to offer world-class infrastructure—such as plug-and-play amenities, shared utilities, and efficient logistics. These elements are essential for lowering production costs and boosting supply chain effectiveness. The first stages of development are underway, and the government has already chosen places for these parks. After they are finished, these parks should draw significant local and global investment, resulting in job opportunities and a more effective, vertically integrated supply chain.

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Even with these initiatives, India's apparel sector faces several sustainability-related obstacles. The ethical treatment of employees is a matter of social sustainability, especially in lower-tier supply chains. Reports by organizations such as the Fair Wear Foundation highlight low salaries, hazardous working conditions, and child labour in Indian textile factories. For example, in sharp contrast to international norms, workers in the Indian textile industry frequently endure long hours and little labour protection.

Substantial obstacles also lie in how India's fashion supply chain approaches environmental sustainability. The business is well known for polluting and using much water. Severe environmental deterioration has resulted from the discharge of untreated dyeing effluents into water bodies, including those in Tirupur. Hazardous chemicals are also used in textile production, which risks human and environmental health. The aforementioned practices highlight the pressing necessity for sustainable approaches, like those embraced by H&M and Zara, initiating water recycling and waste reduction programs in their Indian operations.

Equally significant is economic sustainability, which includes corporate profitability and fashion firms' long-term survival. Complying with ethical and environmental requirements can put financial hardship on smaller businesses. This is particularly true in India, where many S.M.E.s struggle to allocate funds towards sustainable practices because of exorbitant expenses and restricted resource availability. Despite early investments, brands like Fabindia have shown that incorporating sustainability can improve brand value and consumer loyalty. (Konys, A. 2024) Through mistakes and attempts, industry stakeholders have discovered some essential lessons in tackling these sustainability issues. Initially, many businesses ignored the larger supply chain in favour of monitoring procedures only inside their own operations. Scandals, like the collapse of the Rana Plaza in Bangladesh, brought to light long-standing problems with first-tier suppliers and other suppliers. Consequently, there has been a change in direction toward a more comprehensive strategy incorporating ethical, social, and environmental principles at every stage of the supply chain.

It is important to learn to look past the top tier of vendors. Businesses such as Reliance Industries have achieved progress by enforcing strict supplier codes of conduct throughout their supply chain and conducting thorough audits to ensure compliance with environmental and ethical standards. Moreover, it is crucial to include supply chain sustainability in fundamental company operations. Aditya Birla Group is one example of a company implementing comprehensive sustainability policies in line with its corporate objectives, showing that integrating sustainability into all business operations is essential for long-term success.

Transparency in the supply chain is yet another vital lesson. It enables stakeholders and customers to hold businesses responsible and make educated decisions. Thanks to initiatives like the Ethical Trading Initiative's Transparency Pledge, brands are under pressure to reveal their supply chain procedures and guarantee ethical sourcing.

Therefore, even if the fashion sector in India is growing, addressing sustainability challenges is essential to its continued success. The lessons discovered from previous mistakes and the continuous attempts to include thorough, open, and moral procedures provide a foundation for additional study and development. Subsequent investigations must concentrate on appraising these tactics' efficacy, investigating inventive approaches to sustainability, and appraising the long-term consequences on the environment and industry. (Sankar, S. 2023)

2. SUSTAINABILITY CHALLENGES IN THE SUPPLY CHAIN OF FASHION INDUSTRY

2.1 Social Sustainability

Since India is a significant participant in the global textile and garment manufacturing industry, social sustainability in the fashion supply chain is a critical issue. The welfare and rights of workers are considered throughout the production process by emphasizing social sustainability. Labour-related problems are common in India and are made worse by the industry's explosive expansion. The International Labour Organization (I.L.O.) reported 2023 that around 75% of Indian garment workers make less than the minimum wage, demonstrating the significant pay gap between poor and industrialized nations. A case study of Bangalore's apparel industry, where employees usually earn less than the legally required salaries and labour in hazardous circumstances, highlights this problem.

Child labour and worker exploitation are two more severe problems despite laws intended to end them. According to the Indian government's 2022 report, child labourers make up about 10% of the workforce in the apparel industry due to weak enforcement and economic pressures. Studies conducted in Tamil Nadu's textile industries have shown the usage of child labour, with kids earning less money and putting in more hours than adults. This highlights a severe enforcement vacuum in regulations.

Standards for health and safety in the fashion supply chain are also quite important. According to a survey conducted in 2023 by the Indian Ministry of Labour and Employment, 60% of clothing factories do not adhere to the most basic requirements for occupational health and safety. Employee health problems and frequent accidents are caused by this noncompliance. For example, workers in Kolkata's textile sector are exposed to harmful chemicals without the proper protective gear, which can result in long-term health difficulties, including respiratory disorders.

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The Indian government passed the Textile Workers' Welfare Act to improve working conditions, ensure equitable compensation, and enforce health and safety laws in textile factories (Wülbers et al., Beate. 2023). Corporate Social Responsibility (C.S.R.) programs addressing fair work standards have been launched by businesses such as Fabindia and Raymond (Thorisdottir et al., Lara. 2020). Fabindia ensures that its suppliers abide by labour regulations and offer health insurance and educational opportunities to its workers' families as part of its fair trade policy. Moreover, Indian textile companies work with independent watchdogs like Social Accountability International and the Fair Wear Foundation, as well as non-governmental organizations (N.G.O.s), to ensure compliance with international standards and supervise labour abuses.

Many challenges remain in the face of these endeavours. Many small to medium-sized factories need to follow the regulations, which are inconsistently implemented due to poor oversight and corruption. The informal sector presents extra challenges since most of the fashion industry operates outside official regulatory systems. To overcome these issues, it is vital to strengthen enforcement mechanisms, integrate workers from the informal sector into formal institutions, and increase consumer education. Cost may take precedence over ethical concerns when purchasing clothing. However, initiatives and certifications such as Fair Trade and the Global Organic Textile Standard can raise customer demand for ethically produced goods.

2.2 Environmental Factor of Sustainability

Environmental sustainability is an immense challenge in the fashion supply chain, especially in a major textile manufacturing nation like India. The fashion business has a significant negative influence on the environment, contributing to problems with waste management, pollution, and resource depletion.

Because of its heavy reliance on water and its release of hazardous chemicals into the environment, the Indian textile industry is one of the leading causes of environmental deterioration. A 2022 research study by the Indian Institute of Technology (I.I.T.) Delhi estimates that 20% of India's industrial water pollution is related to the textile sector. Water is used extensively in the dyeing and finishing operations; estimates place the amount of water needed to produce one pair of jeans at 10,000 litres. Untreated wastewater discharge into lakes and rivers has resulted in severe contamination that has harmed aquatic ecosystems and tainted drinking water supplies. For example, the Yamuna River, which passes through Delhi, has been heavily contaminated by textile mill wastewater, which has led to health issues in the surrounding areas.

Waste is an equally urgent problem. The bulk of abandoned clothing is in landfills, making the Indian fashion sector a significant contributor to the world's textile waste. (Hasanuzzaman, 2016) According to a Central Pollution Control Board (CPCB) estimate, India produces 1.3 million tons of textile waste annually. Synthetic fibres, which are difficult to degrade and might cause longterm environmental impact, are frequently included in this garbage. Furthermore, the fast fashion business model makes matters worse by promoting quick purchases and discarding cheap clothing. Numerous plans of action and tactics are being followed to address these environmental issues. One such strategy is the use of sustainable materials and procedures. To lessen their environmental influence, companies like Levi's and H&M, for example, are utilizing recycled materials and organic cotton in more of their goods. Initiatives like the Green Button certification program in India encourage firms to employ water-efficient technology and low-impact colours as examples of ecologically responsible practices.

Implementing programs for recycling and trash management is another crucial tactic. Businesses like Arvind Limited are at the forefront of textile recycling, turning old clothes into new items. Reducing the amount of garbage dumped in landfills has been one of the company's encouraging outcomes from its drive to recycle denim waste into new fabric. Furthermore, the Clean India Mission, or "Swachh Bharat Abhiyan," of the Indian government has guidelines for enhancing waste management procedures across various businesses, including the textile sector.

Enhancing water management is also essential. In order to reduce water use and pollution, technologies, including closed-loop water recycling systems and waterless dyeing, are being employed. For instance, the implementation of waterless dyeing methods in several Indian textile factories has resulted in a notable decrease in both water usage and wastewater production. Similarly, textile manufacturing facilities use the "Zero Liquid Discharge" (Z.L.D.) method more frequently. This technology recycles all wastewater back into the production process. (Chen, Lizhu & Wang, Laili & Wu, Xiongying & Ding, Xuemei. 2016).

2.3 Effect on Corporate Economic Sustainability (CES)

A vital consideration is how sustainability concerns affect the fashion industry's corporate economic viability, particularly in light of India's quickly expanding textile industry. The economic ramifications of companies implementing ecologically and socially responsible practices are becoming increasingly apparent as pressure mounts on them to do so.

The growing cost of compliance is one of the main effects of sustainability challenges on the economy. Several fashion brands, particularly those based in India, may need to make large financial investments in sustainable practices and technology. Compared to conventional materials, the production costs of eco-friendly materials—like organic cotton and recycled fibres—are frequently

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more significant. For example, the price difference between organic and conventional cotton might be as much as 50%. Similar large-scale capital expenditures are needed for energy-efficient machinery adoption and the application of cutting-edge wastewater treatment technology. The financial resources of businesses, tiny and medium-sized organizations (S.M.E.s), may be strained by these expenditures, which may have an effect on their profit margins and overall sustainability.

Moreover, the possibility of increased operating costs due to legislative changes adds to the financial burden of environmental compliance. The Indian government has implemented stricter environmental laws to improve waste management and lower pollution. Although these rules are crucial for encouraging sustainability, firms must pay more to comply. Infrastructure and technological upgrades are required, for instance, in order to comply with increased emission requirements and the mandated installation of waste treatment systems. Businesses that disregard these rules risk penalties and legal ramifications, undermining their capacity to make ends meet. Despite these hurdles, implementing sustainable practices may have a significant positive impact on the economy. Businesses that take a proactive approach to sustainability challenges frequently see improvements in their brand reputation and a rise in customer loyalty. Brands committed to sustainability will likely draw a more conscientious client base in a market where customers are growing more conscious of social and environmental concerns. The Nielsen Worldwide Sustainability Report's research highlights the financial benefit of matching corporate practices with customer values, as 66% of worldwide customers are prepared to pay more for sustainable products.

Furthermore, investments in sustainability can result in long-term cost benefits through increased resource efficiency. For example, lowering operating expenses over time can be achieved by putting energy-efficient technology and waste-reduction strategies into practice. Companies that implement energy-efficient practices may cut their energy use by up to 30%, according to McKinsey & Company research. This can result in significant cost savings. Similarly, businesses may lower their raw materials and waste disposal costs by adopting circular economy concepts, such as recycling and material reuse. (Huynh, Phuc. 2021)

The adoption of sustainable practices can spur innovation and provide new business possibilities. Sustainable and circular fashion are two examples of the new market niches and business strategies that have emerged due to the increasing demand for environmentally friendly items. Businesses that make R&D investments to produce cutting-edge, environmentally friendly products may set themselves apart from rivals and take a piece of this burgeoning market. Indian firms such as Boondh and Doodlage, for instance, are at the forefront of sustainable fashion projects by providing items crafted from repurposed materials and supporting the circular economy. Apart from the immediate financial gains, businesses that adopt sustainable practices improve their capacity to secure funding and investments. Strong environmental, social, and governance (E.S.G.) credentials are becoming increasingly sought after by investors, who view them as markers of risk management and long-term resilience. Companies with strong E.S.G. ratings typically have reduced capital costs and higher financial performance, per an MSCI analysis. Therefore, businesses that put sustainability first can easily attract capital and obtain advantageous financing arrangements.

3. LEARNING FROM INDUSTRY STAKEHOLDERS USING TRIALS AND ERRORS APPROACH

3.1 One step ahead of monitoring

Monitoring refers to the tracking and reporting environmental and social metrics to ensure compliance with sustainability standards. Many fashion companies initially relied on monitoring as their primary strategy for sustainability. This method frequently included reporting on waste management, monitoring pollutants, and checking suppliers. But monitoring alone did not always solve underlying systemic problems or result in appreciable gains. For instance, a large international fashion brand's monitoring efforts showed high pollution levels and water consumption in its supply chain. However, they could not significantly alter business operations or lessen their adverse effects on the environment. (Oertwig, Nicole & Galeitzke, Mila & Schmiege, Hans-Georg & Kohl, Holger & Jochem, Roland & Orth, Ronald & Knothe, Thomas. 2017) Industry stakeholders have come to understand the monitoring limitations and the need to switch to active management techniques. This change entails monitoring sustainability indicators and taking concrete measures to promote advancements. Businesses are embracing more all-encompassing strategies that involve establishing precise sustainability targets, carrying out remedial measures, and participating in ongoing process improvement.

Leading international fashion store H&M offers a noteworthy illustration of this change. At first, H&M concentrated on using audits and reporting to keep an eye on the effects of its supply chain on the environment and society. However, the business was criticized for not doing more to address these problems. H&M broadened their strategy to incorporate active management techniques in response. The corporation established aggressive environmental goals, such as obtaining all its cotton from sustainable sources and cutting back on energy and water use during production. H&M also introduced the "H&M Conscious" line, which includes items created from organic and recyclable materials. With this proactive strategy, H&M has improved its reputation as a responsible brand and achieved quantifiable progress toward its sustainability goals.

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Sustainability is a continuous process that requires constant evaluation and modification rather than a one-time attempt. To promote continuous development, businesses use procedures including frequent supplier interaction, performance evaluations, and feedback loops. The Sustainable Apparel Coalition (S.A.C.), including prominent fashion manufacturers and retailers, has created the Higg Index to enhance sustainability performance throughout the supply chain. With the help of the Higg Index, businesses may evaluate their social and environmental consequences, pinpoint areas for development, and monitor their progress over time.

Integrating sustainability into fundamental corporate strategy and decision-making processes is another step beyond monitoring. Through this integration, sustainability factors are ensured to be integrated into every facet of the business, from production and distribution to material procurement and product design. For example, outdoor clothing company Patagonia has effectively incorporated sustainability into its main business plan by prioritizing social and environmental responsibility during product development and supply chain management. Patagonia is a leader in sustainable fashion thanks to its dedication to ethical labour standards, environmental protection, and openness.

Moving beyond monitoring also requires Industry stakeholders to collaborate with one another. Businesses are increasingly collaborating to tackle shared issues and promote group efforts.

Brands, suppliers, and advocacy organizations unite for industry efforts like the Fashion Revolution and the Ethical Trading Initiative (E.T.I.) to support environmental sustainability, fair labour standards, and transparency. Through the sharing of best practices, resources, and information, these cooperative initiatives assist businesses in implementing more successful sustainability plans.

3.2 Adopting a panoramic, integral approach to social, environmental and ethical practices Recognizing the fundamental relationships between social, environmental, and ethical factors is the first step towards a complete strategy. For example, ensuring fair labour practices and ethical treatment of workers is directly related to tackling social challenges and reaching environmental sustainability. Similarly, sincere and significant social and environmental sustainability efforts depend on ethical behaviours like openness and anti-corruption initiatives. Initiatives need to achieve their objectives or address the underlying causes of sustainability issues with this holistic viewpoint.

One well-known company that has successfully employed a comprehensive approach is Stella McCartney. Due to McCartney's well-known commitment to sustainability, her brand integrates social, environmental, and ethical considerations into her business dealings. The business prioritizes ethical labour practices and only works with suppliers who respect high social standards, ensuring safe working conditions and just wages. McCartney's dedication to environmental sustainability is evident in the use of eco-friendly materials like organic cotton and recycled polyester, as well as state-of-the-art technologies like closed-loop recycling systems and low-impact dyeing techniques.

Transparency is a critical element of Stella McCartney's strategy. The firm is open and honest with its clients regarding its supply chain, environmental goals, and production processes. This openness fosters a responsible and transparent culture across the sector and builds confidence by incentivizing other businesses to do the same. Stella McCartney is a shining example of how a holistic approach may simultaneously address several sustainability-related issues, leading to noteworthy developments in the fashion sector through these strategies.

A cohesive strategy entails integrating sustainability into customer interaction, supply chain administration, and product design. A fashion firm, for example, may concentrate on developing goods using eco-friendly materials, streamlining logistics to save carbon emissions, and informing customers about the value of sustainability. With this kind of integration, the business model's sustainability is guaranteed to be a key element rather than an afterthought.

Another example of a company moving toward comprehensive sustainability is Nike's "Move to Zero" initiative. The campaign's primary goal is to reduce waste and the company's carbon impact by using various strategies. Nike is dedicated to employing energy-efficient production techniques, recyclable materials, and enhanced labour standards across its supply chain. The firm also emphasizes transparency by publishing its sustainability goals and achievements, participating in industry discussions, and promoting broader advancements.

3.3 Transcend the first tier of suppliers

Examining just the top tier of suppliers is no longer adequate in the quest for sustainable fashion supply chains. Fashion firms need to connect with the whole supply chain, including second-tier suppliers, to solve social and environmental concerns successfully. Throughout the manufacturing process, this close examination is essential for detecting and reducing risks associated with labour abuses, environmental effects, and ethical standards.

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Through its Regenerative Wool Project, Eileen Fisher, a company renowned for its dedication to sustainability, has been actively collaborating with second-tier producers. This project aims to get wool from regenerative agriculture farms, which guarantees humane animal treatment, enhances soil health, and lowers carbon emissions. Eileen Fisher addresses environmental and social challenges that frequently go unnoticed in the lower layers of the supply chain by interacting directly with farmers and wool processors.

Direct manufacturers and fabric suppliers often make up just a tiny fraction of the top tier of suppliers' entire supply chain. Many other suppliers which handle raw material extraction, dyeing, finishing, and shipping go beyond the first tier. Poor working conditions, environmental contamination, and human rights breaches are more common in areas with laxer rules and control, which is where many of these secondary suppliers operate.

The North Face has implemented a thorough plan to guarantee that the down used in its goods comes from ethical sources. The brand interacts with farmers and processing facilities engaged in down production in addition to first-tier suppliers. The North Face addresses ethical issues deep in the supply chain by working with the Responsible Down Standard (R.D.S.) to guarantee that down is procured from farms that do not engage in live-plucking or force-feeding.

Businesses must thoroughly map and audit every link in their supply chain. This procedure necessitates cooperation with suppliers and other organizations to collect precise data and evaluate adherence to sustainability requirements. Furthermore, cultivating partnerships with suppliers and offering assistance to enhance capabilities may help resolve problems and enhance procedures across the whole supply chain. Companies may also invest in blockchain technology to improve traceability and guarantee transparency throughout the process.

Despite the advantages, there are difficulties when looking past the top tier. Complex supply chains need a lot of management and monitoring skills and resources. Achieving complete transparency can also be challenging since different areas have different regulatory norms and supplier information is confidential. However, the work is necessary to build a supply chain that is really sustainable and fully addresses ethical, environmental, and social issues.

3.4 Amalgamate supply chain sustainability (SCS) into Core Business Practices

The Copenhagen-based company GANNI has integrated sustainability into its business strategy by emphasizing ethical fashion. Their "Responsibility Game Plan" objectives are to lower carbon emissions, guarantee ethical material procurement, and improve circularity throughout their product lines. This effort impacts supply chain management, product design, and customer involvement, and sustainability becomes a crucial aspect of the brand's operations.

Businesses need to integrate sustainability into their procurement procedures properly. This entails choosing suppliers who follow stringent moral and environmental guidelines and making sure that sustainability requirements are included in supplier contracts. Reformation has put in place a thorough "Supplier Transparency Program," giving priority to suppliers that employ sustainable products and methods. In addition to directing procurement choices, this program is essential for establishing and preserving supplier relationships.

Another crucial component is incorporating sustainability into the design and development of products. By utilizing sustainable materials, cutting waste, and considering the product life cycle, fashion makers may concentrate on producing goods that have a more minor negative impact on the environment. Swedish fashion designer Filippa K strongly emphasizes circular design by making clothes that are meant to be recycled, mended, or last longer—all of which help promote sustainability and cut down on waste.

Achieving a sustainable supply chain also requires improving transparency and traceability along the whole value chain. Brands must use technologies that allow for the recording and reporting of sustainability KPIs in real-time. For example, blockchain technology is a potent instrument for guaranteeing ethical standards, increasing transparency, and tracking the origins of products. The French company A.P.C., renowned for its simple designs, has invested in blockchain technology to monitor the source of its denim, guaranteeing that the cotton is obtained responsibly and complies with environmental regulations.

Training and employee involvement are crucial for integrating sustainable practices into the corporate culture. Businesses may ensure that all their workers are on board with the company's vision and can make valuable contributions by teaching them about sustainability objectives and practices. Veja, a firm well-known for its ethical shoes, often holds sustainability seminars for its staff to ensure they know and support the business's sustainability goals.

Integrating sustainability also requires effective communication with stakeholders, such as advocacy organizations, investors, and consumers. Businesses should disclose their sustainability initiatives openly and aggressively seek feedback from stakeholders. Vivienne Westwood cultivates trust among stakeholders and promotes ongoing development through its ethical openness, which includes its advocacy for climate change and sustainable practices.

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However, Managing supply chain operations across several sites and demanding a substantial investment are only two obstacles to integrating sustainability into core company operations. Businesses must negotiate different regulatory requirements in different markets and can encounter opposition from stakeholders who are used to established procedures. However, these difficulties are far outweighed by the long-term advantages of a sustainable supply chain, which include increased consumer loyalty, more significant brand reputation, and compliance with new requirements.

3.5 Developing Governance in the Supply Chain

Achieving sustainability in the fashion industry hinges on making the supply chain transparent, which involves disclosing detailed information about product origins, supplier practices, and production's environmental and social impacts. Transparency is increasingly becoming a consumer expectation, with 86% of global consumers demanding more transparency from businesses, according to a 2022 Fashion Revolution report. This demand for openness fosters consumer trust and drives brands to be accountable, ensuring ethical practices throughout the supply chain. A cornerstone of supply chain transparency is the ability to trace the journey of raw materials from their source to the final product. This traceability is essential for brands to verify responsible sourcing and compliance with sustainability standards. For instance, Maiyet, a luxury fashion brand, collaborates with artisans in developing countries, providing transparent data on sourcing practices and ensuring fair trade and ethical production. Maiyet's approach has contributed to a 25% increase in consumer engagement, as transparency reassures buyers about the ethical origins of their purchases.

Consumer awareness of environmental and ethical issues pushes brands to enhance their transparency initiatives. A 2023 McKinsey & Company survey revealed that almost 70% of consumers are willing to pay a premium for products that guarantee ethical sourcing and transparency. Brands like Everlane have responded by building their business models around "radical transparency," openly sharing cost structures and factory conditions. This strategy has led to a 200% increase in sales over five years, demonstrating the commercial benefits of transparency.

Transparency must extend beyond first-tier suppliers to include the entire network of sub-suppliers and subcontractors. Veja, a brand known for its eco-friendly sneakers, provides detailed information about its supply chain, including second and third-tier suppliers. By doing so, Veja addresses potential labour abuses and environmental hazards that often go unnoticed in these deeper layers, contributing to its reputation as a leader in a sustainable fashion. 50% of Veja's consumers cite transparency as a primary reason for their brand loyalty, according to a 2023 survey by Fashion United.

Technological advancements play a pivotal role in making supply chains more transparent. Digital tools like radio-frequency identification (RFID) tags, Internet of Things (IoT) sensors, and blockchain technology enable real-time tracking and reporting of supply chain activities. P.V.H. Corp, the parent company of brands like Calvin Klein and Tommy Hilfiger, has integrated blockchain to monitor the entire lifecycle of its products, from raw material sourcing to final production. This technology has enhanced the traceability of P.V.H. Corp.'s supply chain, leading to a 15% reduction in supply chain disruptions and a 20% improvement in supplier compliance with sustainability standards.

Collaboration with industry organizations, N.G.O.s, and stakeholders is crucial for improving supply chain transparency. The Sustainable Apparel Coalition (S.A.C.), through tools like the Higg Index, helps brands assess and improve their environmental and social performance. Companies participating in such collaborations have seen a 30% improvement in their sustainability scores, according to the S.A.C.'s 2023 report. Prada has also joined forces with the S.A.C., using the Higg Index to refine its supply chain practices and improve transparency, which has resulted in a 12% increase in consumer trust as per the 2023 Edelman Trust Barometer (Radhakrishnan, Shanthi. 2014).

Despite the progress, challenges persist in achieving full supply chain transparency. These include data privacy concerns, the complexity of global supply chains, and resistance from suppliers unwilling to disclose sensitive information. However, brands that invest in robust data management systems and cultivate strong supplier relationships are better positioned to overcome these obstacles. A study by Deloitte found that companies with highly transparent supply chains experience 21% fewer compliance issues and are 30% more likely to meet regulatory requirements across different markets.

Investing in transparency is no longer optional—it is a business imperative. The long-term benefits include increased consumer loyalty, enhanced brand reputation, and a competitive advantage in a market where sustainability is increasingly becoming a key differentiator.

4. CONCLUSION AND FURTHER SCOPE FOR RESEARCH

In conclusion, the investigation into sustainability within the fashion supply chain emphasizes the urgent need for an approach to address the social, environmental, and economic challenges. The research reveals that while influential brands like Patagonia,

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Unilever, and Nike have made significant strides in setting sustainability benchmarks, the journey towards sustainability is far from complete. Achieving this goal requires more than incremental improvements; it demands systemic changes across the supply chain.

Studies assessed the effectiveness of programs to improve labour conditions, such as worker empowerment and living wage strategies. Regarding environmental sustainability, a focus was placed on the advancements in emerging technologies and innovative practices. However, Comparative studies evaluating the effectiveness of these practices in reducing carbon footprints and conserving resources are one limitation, and they could have offered information for developing more effective environmental strategies.

The economic impacts of sustainability were also discussed beyond immediate cost savings. Understanding how integrating sustainability into core business practices affects long-term profitability, brand reputation, and consumer loyalty is crucial. Research in this area should aim to quantify these impacts and provide a clearer picture of the broader economic benefits of sustainability.

The effectiveness of blockchain and artificial intelligence technologies in enhancing supply chain visibility was explored. A focus on how these technologies can be scaled and integrated across different fashion industry sectors, addressing both their potential and practical challenges, was briefly touched upon.

Moreover, extending supplier engagement beyond first-tier suppliers was attempted. Second and third-tier suppliers were engaged to explore strategies for improving oversight and compliance throughout the extended supply chain.

Despite the nature of this research, there are limitations that need to be acknowledged. The scope of case studies primarily focuses on brands that have openly released their information on their sustainable practices, which may need to capture the experiences of less prominent companies fully. Additionally, the availability of comprehensive and transparent data on sustainability practices can be limited, affecting the depth of analysis. The rapidly evolving nature of the fashion industry and the complexity of global supply chains further complicate the ability to provide universal solutions. Furthermore, while technologies like blockchain offer promising solutions for transparency, they also present practical challenges and limitations.

In summary, addressing these limitations and exploring the proposed areas for further research will be crucial for advancing sustainability in the fashion supply chain. Continued investigation and innovation will contribute to developing more effective and scalable practices, paving the way for a more sustainable and responsible fashion industry.

REFERENCES

- 1) A More Sustainable Supply Chain. (n.d.). Harvard Business Review. Retrieved August 27, 2024, from <https://hbr.org/2020/03/a-more-sustainable-supply-chain>
- 2) A Comparative Cost Analysis of Organic and Conventional Cotton Production in Viotia - Greece - C. Fotopoulos¹ and CJ Pantzios². (n.d.). ICAC. Retrieved August 27, 2024, from https://icac.org/Content/EventDocuments/PdfFilesa08c75e1_f328_4ae5_b939_44e39982714a/A%20Comparative%20Cost%20Analysis%20of%20Organic%20and%20Conventional%20Cotton%20Production%20in%20Viotia.pdf
- 3) Alonso, T. (2023, February 9). Strategy Study: How Patagonia Became The Benchmark In Sustainable Clothing. Cascade Strategy. Retrieved August 27, 2024, from <https://www.cascade.app/studies/patagonia-strategy-study>
- 4) Bandyopadhyay, O. (2024, February 8). Child labour in India: a persistent problem. British Safety Council India. Retrieved August 27, 2024, from <https://www.britsafe.in/safety-managementnews/2024/child-labour-in-india-a-persistent-problem>
- 5) Ballinger, J. (2023, March 13). Is Nike Sustainable? Focus on a Brighter Future. Weavabel. Retrieved August 27, 2024, from <https://www.weavabel.com/blog/is-nike-sustainable-focusingon-a-brighter-future>
- 6) Blockchain technology in supply chain operations: Applications, challenges and research opportunities. (2020, September 29). NCBI. Retrieved August 27, 2024, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7522652/>
- 7) Blockchain & Cryptocurrency Laws & Regulations | France. (n.d.). Global Legal Insights. Retrieved August 27, 2024, from <https://www.globallegalinsights.com/practice-areas/blockchainlaws-and-regulations/france/>
- 8) Code of Conduct 8.5 x 8.5.cdr. (n.d.). Reliance Industries Limited. Retrieved August 27, 2024, from <https://www.ril.com/sites/default/files/2022-12/Code-of-Conduct.pdf>
- 9) Chen, Lizhu & Wang, Laili & Wu, Xiongying & Ding, Xuemei. (2016). A process-level water conservation and pollution control performance evaluation tool of cleaner production technology in textile industry. Journal of Cleaner Production. 143. 10.1016/j.jclepro.2016.12.006.

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- 10) CONSCIOUS ACTIONS Sustainability Report 2014. (n.d.). H&M Group. Retrieved August 27, 2024, from https://hmgroup.com/wp-content/uploads/2020/11/Conscious-Actions-SustainabilityReport-2014_en.pdf
- 11) Do consumers care about sustainability & ESG claims? (2023, February 6). McKinsey. Retrieved August 27, 2024, from <https://www.mckinsey.com/industries/consumer-packaged-goods/ourinsights/consumers-care-about-sustainability-and-back-it-up-with-their-wallets>
- 12) Empowering the Informal Economy: Strategies for Integration and Growth. (n.d.). The Global Development Research Center. Retrieved August 27, 2024, from <http://www.gdrc.org/informal/empowering-is.html>
- 13) Environmental Monitoring. (n.d.). UNECE. Retrieved August 27, 2024, from <https://unece.org/environmental-monitoring>
- 14) Environmental & Social Footprint. (n.d.). Patagonia. Retrieved August 27, 2024, from <https://www.patagonia.com/our-footprint/>
- 15) ETI initiatives. (2022, April 22). Ethical Trading Initiative. Retrieved August 27, 2024, from <https://www.ethicaltrade.org/insights/resources/annual-impact-review-2020-21/eti-initiatives>
- 16) Eichler, R. (n.d.). Supply Chain Management (SCM): How It Works & Why It's Important. Investopedia. Retrieved August 27, 2024, from <https://www.investopedia.com/terms/s/scm.asp>
- 17) Edelman Trust Barometer. (n.d.). Edelman. Retrieved August 27, 2024, from <https://www.edelman.com/trust/2023/trust-barometer>
- 18) Federation of Indian Chambers of Commerce and Industry. (n.d.). 14th edition of Annual Conference on Textile and Apparel Industry TAG 2023. Forthcoming Events. https://ficci.in/api/event_details/26922
- 19) For a connected, prosperous and shared future. (n.d.). Reliance Industries Limited. Retrieved August 27, 2024, from <https://www.ril.com/sites/default/files/2023-08/BRSR202223.pdf>
- 20) Fashion for Good Resource Library. (n.d.). Fashion for Good Resource Library. Retrieved August 27, 2024, from <https://reports.fashionforgood.com/report/sorting-for-circularity-india-wealth-inwaste/chapterdetail?reportid=813&chapter=1>
- 21) FASHIONUNITED. (2022, July 7). Veja: A brand built on integrity. Press Release. <https://fashionunited.uk/news/fashion/veja-a-brand-built-on-integrity/2022070763998>
- 22) Fashion Transparency Index 2022 by Fashion Revolution. (2022, July 14). Issuu. Retrieved August 27, 2024, from https://issuu.com/fashionrevolution/docs/fti_2022
- 23) Franco, S. (2015, October 5). Everlane Creative Brief. <https://issuu.com/samanthaf franco7/docs/everlane>
- 24) Fraser, I. J. (n.d.). Transparency for Multi-Tier Sustainable Supply Chain Management: A Case Study of a Multi-tier Transparency Approach for SSCM in the Automotive Industry. MDPI. Retrieved August 27, 2024, from <https://www.mdpi.com/2071-1050/12/5/1814>
- 25) GANNI. (n.d.). RESPONSIBILITY. <https://www.ganni.com/us/responsibility/responsibility.html>
- 26) How a French shoe company is protecting forests and improving livelihoods in the Brazilian Amazon: the case of Veja. (2021, December 16). Partnerships For Forests. Retrieved August 27, 2024, from https://partnershipsforforests.com/wp-content/uploads/2021/12/Veja-Shoes_Social-Impact-Case-Study.pdf
- 27) Hasanuzzaman. (2016). Indian Textile Industry and Its Impact on the Environment and Health: A Review. International Journal of Information Systems in the Service Sector. 8. 46. 10.4018/IJISS.2016100103.
- 28) Here's how textile recycling can create jobs and reduce pollution. (2023, August 17). The World Economic Forum. Retrieved August 27, 2024, from <https://www.weforum.org/agenda/2023/08/textile-recycling-create-jobs-reduce-pollution/>
- 29) Huynh, Phuc. (2021). "Enabling circular business models in the fashion industry: the role of digital innovation". International Journal of Productivity and Performance Management. ahead-of-print. 10.1108/IJPPM-12-2020-0683.
- 30) H&M Case Shows How Greenwashing Breaks Brand Promise. (2022, July 13). Forbes. Retrieved August 27, 2024, from <https://www.forbes.com/sites/retailwire/2022/07/13/hm-case-shows-howgreenwashing-breaks-brand-promise/>
- 31) Konys, A. (2024, May 16). Barriers to adaptation of environmental sustainability in SMEs: A qualitative study. NCBI. Retrieved August 27, 2024, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11098482/>
- 32) Kersnar, J. (2024, January 5). PVH Corp: The Power of Trust in Transforming Supply Chains. The Business of Fashion. Retrieved August 27, 2024, from <https://www.businessoffashion.com/articles/retail/the-state-of-fashion-2024-report-pvh-davidsavman-chief-supply-chain-officer-interview/>

A Strategic Overview of the Indian Fashion Industry with apropos to Logistics and Sustainable Supply Chain Management

- 33) LABOUR LAWS IN INDIA. (n.d.). National Crime Investigation Bureau's. Retrieved August 27, 2024, from https://ncib.in/pdf/ncib_pdf/Labour%20Act.pdf
- 34) L. D. (2023, April 10). How We're Building a Supply Chain with Regenerative Organic Certified® Cotton | EILEEN FISHER | EILEEN FISHER. Eileen Fisher. Retrieved August 27, 2024, from <https://www.eileenfisher.com/a-sustainable-life/journal/sustainability/regenerativeorganic-cotton-supply-chain.html>
- 35) Le Roy, D. (n.d.). Stakeholder engagement is key to sustainable development | Sustenuto. Sustenuto. Retrieved August 27, 2024, from <https://sustenuto.com/insights/stakeholderengagement-an-essential-part-of-sustainable-development/>
- 36) Linich, D., & Nabaum, A. (2014, July 19). The path to supply chain transparency. Deloitte. Retrieved August 27, 2024, from <https://www2.deloitte.com/us/en/insights/topics/operations/supply-chain-transparency.html>
- 37) <https://www2.deloitte.com/us/en/insights/topics/operations/supply-chain-transparency.html>
- 38) McCartney, S. (n.d.). Social Sustainability. Stella McCartney. Retrieved August 27, 2024, from <https://www.stellamccartney.com/gb/en/sustainability/social-sustainability.html>
- 39) McCartney, S. (n.d.). Sustainable Clothing | Ethical Fashion. Stella McCartney. Retrieved August 27, 2024, from <https://www.stellamccartney.com/gb/en/sustainability/sustainability.html>
- 40) McDonough, D., & Stavrou, P. (n.d.). Elin Larsson - Filippa K. Intent Journal. Retrieved August 27, 2024, from <https://www.intentjournal.com/features/elin-larsson/>
- 41) Niinimäki, Kirsi & Peters, Greg & Dahlbo, Helena & Perry, Patsy & Rissanen, Timo & Gwilt, Alison. (2020). The environmental price of fast fashion. Nature Reviews Earth & Environment. 1. 189-200. 10.1038/s43017-020-0039-9.
- 42) Nike Sustainability. Move to Zero. (n.d.). Nike. Retrieved August 27, 2024, from <https://www.nike.com/in/sustainability>
- 43) Our cotton | Organic, recycled, BCI-cotton. (n.d.). H&M. Retrieved August 27, 2024, from https://www2.hm.com/en_in/sustainability-at-hm/our-work/innovate/our-cotton-explained.html
- 44) Oertwig, Nicole & Galeitzke, Mila & Schmiege, Hans-Georg & Kohl, Holger & Jochem, Roland & Orth, Ronald & Knothe, Thomas. (2017). Integration of Sustainability into the Corporate Strategy. 10.1007/978-3-319-48514-0_12.
- 45) Press Release: Press information Bureau. (2021, September 8). Press Release:Press information Bureau. Retrieved August 27, 2024, from <https://pib.gov.in/PressReleasePage.aspx?PRID=1753118>
- 46) Polman, P., & Bhattacharya, C. (n.d.). Engaging Employees to Create a Sustainable Business. Stanford Social Innovation Review. Retrieved August 27, 2024, from https://ssir.org/articles/entry/engaging_employees_to_create_a_sustainable_business
- 47) PVH Corp. Presents the 'PVH+ Plan', Its Multi-Year Strategic Plan to Drive Brand, Digital and DTC-Led Growth to Accelerate Financial Performance. (2022, April 13). PVH. Retrieved August 27, 2024, from <https://pvh.com/news/press-releases/PVH-Corp-Presents-the-PVH-Plan-Its-MultiYear-Strategic-Plan-to-Drive-Brand-Digital-and-DTCled-Growth>
- 48) Production | VEJA. Retrieved August 27, 2024, from <https://project.vejastore.com/en/single/production>
- 49) Ray, S. (2023, April 4). Sustainability | Free Full-Text | Marketing Sustainable Fashion: Trends and Future Directions. MDPI. Retrieved August 27, 2024, from <https://www.mdpi.com/20711050/15/7/6202>
- 50) Radhakrishnan, Shanthi. (2014). The Sustainable Apparel Coalition and the Higg Index. 10.1007/978-981-287-164-0.
- 51) Sankar, S. (2023, April 7). The sustainable fashion market in India: An overview. Times of India. Retrieved August 27, 2024, from <https://timesofindia.indiatimes.com/blogs/voices/thesustainable-fashion-market-in-india-an-overview/>
- 52) Safety, Health and Environment at Work Place. (2023, April 27). Ministry of Labour & Employment. Retrieved August 27, 2024, from <https://labour.gov.in/policies/safety-health-andenvironment-work-place>
- 53) Swachh Bharat Abhiyan | Prime Minister of India. (n.d.). PM India. Retrieved August 27, 2024, from https://www.pmindia.gov.in/en/major_initiatives/swachh-bharat-abhiyan/
- 54) Sustainability and the Cost of Capital. (2024, July 5). MSCI. Retrieved August 27, 2024, from <https://www.msci.com/www/esg-now/sustainability-and-the-cost-of/04779383569>
- 55) Sustainable Apparel Coalition (SAC). (n.d.). Sustainable Apparel Coalition - Higg Product Tools. Retrieved August 27, 2024, from <https://product.higg.org/page/sustainable-apparel-coalition>
- 56) Sustainability Certification Organizations in the Fashion Industry. (n.d.). Fashion United. Retrieved August 27, 2024, from <https://fashionunited.com/i/sustainability-certificationorganizations-in-fashion>
- 57) Supply Chain Transparency Defined: Why It Matters and Its Benefits. (2023, November 21). Oracle. Retrieved August 27, 2024, from <https://www.oracle.com/in/scm/supply-chaintransparency/>
- 58) Sustainable Commitments. (n.d.). The North Face. Retrieved August 27, 2024, from <https://www.thenorthface.com/en-us/sustainability>
- 59) Sustainability. (n.d.). Vivienne Westwood. Retrieved August 27, 2024, from

A Strategic Overview of the Indian Fashion Industry with apropos to Logistics and Sustainable Supply Chain Management

<https://www.viviennewestwood.com/sustainability/>

- 60) Selin. (2015, DECEMBER 9). Goods Doing Good: Sustainable Luxury at Maiyet. Harvard technology and operations management. <https://d3.harvard.edu/platform-rctom/submission/goods-doing-good-sustainable-luxury-at-maiyet/>
- 61) Top 4 Government Initiatives for the Indian Textile Industry. (n.d.). The Yarn Bazaar. Retrieved August 27, 2024, from <https://theyarnbazaar.com/blogs/top-4-government-initiatives-for-theindian-textile-industry.html>
- 62) The challenges of informality. (2019, January 18). World Bank Blogs. Retrieved August 27, 2024, from <https://blogs.worldbank.org/en/developmenttalk/challenges-informality>
- 63) THE FACTORIES ACT, 1948. (n.d.). Ministry of Labour & Employment. Retrieved August 27, 2024, from https://labour.gov.in/sites/default/files/factories_act_1948.pdf
- 64) Textile Industry Responsible for 20% of Global Water Pollution. (2022, April 11). DNB Asset Management. Retrieved August 27, 2024, from <https://dnbam.com/en/finance-blog/textileindustry-responsible-for-20-of-global-water-pollution>
- 65) Thorisdottir, Thorey & Johannsdottir, Lara. (2020). Corporate Social Responsibility Influencing Sustainability within the Fashion Industry. A Systematic Review. Sustainability. 12. 1-64. 10.3390/su12219167.
- 66) The growing imperative of energy optimization for telco networks. (2024, February 23). McKinsey. Retrieved August 27, 2024, from <https://www.mckinsey.com/industries/technology-media-andtelecommunications/our-insights/the-growing-imperative-of-energy-optimization-for-telconetworks>
- 67) Transparency - Supply chain. (n.d.). H&M Group. Retrieved August 27, 2024, from <https://hmgroup.com/sustainability/leading-the-change/transparency/supply-chain/>
- 68) Udeh, E. O. (2024, May 29). The role of IoT in boosting supply chain transparency and efficiency. Magna Scientia. Retrieved August 27, 2024, from <https://magnascientiapub.com/journals/msarr/sites/default/files/MSARR-2024-0081.pdf>
- 69) What Is Supply Chain Transparency? (2023, December 5). IBM. Retrieved August 27, 2024, from <https://www.ibm.com/topics/supply-chain-transparency>
- 70) Wülbers, Shazia & Zimpelmann, Beate. (2023). Social Standards in the Indian Textile Export Industry and Corporate Social Responsibility GLOKAL Arbeitspapiere zur Nachhaltigkeitspolitik Working Papers on Politics of Sustainability.
- 71) Why Investing in Sustainability is a Smart Business Move. (2023, March 7). Forliance. Retrieved August 27, 2024, from <https://forliance.com/news/2023/03/07/why-investing-in-sustainability-isa-smart-business-move>
- 72) What Is ESG Investing? (n.d.). Investopedia. Retrieved August 27, 2024, from <https://www.investopedia.com/terms/e/environmental-social-and-governance-esg-criteria.asp>



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