



Trends In Sustainable Fashion and Eco-Friendly Textiles – A Review

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Abstract

Eco - friendly textiles are made from natural fibers like cotton, animal fibers like wool and silk, and synthetic materials like nylon, polyester, and acrylics. The production of natural fibers is nearly equal to the production of synthetic materials (of which polyester accounts for about half). The phases of textile production are fiber production, fiber processing and spinning, yarn preparation, fabric creation, bleaching, dyeing and printing and finishing. Because the process of changing raw fibers into completed apparel and non-apparel textile items is complex, most textile mills specialize. Knitting and weaving are used alternately in the production of man-made cotton and wool materials. Sustainability in fashion can only be completely accomplished if all levels and stages of the product life cycle are thoroughly investigated to ensure that more environmentally and socially sustainable practices are implemented during the manufacturing and consumption process. Once viewed as a trend, sustainable fashion today is widely perceived as an influential part of the environmental movement. There are a number of approaches taken by the stakeholders in the fashion production starting from fiber production to garment manufacturing even the supply chain management to fulfil the sustainability requirements. Fashion items produced using sustainable practices can contribute to environmental, social and economic well-being leading to a green earth in the future. This review presents the data and findings collected from relevant “review and research articles” relating to sustainable fashion and textile production that are available in selected databases. This paper illustrates how the textile industry may use strategic ways to improve ecologically sustainable textile product usage and manufacturing. A discussion is focused on how to be increased sustainability in the textile industry. This paper introduces key principles for ecologically sustainable business practices to consider (e.g., eco-design, corporate social responsibility and green supply chain management). It is critical that all stakeholders in the textile industry, including consumers, producers, environmental protection is emphasized in the eco-friendly textile manufacture.

Key words

Eco-Friendly Textile, Environmental Pollutants, Natural fibers, Fashion Trends, Sustainable Practices

Introduction:

Sustainable fashion movements first appeared with the anti-fur campaigns in the 1980s and late 1990s, where numerous sweatshop scandals erupted, putting tremendous social pressure on textile manufacturers and retailers to introduce improved working conditions in their factories. Sustainable fashion, while not completely embraced by all retailers, has proven to be the way forward if we want to safeguard our planet (Wang 2008). Before claiming the ethical label, retailers are required to consider all stages of the manufacturing process in order to fully achieve sustainability. The life cycle of the clothing products may either begin at farms for plant and

animal-based fibers such as cotton and wool, or at factories for synthetic fibers such as polyester (Wang 2008). It is from these early stages that retailers and consumers need to be made aware of what each stage involves, how each stage has an impact on us socially and environmentally and be able to identify better sustainable alternatives.

The fashion and textiles industry are one of the major contributors to negative environmental impacts. The growing demand for fast fashion has resulted in factories using environmentally harmful practices in their manufacturing cycle as a means of trying to keep up with these demands (Long and Nasiry 2019). By using cheap labour in Asian countries such as India, Bangladesh, China and Vietnam, the global market has made it easy for companies to sell clothing products at low prices. This has resulted in more frequent purchases of clothing by consumers. Fast fashion business model is popular among retailers across the globe (Long and Nasiry 2019), and the South African retail industry is no exception to this. Most of the clothing manufactured and worn today are made of a mixture of cotton (a natural fiber) and polyester (a synthetic fiber). Both natural and synthetic fibers contribute to environmental degradation from the development stage of the apparel life cycle to the disposal stage.

The care phase of the clothing lifecycle has the greatest overall negative effect on the environment (Fletcher 2013). In order to achieve a sustainable and cohesive relationship between the economy and the environment, it is the duty of all consumers and organizations to use natural resources effectively, minimize emissions and protect the global environment and the ecosystem for future generations (Wang 2008). The sustainable fashion considers the social, natural and economic "price" paid in fashion manufacturing. Sustainability in fashion can only be completely accomplished if all levels and stages of the product life cycle are thoroughly investigated to ensure that more environmentally and socially sustainable practices are implemented during the manufacturing and consumption process. Once viewed as a trend, sustainable fashion today is widely perceived as an influential part of the environmental movement. In their study, Joy *et.al.* (2012) stated that, as consumers become more aware of the processes involved in the production of clothing their connection with nature will set off a new viewpoint on apparel, one that actively seeks sustainably produced fabrics and manufacturing processes and that sees slow fashion, given higher costs, as much more attractive when compared to fast fashion.

Fashion style:

Fashion products can be classified as fast and slow. The concept of fast fashion is alluring to many consumers who like to change their fashion style frequently, thus compromising sustainable production. Corporations such as Zara, Uniqlo and H&M have an emphasis on fast fashion to fulfil consumers' demands. Although many consumers today are conscious of sustainability from a young age, the continual increased demand for newer fast fashion results in a mass consumer that generates piles of waste cloth. However, slow fashion (a process using sustainable production methods and greener technologies) meets the expectations of social responsibility and environmental sustainability.

Textile and fashion production have a negative impact on the environment:

- Firstly, natural and synthetic fibres used as raw material need a substantial amount of water and energy for their production, respectively.
- Secondly, there is significant environmental impact during fabric chemical processing, which uses large quantities of chemicals, auxiliaries, energy and water leading to the generation of significant amount of effluent.
- Thirdly, substantial amount of water and energy are consumed for the care and maintenance of clothing during their use. Finally, at the end-of-life (EOL) of the fashion and textile products,

The textile and garment industries cause environmental damage at every stage of manufacturing, from the cultivation of raw materials through the disposal of finished goods. Chemical loading, high water consumption, high energy consumption, air pollution, solid waste, and odour creation are all key environmental concerns in the textile industry. To achieve sustainable production, it is necessary to examine the performance of the textile sector while considering the three elements of sustainability. All through the life cycle of textile products, the textile sector has a substantial environmental impact. As a result, throughout the product life cycle, energy, chemicals, and water are significant environmental effect contributors in the manufacturing industry.

To ensure environmental sustainability, apparel designers should produce things using ecologically and socially responsible design approaches and trends; the supply chain must analyze the effects of their business practices on culture, economics, and ecosystem. The environmental sustainability of textile products, a vital component of today's human life, has garnered considerable attention from both suppliers and customers in recent years due to life cycle resource consumption and environmental emissions (Achabou and Dekhills, 2013).

The concept of incorporating eco-friendly sustainable environmental operations into the traditional supply chain is referred to as "green supply chain management" (GSCM). Product design, material sourcing and selection, manufacturing and production, operation, and end-of-life management are all examples of this. GSCM emphasizes promoting value creation throughout the supply chain organizations to lower total environmental effect, rather than simply aiming to mitigate the supply chain's environmental impact (Mahltig *et.al.*, 2004).

Understanding the green supply chain management, social, and economic impact, as well as making appropriate changes to reduce it, is the foundation of sustainable supply chain management. Everything from the electricity system in a warehouse to product delivery and beyond can be included in the operation (Majumdare *et.al.*, 2010). If your warehouse produces goods, your sustainability strategy will entail a study of the full manufacturing process, including the sustainability practices of all raw material suppliers, product assembly in the plant, and waste disposal and recycling. In a supply chain, sustainability is more than just becoming green. Because environmental responsibility is such a hot topic in today's business.

In order to meet their important criteria, those who do not have enough are compelled to accept short-term decisions that often have unfavorable long-term effects for the environment. Because of improved production technology used to meet expanding consumer demands, manufacturing activities have grown more important to the global environment. The growth of technology has resulted in environmental, air, and water degradation, ozone layer thinning, and a decline in green area. However, in response to these challenges, a sensitive public opinion has emerged, particularly in industrialized countries. New safeguards have started to be taken, both to sustain industrialization and to improve the environment (Ali *et.al.*, 2014).

Changes in the textile sector, as well as many other industries, have contributed significantly to the rise of environmental challenges in recent years, in tandem with technical improvements. The discharge of significant volumes of chemical loads into the receiving environment is the textile industry's main environmental impact. High chemical and water usage, energy consumption, air pollution, solid waste generation, and odor production are all important considerations. The environmental problems that textile has caused have been reviewed in this review study, and solutions within the range of sustainability have been suggested.

Textile Industry's Environmental Impacts:

The major environmental effects of the textile industry include the discharge of large amounts of chemical loads due to the high consumption of water and harmful chemicals used in this industry. The corresponding water pollution, energy requirements in production processes and knowledge air emissions, packaging and waste management production issues, and the formation of toxic fumes caused by bleaching, dyeing, and printing procedures (Aouniet *et.al.*, 2012). The textile industry is responsible for some of the world's most severe economic and environmental effects. Textiles are made from natural fibers like cotton, animal fibers like wool and silk and synthetic materials like nylon, polyester and acrylics. The production of natural fibers is nearly equal to the production of synthetic materials (of which polyester accounts for about half). The phases of textile production are fiber production, fiber processing and spinning, yarn preparation, fabric creation, bleaching, dyeing, and printing, and finishing. Because the process of changing raw fibers into completed apparel and non-apparel textile items is complex, most textile mills specialize. Knitting and weaving are used alternately in the production of man-made cotton and wool materials.

The Cost of the Environment in the Garment Supply Chain:

The garment sector has several environmental consequences. It pollutes the environment in a variety of ways. Environmental pollution includes wastewater discharge, pollution and waste discharge, air pollutants, and troublemakers. The supply chain expenditures have an impact on the environment since delivering products more efficiently reduces your carbon footprint. Companies are now establishing sustainability initiatives to aid the

environment by reducing miles travelled, production expenses, product waste, and unscheduled activities (Khatri *et.al.*, 2015) Importers and exporters work together with their suppliers to express their sustainability ideals and expectations. Many businesses, such as retailers and large brands in the United States, have begun to assess their suppliers' environmental performance. They assess their greenhouse gas emissions, energy and water use, and trash generation through surveys and questionnaires (Kim, 2011).

Companies who are committed to sustainability will collaborate with their suppliers to identify pollution and waste sources and devise preventative solutions. To avoid pollution, they would also urge suppliers to employ cleaner and more cost-effective methods of production. The idea is to broaden the scope of accountability throughout the supply chain. Being environmentally conscious has other benefits besides making the world a greener place. Companies that strive for sustainability have a few benefits, including a better public image, a lower risk of noncompliance, the attraction of more environmentally conscious customers (a group that is rising), increased productivity and quality, and an increase in more sustainable products.

The Importance of Sustainability in Supply Chain Management:

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Sustainable Fashion and Textile Design:

One of the key challenges faced by the fashion textile industries is adopting sustainability in product manufacturing. Sustainability focuses on the "triple bottom line": environmental social and economic, impacts of a product or service (Banat and Bastaki, 2004). From a sustainability perspective, fashion and textile products are considered to be inherently at odds with the production process, as designers and product developers face several challenges to streamline a style. This section focuses on the requirements, fashion consumption and consumer attitude relating to sustainability in fashion and textiles. Requirements of Sustainability Due to the inherent nature and fast-pace of the fashion industry, several fashion manufacturers in the past have used unsustainable practices to meet demand and gain increased profitability. As there is an increased global trend towards sustainable fashion, many of the current fashion brands are now adopting sustainable practises in the three pillars of sustainability (Bariket*et.al.*, 2016).

The most important sustainability factor is the environmental impact created during the production of fashion and textile items. Furthermore, the social accountability and economic aspects of in fashion and textile production is neglected in many countries, which is a global concern. It is believed that the fashion items produced by sustainable practises can alleviate the ecological and social strains in addition to providing an ethical choice for sustainable-conscious consumers to buy sustainable product (Barnes *et.al.* 2006). If not reused, these garments

meet with landfill or generation of bond waste, depending on the degree of wear, physical condition, type of garment and fibre composition. The economic viability of recycle and reuse depends on the infrastructure and technology available for recycling. The concept of “throwaway fashion” plays a major role in global sustainability. Over the last decade, the concept of fast fashion has revolutionized the fashion industry, where new fashion styles are available every week (Bhardwaj and Fairhurst, 2010). Easy access to the fast fashion stores online and at a competitive price has especially helped young female consumers to fulfil their demand for new fashion styles (Barnett *et.al.*, 2005).

In addition, fast fashion retailers such as Zara, Benetton, H&M and Topshop are now selling fashion items at competitive prices that are designed to be used less than 10 times then becomes a “throwaway fashion” (Birtwistle and Moore, 2006). To address the “throwaway culture”, consumer ethics has played a significant role in recent years (Bruce *et.al.*, 2004).

Ethical consumers consider the impact of consumption of a product on the environment, humans, and animals (Burke, 2015). Although ethical consumers are focusing on sustainable products and practices, research evidence shows that many consumers are yet to adopt these practises for certain products. Indeed, when fast fashion is considered, consumer awareness of sustainability techniques is found to be low. For example, it is often difficult for consumers to use ethical practises in their fast fashion product consumption, as information is hard to find. Hence, the concept of sustainable fashion becomes ‘unfashionable’ which can increase the disposal of fashion products after only limited use (Barnett, *et.al.*, 2005).

The concept of slow fashion, on the other hand, helps consumers to consider the economic models and sustainable practices related to fashion production, distribution and use (Carrigan and Attalla, 2001). It helps consumers to pay attention to “valuing and knowing the object” and integrates experience with self enhancement values (Chen and Burns, 2006). The slow fashion approach avoids several negative factors related to fast fashion, in particular, large volumes of waste, and not paying attention to the environment. Clark, (2008) mentions that the approach of slow fashion is just the opposite of fast fashion. Slow fashion offers better sustainable solutions that have a direct and positive impact on design, production, consumption, and use (Carrigan and Attala,2001).

The slow fashion approach is based on the practises of food production and consumption for a sustainable living (Choi, *et.al.*, 2012). Successful consumer adoption of sustainable fashion depends on consumer awareness through education on reducing waste and environmental impact. Furthermore, understanding the consumer’s ethical values and the complex driving factors can provide key guidelines for sustainability in fashion products. Recent research demonstrates that barriers such as lack of consumer awareness, inappropriate retail environment, and social norms impact on the movement towards “eco-conscious fashion acquisition” (Choudhary, 2014).

In order to achieve low-cost production, the fashion manufacturers in developing countries take advantage of lack of strict regulations and lower environmental awareness, which hinders environmental sustainability. For achieving sustainable fashion and textile production, the fashion manufacturers should focus on the sustainability aspects of production and follow the sustainability guidelines outlined in the ISO 14000 and other environmental management standards. The following section describes the approaches such as selection of raw materials, eco-friendly processes, product life cycle assessment and recyclability to achieve environmental sustainability in fashion and textiles.

Eco-friendly Processes:

The conventional fashion and textile manufacturing practices based on non-renewable energy sources (gas, coal or petroleum) are unsustainable due to their limited availability and waste production that creates environmental burden. As the term “green production” is becoming important in many of the manufacturing segments, fashion

and textile producers and retailers are adopting the terms “green production”. Emerging technologies (sol-gel, layer-by layer deposition, enzyme processing and plasma deposition) and materials (nano materials), are paving the way for sustainable fashion production. Sustainable practices in yarn, fabric and garment manufacturing are discussed in the following section. Yarn and Fabric Manufacturing Yarn and fabric manufacturing are mechanical processes that need large amount of energy, generate waste, dust and noise (Dubas, *et.al.*, 2006).

The global emphasis on sustainability has led to the development of yarn and fabric manufacturing machines that uses less energy, works with higher efficiency and generates less dust and noise. As a result, several new techniques have evolved in spinning (such as open-end rotor and air jet spinning), weaving (rapier, projectile, air jet, multi-phase and water jet looms) and knitting (high speed circular knitting, computerized flatbed machine, seamless knitting). Yarn manufacturing processes such as ring spinning, rotor spinning and air jet spinning are energy intensive (Eder Hansen, 2015). Among these, ring spinning uses maximum amount of energy, hence, imparts highest amount of environmental load. Increase in the spindle speed (a challenging task), efficient driving system, lightweight bobbins, advanced ring and traveler combination can be helpful to reduce the environmental impact.

Eco-friendly Chemical Processing:

In the industrial sector, process wastewater is a major cause of pollution. per tonne of wool produced, 544 m3 of effluent is produced, which is contaminated with bacteria, chemicals, dyes, and bleaches. The effluent is usually alkaline (high pH), includes particles, oil, and potentially toxic organics such phenols from dyeing and halogenated organics from whitening, as well as a high BOD/COD load. Heavy metals like copper and chromium may be present in dye wastewaters, which are frequently brilliantly colored. During the manufacture of wool, bacteria and other diseases may be released (ISO E, 2006). Wool can be utilized in industrial applications such as thermal and acoustic insulation, as well as pads to absorb oil spills, in addition to premium next-to-skin garments. Natural fibers, such as wool, lessen the textile industry’s pollution and landfill build-up at the disposal stage.

Wool biodegrades rapidly in warm, wet environments, such as soil, through the activity of fungi and bacteria to necessary elements (i.e. Nitrogen and Sulphur). Innovative cost-competitive processes for new soft handle contact, no shrinking, and washable woolen textiles are needed in the textile and garment industries. The most effective methods for fiber modification are oxidative or reductive procedures, as well as the application of polymer resins to the wool surface. However, such methods produce hazardous chemicals that can be retained in fabrics and industrial effluents. Proteolytic enzymes have been employed to generate environmentally friendly alternative procedures for fabric manufacture (Joy, *et.al.*, 2012). Because the enzymes employed are created from bacterial or fungal species cultivated via bioengineering fermentation methods and then extracted, the economics of enzyme production and extraction are cost-effective. However, using pure enzymes during processing is difficult to manage and may result in enzyme penetration into the body. Synergistic effects, which occur when two or more substances work together to produce effects that are greater than the sum of their parts, are the most significant environmental impact of rapid pH variation in the large body of water. This process is particularly important in surface waters, where an increase in pH increases the toxicity of chemicals such as ammonia and iron, posing serious risks to fish stocks and children washing and playing in the water.

The effluent created in wet processing contains toxic organic materials, which are non-biodegradable and difficult to separate during effluent treatment. Therefore, newer technologies and nontoxic chemicals (dyes, auxiliaries and surfactants) should be used to reduce the environmental load. These newer approaches should focus on use of alternative advanced techniques or combined processes, new chemical formulations, reuse of dye-bath, waste reduction, and effluent treatment. Khatri *et. al.*, (2015) reviewed developments in the dyeing of cotton fabrics with reactive dyes to reduce effluent pollution. It was suggested that focusing on the use of alternative dyeing techniques can substantially reduce the effluent. As effluent treatment requires additional capital investment, high cost of effluent treatment and maintenance, textile plants should focus on adapting newer technologies.

Approaches such as use of advanced processes with recent dyestuffs and modern dyeing machinery, can help to reduce environmental concern. Some of the processes include: low liquor-to-material ratio dyeing, low padding trough volumes, pad dyeing technology, urea and salt-free continuous dyeing, modified washing-off techniques,

micelle dyeing, polymerization techniques for dye fixation, use of biodegradable organic compounds as dye liquor, and use of chemically modified cotton materials prior to dyeing.

Khatri *et. al.*, (2015) also showed that the integrated approach of desizing, bleaching and reactive dyeing can result in reduced cost due to reduced use of chemicals and energy. As mentioned earlier, fabric chemical processing consumes large amount of water, which necessitates drying at the end of the process using thermal energy. Hence, alternative water-free techniques can reduce the consumption of water and thermal energy. For example, plasma treatment is a dry and eco-friendly technology that can help to achieve new functionalities, such as hydrophilicity, water repellency, anti-static effect, increased dyeability and antibacterial properties, without altering bulk properties and aesthetics of fabrics.

Plasma treatment is performed by exciting partially ionized gas with the consumption of low amount of water and energy. Although, plasma technology is an ecofriendly process that avoids generation of effluents, the economic aspects of textile application need to be assessed before adopting the technology. Technologies such as Dye Coo (incorporating powder dye into polyester fabric using CO₂, which is water free process, reduces energy and chemical consumption by 50% compared with conventional methods and Air Dye (direct transfer of dye into polyester fabric from paper using printing machines, which uses reduced water and energy, and has lower greenhouse gas emissions) can be applied to reduce water and energy consumption, and reduce the generation of effluents. Effluent Treatment Generally, the effluent generated during chemical processing is treated by different techniques before discharged to the water systems.

Conventional effluent treatment techniques:

Techniques such as UV treatment, Ozonisation, hydrogen peroxide treatment, TiO₂ photocatalysis, Fenton's reagent and electrochemical processes are found to be inadequate in effluent treatment, as the new classes of dyestuffs and auxiliaries can resist these processes.

Hence, advanced techniques such as chemical precipitation, biological treatment, activated carbon adsorption, membrane technology, ultrafiltration, microfiltration, nano-filtration, reverse osmosis, coagulation-membrane separation and evaporation are being widely adopted by textile manufacturers. The application of membrane-based processes (filtration) for effluent treatment is becoming popular due to their high removal efficiency, as well as reusability of water and other constituents (Niinimaki and Hassi, 2011). For recycling of insoluble dyes (such as disperse or Indigo), auxiliary chemicals (polyvinyl alcohol) and water, the ultrafiltration process is becoming popular.

Filtration processes may need high initial outlay, but the process can be economical due to high efficiency of extracting reusable salt, permeate, and water. The other drawbacks of the filtration process are the disposal of concentrate stream, which is done by incineration, evaporation or discharging it into the ocean. These processes are not environmentally friendly. The combination of a biological reactor and membrane separation device, commonly known as membrane bioreactor (MBR), is a new innovative concept for effluent treatment.

Garment Manufacturing:

Garment manufacturing process is energy intensive and there are a wide range of areas garment manufacturers can focus to reduce the energy usage. The use of energy efficient tools, equipment and machinery for cutting, sewing, pressing and packaging; and the use of eco-friendly processes are the key factors requiring improvement to produce sustainable fashion. The waste generated during garment production such as paper, plastic, fabric remnants, cardboards used for packaging, and wire coat hangers should be recycled and reused. Several other strategies for saving energy and water, such as installing water efficient fixtures, training the staffs on energy efficiency skillsets, energy efficient heating/cooling devices, sensor enabled lighting systems, and rain-water harvesting for nondrinking purposes can also help in achieving sustainable fashion.

The selection of appropriate raw materials with a lower ecological footprint (renewable, biodegradable and non-depleting) and energy efficient processes can help to reduce the environmental impact. The factors related to sustainability in fashion products are marked inside the red rectangle. Use of renewable energy, energy saving wherever possible, reducing air pollution, recycling hard waste, and giving attention to social accountability can help in achieving sustainable textiles.

The fundamental thrust of lean manufacturing is to produce a high-quality product at lower cost by reducing or

eliminating the seven cardinal wastes such waiting, inventory, overproduction, repair, inappropriate processing, excess motion, and transportation from the value stream through continuous improvement and to deliver the value to the customer (Perry and Towers, 2009).

The goal of the lean manufacturing is to create an integrated system using multi-dimensional approach that includes adoption of management practices such as pull strategy, just in time philosophy, total quality management, cellular manufacturing, electronic data interchange (EDI), Kanban and co-design. Lean production techniques create a sustainable and positive work environment by emphasizing on empowering the workers and adopting the tools which enhance the operational efficiency by cycle reduction, cellular manufacturing, working in teams and stabilizing work flow etc.

Yang *et. al.* (2008) added that when the different forms of wastes in lean culture are reduced, will in turn useful in managing the environmental waste by enhancing environmental performance. Herva*et. al.* (2008) developed a useful tool to evaluate the influence of a garment manufacturing plant's environmental impact. They analysed the ecological footprint (EF) and compared the data to examine the environmental impact of different processes in a garment manufacturing plant. The authors collected data and divided the data into three categories: energy, resources, and waste. The major contributor to the final EF was obtained from the resources category (91.33%), as materials constitute the primary factors in garment manufacturing. Energy consumption was the second contributor accounting for 5.32 %, while the waste category was the lowest at 3.35 %. E

Eco-Labeling:

The Global Eco-labelling Network defines an eco-label as “a label which identifies overall environmental preference of a product within a product category based on life cycle consideration” Eco-labels provide information on eco-friendly products to consumers, which can help in reducing the environmental impacts on their daily activities. Consumers can compare various products in manufactured using eco-friendly processes, so they are informed about the adverse consequences during use and disposal. Eco-labelling has an important role in the development of sustainable fashion products globally, and it differentiates retail markets for “go green” customers. Neutral third parties are involved in awarding the eco-label to the products that fulfil the established environmental criteria.

The major goals of eco-labelling are:

- Creating awareness on eco-friendly products
- Improving environmental protection
- Assuring enterprises contribute towards improved environmental safety and social impacts
- Performing an educational role with a seal of ecological approval
- Increasing transparency within the international market.

This section focuses on the requirements, fashion consumption and consumer attitude relating to sustainability in fashion and textiles. Requirements of Sustainability Due to the inherent nature and fast-pace of the fashion industry, several fashion manufacturers in the past have used unsustainable practices to meet demand and gain increased profitability.

Conclusion:

Sustainable fashion production is gaining significant importance due to the global trend for sustainable products, and increased consumer awareness regarding sustainability. In order to reduce production costs, some fashion producers in developing countries are taking advantage of lenient regulations and low environmental awareness. However, many popular fashion brands such as H&M, Adidas and Uniqlo are incorporating sustainable practices into their production, supply chain, and retail management. The emphasis of these brands on sustainability is helping to achieve improved labour standards which are generating socially responsible products and services and a safer environment. Several international and private firms are working to monitor, assist and evaluate organizations the performance of fashion manufacturers and retailers. These organizations work on sustainability aspects such as licensing, permits and compliance requirements in managing waste, energy and water. Furthermore, several standards have already been developed to provide guidelines supporting the three pillars of sustainability. In addition to the fashion producers, retailers and international organizations, the consumers play

an important role in sustainable fashion. Consumers can select or reject a product if it is not manufactured with appropriate labour and resource consumption in socially acceptable conditions. Although some consumers are ready to pay higher prices for the sustainable fashion items, many of them may not be ready due to budget limitations, choice and mindset. In the future, sustainable fashion will not become a reality unless there is demand for sustainable fashion products and services. Successful consumer adoptability of sustainable fashion depends on consumer awareness through education on reducing waste and environmental impact, in addition to meeting consumer demand for ethical products. The current sustainable practices by manufacturers and retailers in the fashion industry will demonstrate how well society is ethically secured, the environment is protected and the workforce can benefit, together with the uptake of sustainable approaches for fashion product's aftercare and disposal.

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