



Research Article

Fashion Product Solutions and Challenges for Environmental and Trend Conscious Consumers

Melissa Wagner^{1,3*}, Yan Chen³, Antonela Curteza², Sebastien Thomassey¹, Anne Perwuelz¹ and Xianyi Zeng¹

Abstract

This paper documents current product solutions offered by the fashion industry for environmental and trend conscious consumers, and determines challenges, to discover product development strategies for more sustainability. This study reviewed green and ethical practices in contemporary fashion products based on literature and brand cases. A classification of main sustainable solutions was adapted, and results were collected accordingly. This study identifies eight solution categories, and most prominent examples of products and brands were highlighted, containing one or more design features. It is important to summarize approaches as there are differing designs due to creators' individuality. The general aim of all presented product examples is the reduced impact on environment and society. Challenges were identified with respect to the total impact of solutions and other product factors such as value, quality, or aesthetics. The results can be beneficial for the future development of new solutions for more environmentally friendly fashion. However, it is suggested that solutions need to be analysed critically to identify the real environmental value.

Keywords

Sustainable design; Green products; Sustainability; Slow fashion; Eco values; Conscious consumers

Introduction

The fashion industry needs to become more sustainable to reduce its impact on environment and society and to meet consumer needs and expectations. Consumers have become more demanding and aware of environmental issues [1]. But they are also seeking for personal benefits. Thus, environmental conscious consumers can be less driven to invest in organic fashion than in food, for example. Moreover, trend reports about rising awareness need to be analysed critically. In previous studies, consumer behaviour analysis focuses on consumer motivations and decision-making. In this context, ethics reflect morals and lead to pro-social behaviour. Researchers noticed that consumers tend to give socially desirable answers to questions related to their sustainable behaviour, resulting in an attitude-behaviour gap [2-4]. However, sustainable offers are rising, and companies are more and more developing new attractive fashion product solutions for environmental and trend conscious consumers.

This research focuses on fashion product solutions available on the market. As such, in the beginning, the perception of ethical

fashion is discussed. Followed by, the concept of ethical fashion which is analysed and main themes are developed. Accordingly, fashion product solutions and barriers can be grouped into the themes. Finally, the solutions can support conclusions about future developments.

Perception of ethical fashion

Sustainability can be used as an innovation strategy, adding values to consumers. This strategy is growingly realized by more businesses and researchers. But, ethical fashion might be perceived as confusing as it sounds like a paradox: The fashion industry is one of the most polluting industries, second after oil, and consumers and their consumption patterns are part of the problem, creating challenges. But, sustainability, in general, is rising and affecting all kind of business, also textiles. This is visible in an increased promotion of ethical fashion which is becoming more prominent in the global fashion industry. It was also seen in the example of the Ethical Fashion Show in Germany, held parallel to the Berlin Fashion Week. In their Green Showroom, brands from the street and casual wear are presented with the focus on design and sustainability: *urban Zeitgeist, eco-fair lifestyle and fashion* [5]. By identifying design solutions existing in clothing nowadays, changes in society can be seen.

The concept of ethical fashion: slow fashion

On the one hand, due to the environmental problems in the fashion industry and on the other hand, due to the consumer demand and more consciousness, a new concept rises along the traditional fast fashion concept. The slow fashion concept refers to the slow food movement, which focuses on local and small producer [6]. According to the Slow Fashion Award [7], the concept describes high quality which is realised through design, as well as fair labour conditions. The general aim is to reduce the negative environmental impact of fashion and its processes. This is caused by the use of chemical products, the exploitation of finite resources, and the high CO₂ emissions [8]. In the following, examples of changes from the fast to the slow fashion design are discussed, inspired by environmental and ethical issues occurring in the fashion industry.

To create eco or environmentally friendly fashion, sustainable practises are operating on several levels, either in the whole supply chain or solely in a single company [9]. Eco design can also focus, besides the steps involved in the supply chain, on the pre-consumer phase which includes production and transportation, and it can apply in the use or the post-consumer phase, either through recycling or upcycling. For clothing it has been seen that the environmental impact can be strongly influenced by the use phase of the consumer in the care phase or laundering; additionally, it is possible to involve all the stages of the lifecycle, including at the systems design level [10].

But, there are barriers for promoting and selling ethical products, such as a higher price or perceived scepticism if the price is too low, lower availability, or prejudice of customers towards aesthetics and quality of a sustainable garment. Often, eco clothing is associated with a stereotypical image of anti-fashion [11]. Barriers are playing a role in identifying consumer perception towards environmental friendly fashion products. Consumer expectations and perceptions are important factors in the product analysis. Li et al. [12] showed a

*Corresponding author: Melissa Wagner, GEMTEX, ENSAIT, 2 Allée Louise et Victor Champier, 59056 Roubaix, France, E-mail: melissa.wagner@ensait.fr

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Table 1: Main sustainable solutions.

Sustainable solutions			
(i)	use of organic or low impact fibres	(v)	green certifications and communication
(ii)	reuse and re/up-cycling of materials	(vi)	green product and process design
(iii)	alternative consumption practices	(vii)	ethical or local production
(iv)	clean technologies	(viii)	use of green design

relation of experience to perception and intention on co-design in online shopping, more design knowledge for consumers could have an impact on satisfaction and the purchase behaviour. A general solution to eco barriers are that environmental friendly fashion is focusing more and more on the design, reducing the perception of old-fashioned eco clothing, and targeting consumers that are also trend conscious. Thus, contemporary eco clothing design needs to be able to balance ethics, aesthetics and functionality. According to the push and pull marketing concepts, not only the industry but also consumers are influencers, creating new challenges through their impact on the environment. The question arises, how these consumer needs for more environmentally friendly fashion solutions influence the design of garments? And what are the barriers and challenges in the process? Clothing designers are incorporating sustainability into their design strategies and material choices as discussed in the following, presenting contemporary consumer products found in sustainable fashion.

Approach

This study investigates into the slow fashion concept and the contemporary design solutions available, and aspects related to environmentally conscious consumers are discussed, presenting most prominent examples of sustainable products, emphasizing on one or more design possibilities, having a better environmental performance than traditional solutions. Based on our previous study, this study elaborates in detail about the definition of sustainable solutions, and including possible barriers [13]. The six main solutions defined by Caniato et al. [14], (Table 1), are adapted to eight solution categories and presented according to the results for sustainable practices based on literature and current trends, as well as consumer needs.

Results and Discussion

The presented examples of current trends and offers grouped according to the sustainable solution categories have all in common that they have less impact on the environment or society. Main impact categories are total raw material or resource consumption, atmosphere and water impact, and toxicity [15]. Referring to the first category, sustainable fibres should not only be organic fibres, but include fibres that have a lower impact. Secondly, by incorporating circular design or design for re- and upcycling, designs can replace button closures with alternative closing possibilities or leather labels with printed versions. But also, other methods can be used, such as clean technologies or high-quality manufacturing to increase durability and create a long product life. Existing product solutions of brands have been found to function as a role model and to be able to develop from a local to a global concept. The discussion extracts the main contemporary ideas, looking into its local origin and global spreading over time. There is a broad variety; design solutions are different due to designer individuality and the influence of other factors, such as social and fashion trends. Designs are shaped by various factors such as branding

as well as consumer needs, resulting in the design solutions presented in this study. To promote sustainable fashion, consumer needs have to be defined and met accordingly through offering the right design solutions that should have physical but also emotional durability such as long-lasting wear and relevance or desirability of consumers.

(i) Organic or low impact fibres. Organic fibres have less impact on the soil or environment due to the lack of use of toxic insecticides, herbicides or fungicides [14]. Most prominent example for the use of organic fibres in clothing is organic cotton. Often, consumers tend to prefer natural fibres to synthetic [16]; however, most consumers are not aware of the real impact in the production process. E.g., to produce one kilogram of cotton, a high amount of water is needed, up to 10,000 litres of water, and also a high amount of land is used to grow the fibre. Organic fibres are not always having a lower impact in all their impact categories, thus the focus should not only be on organic but on the total impact. Other natural raw materials from a plant are hemp or kapok, and from an animal source wool and silk which are available as organic wool and peace silk, this refers to a more ethical procedure of gaining the fibres. The wool process is mulesing free, and the alternative silk process can gain the silk without boiling and killing the silk worm. Still, for consumers being highly ethical and therefore avoiding animal products, i.e., living a vegan lifestyle, wool and silk are not suitable. Nowadays, there are several alternative fibres such as lyocell fibres, also called Tencel, made from cellulose. Also, food sources are used, such as fibres made from soy, milk or coffee, as well as food waste are recycled, such as orange waste peels and seed. Another example from nature is algae fabric.

An example is that of the US brand Patagonia with a management based on sustainable development and an offer of innovative and efficient products [17]. The design strategy uses only organic cotton, and focuses on both the product quality and sustainability [8]. Also, consumers show importance of the origin of the raw material; The Ethnicity report [18] states the high interest of French consumers towards the origin of raw materials and production location compared to environmental or social impact in general in production process [19]; Local suppliers are shortening the transportation cycle. Also, another fibre approach focuses on using more durable textile materials which can prolong the product life, or more sustainable materials such as recycled fibres, described in the following.

(ii) Reuse and re/up-cycling. The reuse and re- or upcycling of materials has a lower impact on the environment by saving resources and decreasing landfill. The three concepts are the three R's, to reduce, reuse and recycle. The traditional concept of a linear process is transformed into a circular one, incorporating circular design. When designing for recycling, additional considerations have to be made, such as material content and product accessories; i.e., there are difficulties in recycling products according to a separation of different materials and accessories such as buttons or labels. Therefore, the design process can already focus on design for circularity by, e.g., replacing button closures with alternative closing designs or leather labels with printed versions. Upcycling can be a method to add more value to a product.

Besides old clothing from e.g., manufacturing scraps, also other materials can be used in the fashion design such as bottles and tyres [14]. Referring to the local to global concepts and upcycling, most prominent example is the recycling of truck canvas by the Swiss company Freitag, selling backpacks, bags and other accessories made from recycled material such as old truck canvas, safety belts or bicycle

tubes. Using this concept, the brand offers unique designs and creates a lifestyle product with more value. Other companies worldwide are adopting similar concepts. Examples are the Romanian brand upside-down, selling products Made in Romania and reusing materials such as from old outdoor advertising banners and billboards. Or, another example is the Turkish brand %100 ISTANBUL, which sells upcycled bags in their concept store made from recycled seed or food sacks and also exhibition banners and others.

Another prominent example is the German sports brand Adidas and the launch of Parley for the Oceans, using recycled ocean plastic for their products. Besides sneakers, also swimwear products are offered, made from upcycled fishing nets and debris; the design of the products is inspired by the sea, using blue colours and the wave structures among others. On the one hand, especially when it comes to performing products, the quality has to be ensured. Recycled products have been seen to cause the problem of trust in quality. In the luxury sector, research revealed that the consumer perception of the products made from recycled materials is negative [20].

(iii) Alternative consumption practices. Besides vintage practices and second-hand, there are many more alternative practices such as renting or leasing. These practices are offering a second or several life and dematerialization to products. Trends such as minimalism or focus on service rather than product ownership are popular, and offering a unique fashion product or service to consumers. Consumers can have nostalgic emotions towards them and require different styles than these available on the current market. Moreover, due to cost reasons, the second-hand options are desirable, especially for price-conscious consumers or those with lower incomes, such as students. For specific types of clothing such as children wear, second-hand clothing is preferred as children grow fast and require bigger sized garments. Other alternative models or approaches offer clothing that customers can rent, share, lease, or switch.

(iv) Clean technologies. Besides information technologies [21], companies focus on the improvement of product processes, e.g., using less water during dyeing or using natural dyes, i.e., vegetable and plant dyes. Also, social cause care is included, by basing dyeing on traditional methods. In this context, companies are working with a non-profit organisation to develop sustainable community-based projects. These clean technologies should be shared widely by using open source to further develop sustainable practices.

(v) Green certifications and communications. Green certifications and communication strategies are essential in order to show added value to consumers. Besides labelling and certifications, branding can help brands and products to tell an emotional story of the real facts behind a sustainable product. Besides the traditional design requirements, the design for green products follows certain eco standards. As mentioned before, organic cotton is well known; Besides, certifications include the fair trade of suppliers. A prominent example of certification is the GOTS (Global Organic Textile Standards) and the Fairtrade certification or Fair Wear Foundation. Also, there are country-specific certificates, such as the Bündnis für Nachhaltige Textilien from Germany; others are the Oeko-Tex. The certifications need certain measurements accordingly, such as through the LCA (life cycle assessment).

(vi) Green product and process design. A green product can present one of the six in here mentioned solutions, or several or all of them. Referring to the example of organic cotton, using a single approach this means that the textile material is certified as coming

from a fair-trade source; but to include multiple approaches, other factors should be considered as well. These considerations include for example the dyeing, i.e., using natural dye to avoid chemical substances. Hereby the whole product becomes sustainable. Besides the product, sustainable design also applies to the packaging and services, using improved packaging and giving consumer advice on garment care such as washing with lower temperature and less often, or offering disposing services to customers, e.g., H&M and their Garment Collecting service. Therefore, besides the product characteristics and the materials used, also production technologies and services should be included to define a green product to be sustainable [14]. As mentioned, consumers and their use phase have an influence on the products' sustainability.

(vii) Ethical or local production. An ethical or local production can help to minimize environmental impact through reducing transportation and using local resources. Examples are fair trade, or made in country labels.

(viii) Use of green design. A green design can be besides the design for recycling, also a classic or aesthetically appealing design. Researchers suggest to include aesthetics - if ethical fashion is attractive, it can also attract young consumers [2]. Designers are lacking knowledge of sustainable design, thus, one of the major barriers is the design which was also revealed by fashion professionals [11]. Solutions are proposing to incorporate more sustainability into design and to trigger trendsetting [22]. Also, there are assumptions made that simple and classic clothing is more sustainable, such as a simple, sleek black dress [22], i.e., compared to fashion orientation that style orientations lead to more sustainable patterns than do fashion orientations [23]. Therefore, more attention needs to be on the styles and product aesthetics: Most of the sustainable fashion designs at this stage still focus on the use of environmentally friendly materials, such as cotton, hemp and/or other natural fibers; not much attention is put on the styles or aesthetic side of the product [11].

Conclusions

Discussing the sustainable methods and the fashion consumer and his needs following has been found. Consumers can be the main influencers in the design process of products, refer to the concept of co-design or consumer-centred design. Li et al. [12] showed that co-design in online shopping can have an impact on satisfaction and the purchase behaviour. Also, through their 'pester' power, especially in social media or through feedback systems, their opinion becomes important and can influence either positively or negatively. Information nowadays is spreading fast, e.g., Gucci has recently announced to become fur-free, and this statement can be found in social media discussions, influencing the brand presence and image. Environmental consumers have been seen to passively or actively promote or boycott products related to environmental issues or ethics, such as boycotting brands and products using fur or angora wool. Therefore, the perception and decision-making process of consumers is a rising topic in research and company's marketing departments. The research on consumer behaviour, and especially on ethics, needs a sensitive approach, due to bias in what the consumers state and how they behave; refer to the previously mentioned attitude-behaviour gap due to socially desirable answers. Different researchers tried to define the factors that can minimise this gap. One approach is to focus not only on ethics in the product - it has been found that ethicality might not be the main purchase criteria - but also on other factors such as price and availability [24,25]. Also, as there is a broad variety

of key influence factors and buying motivations, and the function the fashion item performs varies strongly [26], two categories in product design were defined; the functional and symbolic product attributes [27], whereby the product can also own both. Concluding, besides general product features and sustainable design, emotions have to be included into the design to achieve full consumer satisfaction.

There are several categories to define sustainable methods for eco fashion. The results show that contemporary fashion design offers several solutions for the environmentally conscious consumer. However, there is a necessity for more information on both sides, for the consumer and the company related stakeholders to create real sustainable products. Evaluation tools such as LCA are helpful to determine the real value; marketing tools are necessary to promote the sustainable value towards the consumer, including traditional factors as well as contemporary evaluators such as sensory features like emotions and feeling. The presentation of the right information about the product is crucial to promote the green product; different types from several sources are available. Researchers need to consider subjective attributes and analyse according to the brand values if the product incorporates this image. This overview can benefit the future development of new solutions in sustainable clothing design, in further research the acceptance of the various concepts needs testing.

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Author Affiliations

Top

¹GEMTEX, ENSAIT, 2 Allée Louise et Victor Champier, 59056 Roubaix, France
²Faculty of Textiles Leather and Industrial Management, Gheorghe Asachi Technical University of Iasi, B-dul. D. Mangeron Nr. 67, 700050 Iasi, Romania
³College of Textile and Clothing Engineering, Soochow University, Suzhou 215006, China

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