

## The Characteristics of Fast Fashion or Slow Fashion and Their Future Sustainability

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**Abstract:** In recent years, the fast-fashion clothing industry has caused increasingly serious environmental pollution during the process of clothing production and inventory disposal. This essay discusses the respective advantages and disadvantages of the fast fashion industry and the slow fashion industry, especially the problems and benefits in terms of environmental pollution. The results show that from the perspective of environmental protection, the slow fashion clothing industry is more environmentally friendlier than the fast-fashion clothing industry; however, slow fashion also has the disadvantage of lagging behind, and its shortcomings make it difficult for consumers to favor. As a result, the fast fashion industry still dominates the apparel market, and it is more popular due to its low production cost and fast production speed. However, the fast fashion industry poses many threats to the environment, such as the pollution of wastewater by dyes during the production process, and the toxic gas emitted by the burning of stored clothes, polluting the atmosphere. This essay compares the fast fashion industry and the environmentally friendly clothing industry fashion in terms of the pollution range of the two different clothing industries, the use of dyes during production, the choice of clothing fabrics, and the disposal of inventory clothing. From the point of view of chemical engineering and operation unit of chemical engineering, the results show that the slow-fashion clothing industry is superior to the fast-fashion clothing industry in the use of dyes, the choice of fabrics, and the disposal of waste clothing. The purpose of writing this article is to form a concrete awareness of the harm caused by the fast fashion industry and to popularize the culture of the slow fashion industry to the general public. It is expected that the two different clothing industries can learn from each other in order to rectify for more environmental friendly solution, and therefore, reduce the pollution and damage to the ecosystem.

### 1. Introduction

As the textile industry has become one of the most popular and useful industries in the world over time, people often ignore the fact that it is also one of the most environmentally damaging industries. Instead, as people's desires grow, so does the speed of producing new garments grows. In order to achieve the quantity that the world wants, we humans have developed a number of efficient but unethical ways of manufacturing goods. Although many of us are starting to realize the importance of protecting the Earth, it is the simple things that are often forgotten. Looking in the closet, only a few are able to have the exact number of clothes they need, while most of us all have the number of clothes we want.

Fast Fashion, the term that is used to describe clothing designs that are low-cost and highly productive based on replicating catwalk trends and high-fashion designs. The idea appeared so people, especially teenagers, can get the newest styles on the market as fast as possible at a relatively low price. Fashion fast existed because the industrial revolution introduced new technology—like the

sewing machine, so clothes became easier, quicker, and cheaper to make. Trends can be switched at any second, where the latest styles can be already thrown into the trash the next day. Slow fashion, also known as sustainable fashion, is a concept describing the opposite to fast fashion, advocated for producing clothes with respect to the people, environment, and animals. By the late 2000s, fast fashion had reached its peak. Brands like Zara, Gap, and H&M spread all over the street and on the internet, the world people live in nowadays. The key idea of this report is to compare and contrast the similarities and differences between the two types of fashion and explore their effects on the environment, whether adverse or beneficial. In addition, it is significant to alert the public and raise their awareness of the negative side of garment processing.

The main purpose of this article is to analyze the two totally different approaches to fashion in order to see their negative and positive impact on society and the environment. For the first part of the report, it shows how fast fashion brings benefits to humanity, but causes a negative impact on the environment, talking specifically about what kind of pollution it contributes to during the process of production. Then, it will demonstrate both the advantages and disadvantages of slow fashion, from the sustainable methods that they use to what factors are causing it to be the minority while quoting some examples on how they are environmentally friendly. Lastly, it will explore the main differences between the two types of fashion, dividing them into three categories, namely fashionability, price, and the impact on the environment and humans.

## **2. Fast Fashion**

### **2.1 Advantages of Fast Fashion**

Fast fashion is usually treated as an accelerated business model featured with short product life cycles, catwalk fashion imitation, and affordable prices [1]. Many fashion brands began rapidly copying the catwalk style in the mid-1970s, producing clothing at a much lower cost, offering cheap fashion products to the retail market within months [2], and encouraging over-consumption by low prices and fast product rotations. Compared with traditional fashion brands with fewer styles, slow updates, and more inventory, fast fashion brands have more styles, higher fashion degrees, and fast update, which has attracted a large number of young consumers. At the same time, such fast fashion brands abandon the marketing strategy of traditional clothing enterprises (advertising, celebrity endorsement, sponsorship activities, and media exposure, etc.). According to its unique marketing strategy, it opens eye-catching and huge stores in bustling commercial areas, uses its geographical location and store display to promote its brand image, and plays an influence beyond the advertising effect. Moreover, it could help these brands leave a good brand image in the minds of consumers, enabling consumers to give priority to these brands when they want to buy clothes. The most successful brands in this segment include Spanish conglomerate Zara and Swedish counterpart H&M. They can translate a fashion idea to a fashion product within two–three weeks, which results in up to 24 collections a year [2], in contrast to the luxury fashion brands with only one–two collections a year [3]. Additionally, these brands, low prices to attract consumers to over-consumption by reducing costs, like using cheap materials and labor. This business model gained popularity throughout the 1980s, and some described it as the “democratization of fashion” because the once-exclusive luxuries were now accessible to everyone [1].

### **2.2 Impacts of Fast Fashion Industry**

The fast fashion industry also produces huge waste and causes serious pollution to the environment [4]. More than \$500 billion is lost worldwide every year due to inadequate clothing utilization, and the lack of recycling. Retailers such as Zara, H&M and Topshop are known for designing fashion products that use less than 10 times, and encouraging so-called "throwaway fashion" [5]. Moreover, the wastes generated by fashion products, such as textiles and chemical dyes, impose environmental damages, water resource pollution and climate change. It is estimated that, if the full Garment-manufacturing supply chain is considered, the fashion industry is responsible for 3.3 billion tons or 10 percent of global CO<sub>2</sub> emissions and 20 percent of global waste streams. Meanwhile, due to the

excessive consumption of consumers, more and more idle products are also burned or land-filled, indirectly leading to environmental damage and waste of resources.

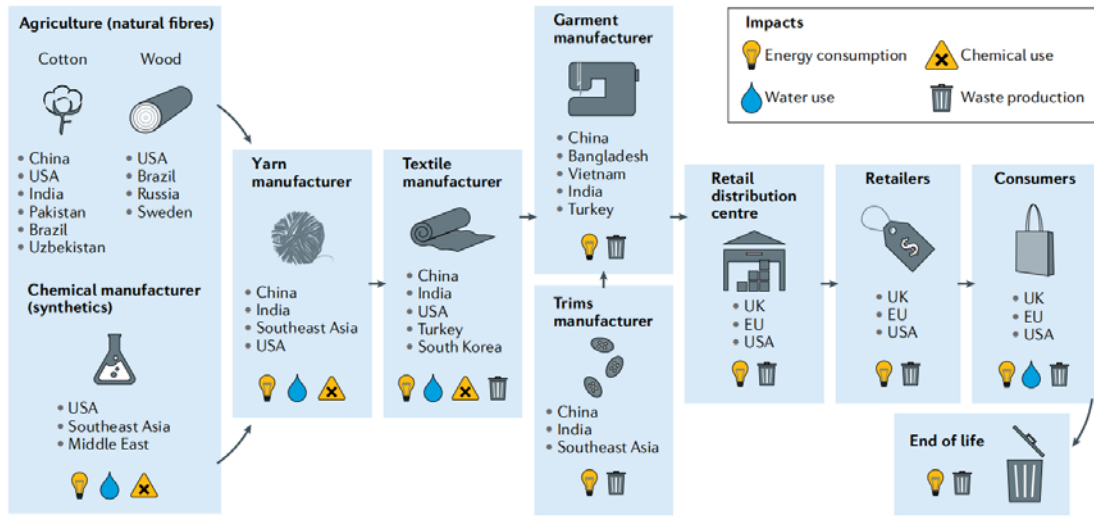


Fig. 1 Garment-manufacturing supply chain [6].

At each stage of the Fig.1 supply chain, the fashion industry exerts environmental impacts. This supply chain is globally distributed, with much of the initial fiber production and garment manufacturing occurring in developing countries, while consumption typically occurs in developed countries. Therefore, the fast fashion industry also has different effects on the environment in different countries and regions. Meanwhile, although southern Earth countries like China, India, and Cambodia produce and export the majority of textiles and clothing that the market needs each year, the clothing design process is in the global north, usually, the EU or the US, where these brands' main offices are located. The distance makes it difficult to avoid mistakes in the production plan, resulting in unnecessary pre-consumer waste in manufacturing [6].

High volumes of fast fashion production, consumption, and the logic behind it increase the environmental impacts by promoting unsustainable manufacturing, distribution and use of the garments [6]. As shown in Fig.2, in countries where cotton is grown or textile industrial wastewater has not been properly purified, not only chemical and water pollution is serious, but also produces a huge carbon footprint. Chemicals spread around the globe and are enriched in the food chain, posing risk to organisms, ecosystems and biodiversity. In addition, clothing exports from the countries produced to the countries consumed, the entire transportation, and distribution process is accompanied by this pollution.

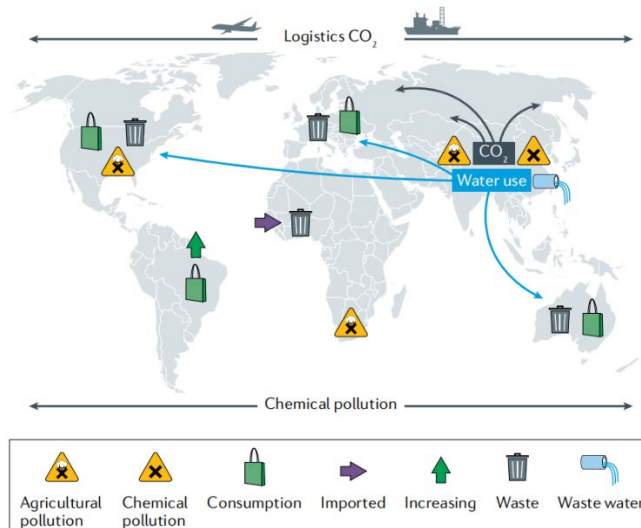


Fig. 2 Geographic distribution of fast-fashion environmental impacts [6].

The fast fashion industry uses a large quantity of water and produces amounts of wastewater containing toxic chemicals. It exacerbates water scarcity, averaging an estimated 200 tonnes of water used during the production of one tonne of textile [7]. Meanwhile, the wastewater entry into the groundwater may degrade the entire ecosystem [7]. For example, the fashion industry in Cambodia, which is responsible for 88% of all industrial manufacturing, has caused an estimated 60% of water pollution and 34% of chemical pollution [7]. In the current supply chain, fashion product's carbon footprint is one of the largest, creating even more greenhouse gases than aviation and shipping industries combined because almost all fashion products are outsourced and transported internationally. Furthermore, the fashion industry's high carbon footprint comes from high energy use and is influenced by the source of the energy used. Kirsi et al estimate global production of 2.9 Gt of CO<sub>2</sub> equivalent emissions, two-thirds of which is associated with synthetic materials during fiber production, textile manufacturing, and garment construction [6]. In China, textile manufacturing depends on coal-based energy and has a 40% larger carbon footprint than textiles made in Turkey or Europe [8]. Many chemicals are used in the textile manufacturing process. A single European textile-finishing company uses over 466 g of chemicals per kg of textile, including sizing agents, pretreatment auxiliaries, dyestuff, pigments, dyeing auxiliaries, final finishing auxiliaries, and basic chemicals [9]. In the environment, Agrochemicals leach into the soil, where they cause a decrease in soil biodiversity and fertility, interrupt biological processes and destroy microorganisms, plants and insects.

As opposed to fast fashion, which generates large volumes of waste and environmental pollution, the slow fashion model pays special attention to sustainability in design, production, consumption, and use [10]. More information about slow fashion can be found in the following sections.

### **3. Slow Fashion**

#### **3.1 Advantages of slow fashion**

##### **3.1.1 Fabric-saving cutting method**

At present, garment design innovation, mainly focuses on fabrics, patterns, styles and other directions, while domestic research on garment structure innovation is relatively few. In fact, the clothing structure not only supports the fashion design but also enriches the cultural connotation of the clothing. The one-piece structure design is the inheritance and innovation of the traditional clothing design concept and traditional culture. This special cutting method means using the splicing method, using different styles of waste fabrics for splicing. Taking Timo Raisanen's zero-waste pattern [11] as an example: The fabric has many curved arcs and oblique lines, so after the cutting is completed, it will inevitably cause waste of remaining material. The quilting method (Fig.3) [13] is to redesign the typesetting, through the methods such as transfer, splicing, and reconstruction of the pattern can make the best use of the fabric. A similar pattern of tailoring is called "One-piece" clothing construction. One-piece clothing is the oldest form of clothing. Only one piece of fabric is used to form a clothing style that conforms to the dynamic structure theory composed of the balance direction of the clothing fabric and the mechanical points of the human body by winding, knotting, or hanging on the human body model. Take Issey Miyake [12], a Japanese brand for an example: according to the "132 5" pattern (Fig.4) [14], all the designs are cut and sewn from a single piece of cloth, made from polyester fiber material made from recycled PET plastic bottles that can be folded into a perfectly regular and aesthetically pleasing flat geometry. The four numbers in the name of the collection are named for this reason only: "1" represents a whole fabric, "3" represents three dimensions, and "2" represents the two-dimensional shape after folding, and "5" represents transcends time and space. Folded plane shapes give clothing the greatest vitality by being worn by people, and contain the inspiration of clothing design to expand infinite possibilities...

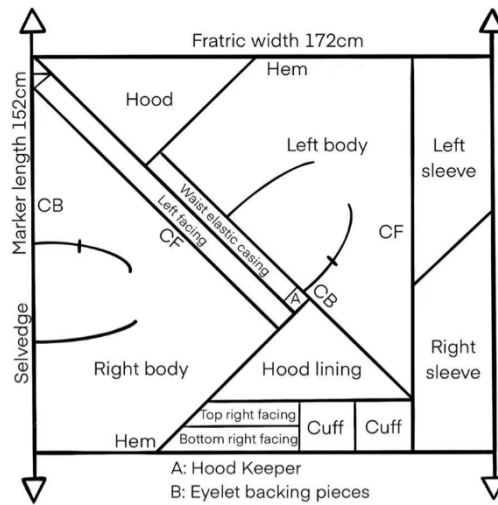


Fig.3 Timo Risanen' s zero-waste pattern [13]



Fig.4 “132 5” Front and back renderings [14]

### 3.1.2 The Use of Natural Fabrics

It's worth mentioning that it is more environmentally friendly in terms of fabric choices. Fashion designers have introduced environmentally friendly natural fabrics. These natural materials not only meet, the effect requirements of garment products but also have great environmental benefits. Compared with chemical synthetic materials, they are lower in energy consumption, and pollution. For example, using natural green fiber. Natural green fiber refers to the fiber obtained from the original nature or from the artificial cultivation of animals and plants. Including cotton fabrics, linen fabrics, wool fabrics, silk fabrics, etc. In addition, some natural fibers with their own characteristics have emerged, such as natural colored cotton [15]; *Musa textilis* Nee [16]; Lyocell fiber [17], Milk Protein fiber, etc. These natural fibers in addition to good hygroscopic, breathable, natural and other properties, but also without bleaching and dyeing, thereby reducing the environmental pollution. In addition, green synthetic materials are also used. “Synthetic green fiber material refers to synthetic, with appropriate molecular weight, and soluble or fusible linear polymer, by spinning forming and post-treatment of the fiber material”, Including, PCL, PLA, and so on.

### 3.1.3 The Use of Natural Dyes

Plant dyes refer to dyes extracted from plants, flowers, fruits, roots, leaves, and other natural parts. The pigments of different parts of different plants are different, they can be divided into 7 color systems, namely red, yellow, green, blue, black, purple and brown (Carotenoids: gardenia yellow; Flavonoids: Green Thatch Yellow; Alkaloids: *Philodendron amurense* Rupr). Compared with chemical synthetic dyes, natural plant dye is harmless, non-toxic, and non-polluting. Natural plant dyes also have anti - bacterial, anti - ultraviolet, deodorant, and anti - insect mildew and other functions. There are many antibacterial active components in plant dyes, which are alkaloids, acids,

ketones, aldehydes phenols and so on. Also, their UV transmittance is very low. About its deodorant function: tea and waxberry bark extract has the best deodorization effect, bamboo leaf extract has the worst deodorization effect, tea polyphenol extract can eliminate 79.6% ammonia, waxberry bark extract can eliminate 81.6% ammonia; The ammonia removal rate of citrus peel and aloe extract was 71.8% and 70.2%, respectively [18]. Insect, and mildew resistance function is not only suitable for clothing dyes, but abroad also widely used chrysanthemum, maple, cypress, and other dry distillate to do mildew inhibitor.

### **3.1.4 Recyclability**

Sustainable fashion design is based on the principle of recycling. When designing clothes, designers fully consider the recyclability of its components and the recycling of raw materials, such as the three characteristics mentioned in the three parts above. This rigorous design concept makes sustainable fashion cyclical, satisfying the 3R principle [19]: Recycle, Reuse and Reduce. It also has the characteristics of degraded processing. After the recycling of old clothes or the use of clothing manufacturing process surplus cloth, through regeneration treatment, production of cotton, non-woven fabric, natural fiber, and other materials, and then processed into a mop, greenhouse insulation felt and other primary products.

## **3.2 Disadvantages**

### **3.2.1 Long production time, relatively slow update speed**

The time required to make a luxury garment or accessory is much longer than the fastest production time of a fast fashion garment production line. For example, an Hermès bag was completed by the same craftsman, wearing a leather apron, holding an awl and wax-dipped twine, stitch by stitch, in 3 days. The magic weapon for Hermès to make bags is an ancestral stitching method called double riding nails. This stitching method can only be done by hand and cannot be replaced by a sewing machine.

### **3.2.2 Luxury Consumption**

Slow fashion is a rational way of consumption, but it also belongs to high-end fashion consumption and is not suitable for everyone. In times of economic downturn, people may even abandon high-priced products and choose "fast fashion" brands that look good and are affordable. Especially young people, they prefer fast, fresh and cheap clothing. The higher production costs of slow fashion brands cannot be changed. From design, material selection, production, to shooting advertisements and putting them on sale in boutiques, the value of luxury goods has experienced a rising state. The series of numbers on the price tags on the shelves reflect the material, creativity, and brand prestige.

### **3.2.3 Market Competitiveness Leads to The Slower Development of Slow Fashion**

Take China as an example. The current situation of the sustainable development of clothing brands in China can be classified by internal and external issues. The internal problem is mainly reflected in the fact that many domestic apparel companies rely on low technology, high energy consumption, and low value-added operations, especially the vigorous development of online consumption in recent years. In order to survive or quickly occupy the market. From the perspective of many designing apparel products and operating methods, they are relatively "shortsighted" management experience methods. The emergence of many companies is only a flash in the pan, and once a market crisis occurs, they will be on the verge of bankruptcy. For example, due to the sudden outbreak of the covid-19 in 2020, the total social consumer goods sold in my country fell by 20.5% from January to February. With the control of the domestic epidemic, it fell by 7.5% year-on-year in April. The situation is less optimistic than before. The total sales in the first four months of 2020 will be 305.7 billion, a year-on-year decrease of 29%. Among them, brand companies such as Anta and Li Ning were affected by the epidemic and their revenue dropped by 7% to 58% [20]. This shows that if a clothing brand company does not have strong economic power and a sustainable development strategy plan, it will be difficult to survive such a sudden crisis. The external troubles are mainly reflected in the influx of

foreign famous brand clothing into the country, which has created a huge market impact on domestic clothing brands.

#### **4. The differences between Fast Fashion and Slow Fashion**

##### **4.1 Fashionability**

One of the biggest reasons that slow fashion is not as popular as fast fashion is because of its “fashionability”. clothes produced from the fast fashion industry usually follow the trend of what is most popular among people. By observing the public’s preference, they will come up with clothes in line with the majority's aesthetic. For instance, Zara, one of the most popular clothing brands among young people, uses trend forecasting as one of the solutions to better understand their customers. It is reactive, responding to market demand as it happens, which prevents the possibility of planning for styles and quantity. Different from Zara, H&M chooses another path. Their fashion approach works by incorporating high-end design into even its most basic, egalitarian lines. Each season, it makes a small number of "trend" pieces — difficult or directional clothes that may appeal primarily to the most fashion-forward clients. While Fast fashion brands can catch people's attention quickly, slow fashion brands always keep their style. This reduces their popularity because people nowadays are very conscious of what they wear. Also, with their process of production, and materials all being eco-friendly to the environment, it limits the diversity of slow fashion clothing. For example, Patagonia, which uses organically grown cotton and recycled materials, focuses on outdoor clothing. By scrolling through their internet, it is difficult to find clothes with a sense of design but mostly practical to wear.

##### **4.2 The Price**

Another differentiating factor between the two types of fashions will be their price. Clothes from the fast fashion industry are usually a lot cheaper than slow fashion clothes. It is because of the different manufacturing processes. To produce cheap and easily accessible apparel, the raw ingredients and finished textiles utilized to make the clothing must also be inexpensive. Most of the time, these cheap fabrics are made from non-renewable fossil fuels and are called petrochemical textiles. Industries will use synthetic textiles like polyester of which the great majority of the market is very poor quality and is used by manufacturers because it is a cheap alternative to natural fibers. Also, another way that fast fashion industries use to lower their cost is through cheap labor. Brands are able to leverage cheap labor to manufacture their goods by moving production overseas. The making of goods has been outsourced to low-cost economies, particularly where wages are very low like Vietnam, Bangladesh, and many other countries. Those brands forced workers to work up to 150 hours of overtime but only gave them a living wage. Ayesha Barenblat, the founder of Remake, a nonprofit that focuses on helping people move away from fast fashion and move towards living a sustainable lifestyle, once said “The cost of fast-fashion really is the bodies of black and brown women who power this industry around the world, who are placed in risky situations, but also kept in a cycle of poverty and oppression through the wages they make.”

For slow fashion, industries usually decide to use materials that are natural or recycled. For instance, organic cotton, one of the most natural fabrics in the world, is grown without pesticides or chemical fertilizers. Not only is it 100% natural, but it is also better for the environment as it uses 62% less energy and 88% less water than conventional cotton. Another sustainable fabric that is often used is organic hemp as it is one of the most Eco-friendly natural fabrics around. Also, hemp is being considered a carbon trapper, because it can absorb CO<sub>2</sub> from the atmosphere. However, those natural fabrics require more labor and time, and thus, are more expensive than clothes from the fast fashion industry. Another reason is because of the small-scale production. Many slow fashion brands are small companies with only limited people. Therefore, when only a few people make the clothing, it is less efficient than when they are made in a factory, and the cost rises - for the buyer.

##### **4.3 The impact on the environment and human**

The clothing industry is one of the major sources of pollution on a global scale. The fashion industry, especially the fast fashion industry, is responsible for 10% of global carbon emissions, which is more than all international flight emissions combined. Fast fashion also contributes 20% of global wastewater, primarily due to hazardous textile dyes [21]. This dye contaminates ecosystems, and microfibers from non-renewable materials (such as polyester) damage our streams even more. Many of the chemicals employed in the production of these fabrics are poisonous, and some are even cancerous. The materials that fast fashion brands use are not only bad for the ecosystem but humans ourselves as well. Because of their microscopic form, these compounds have the potential to harm both humans and the environment. Another concern is plastic petrochemical textiles. About 1.5 million metric tonnes of the 8 million metric tonnes of plastic that finds up in our oceans each year is "microplastics" which 35% of which originate from petrochemical textiles. Microplastics can then end up in the tummies of marine animals, and so in the bellies of those who eat them, including humans. [22] In slow fashion, it uses Eco-friendly material and natural dyes that are less harmful to the environment. Also, it uses fewer chemicals which can gradually cause people to become sick, or even worse, neurotoxicity, liver, kidney, and lung disorders, cancer, and more. For instance, some fast fashion brands will market their clothes as wrinkle-resistant. However, they are actually made with formaldehyde, which can cause eye and nose irritation, allergic reactions on the skin.

## 5. Conclusion

The fast fashion industry has been heavily criticized in recent years for its limited consideration of social and environmental issues. Its impact on the environment is widespread and significant, especially in the process of production and transportation, and the harm caused to the environment is huge. In order to reduce the environmental pollution of the fashion industry as far as possible, it has become inevitable to find a new fashion industry model. The paper analyzes the advantages and disadvantages of the two most popular fashion industry models respectively and compares them in terms of pollution scope, dye use, fabric selection, inventory clothing disposal, and so on. By comparison, we can clearly find that even if slow fashion has shortcomings such as high price, long production time and slow update speed, this industry is environment-friendly. Nevertheless, due to fast fashion brands have more styles, higher fashion degrees, and fast updates, it still attracts a large number of young consumers, and its sales are growing year by year. Therefore, we hope that fast fashion and slow fashion can learn from each other, correct the clothing industry, absorb mutual benefit, correct their own shortcomings so that fast fashion and slow fashion can go hand in hand to reduce environmental pollution in the fashion industry in the future.

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