

# ***Sustainable Supply Chain Development Strategies in the Fast Fashion Industry: A Case Study of Nike***

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**Abstract:** With the acceleration of globalization, companies are increasingly concerned about environmental protection and social responsibility, and sustainable development has become an important trend in industrial development. The fast fashion industry has attracted much attention due to its rapid market response, mass production, and frequent style updates. However, its supply chain faces many challenges in terms of sustainability. Based on this background, this study delves into sustainable supply chain management in the fast fashion industry using Nike as a case study. By analyzing Nike's strategies, practices and achievements, this paper provides useful suggestions and insights for achieving sustainability in the fast fashion industry. Nike has positively contributed to supply chain sustainability by promoting a circular economy, establishing a green supply chain and optimizing inventory management. This study can provide an important reference for the sustainable development of the fast fashion industry and a guide for companies to innovate and improve continuously under the global sustainability agenda.

**Keywords:** Sustainable development, Fast fashion, Supply chain management, Nike

## **1. Introduction**

In the context of today's globalization, sustainable development has become one of the important trends for enterprise development. With increasing attention to environmental protection and social responsibility, sustainable supply chain management has gradually become a key means for enterprises to achieve sustainable development. Sustainable supply chain management aims to integrate environmental, social, and economic factors to achieve sustainability in production and supply chain operations, meeting current needs without compromising the needs of future generations [1].

The fast fashion industry has developed rapidly in recent years, becoming one of the largest industries globally. Companies in the fast fashion industry are known for their rapid market responsiveness, large-scale production, and frequent style updates [2]. However, fast fashion supply chains also need help with sustainability, particularly regarding sustainability. Due to the rapid pace of production and large volumes, fast fashion supply chains often come with issues such as high energy consumption, emissions, and resource wastage, significantly impacting the environment and society. As one of the global leaders in fast fashion brands, Nike has always been at the forefront of sustainable supply chain development. Nike's brand positioning emphasizes innovation, quality, and

performance while also considering sustainable development as one of its important strategic directions. Since its establishment in 1972, Nike has continuously strived to integrate sustainability into its business operations.

Current research indicates that sustainable development is crucial in enterprise supply chain management. Most scholars agree that sustainable development is essential for the long-term development of enterprises and focus on discussing specific methods and measures for implementing sustainable development in supply chain management [3]. Particularly in the field of fast fashion supply chains, researchers universally point out the urgent need for sustainable transformation in the fast fashion industry to reduce its negative environmental impacts [4]. However, despite the increasing research on sustainable development in fashion supply chains, specific analyses of sustainable development in individual fast fashion company supply chains still need to be made available.

This study takes the supply chain of the fast fashion industry as the research object. It aims to provide useful recommendations and insights for the industry's sustainable development by thoroughly exploring Nike's strategies, practices, and achievements in supply chain sustainable development.

## 2. Case Description

Nike was founded in 1962 and is headquartered in Beaverton, Oregon, United States. As one of the global leading fast fashion brands, Nike has long been committed to achieving sustainable development in supply chain management. In recent years, Nike has taken a series of measures to enhance the sustainability of its supply chain.

Firstly, Nike Inc. is dedicated to promoting the circular economy by recycling and reusing waste materials, reducing resource consumption, and minimizing waste emissions. Among these efforts, Nike's "Nike Grind" program is a typical example. This program converts discarded athletic shoes and manufacturing waste into high-quality recycled materials for manufacturing new athletic shoes and other products, effectively utilizing resources. In addition to the "Nike Grind" program, Nike actively explores other possibilities for waste reuse. For example, Nike transforms discarded plastic bottles into eco-friendly fabrics, applying them in manufacturing sportswear and footwear products. Furthermore, they collaborate with suppliers to recycle and reuse discarded textiles and production by-products, converting them into new raw materials, thus achieving resource reuse.

Secondly, Nike has established a green supply chain, focusing on reducing carbon emissions and environmental pollution. By adopting environmentally friendly materials, introducing clean energy, and optimizing production processes, Nike endeavors to reduce the environmental impact of its supply chain. Particularly in production, Nike actively utilizes water-based pigments and low-energy production processes, effectively reducing water consumption and chemical pollution.

In addition to internal practices, Nike actively participates in industry cooperation and cross-industry collaborations to promote the sustainable development of the supply chain. They are a Sustainable Apparel Coalition (SAC) member and collaborate with other brands and retailers to develop and implement standards and guidelines for sustainable supply chains. Through cooperation with industry organizations and NGOs, Nike shares best practices and promotes collective progress within the industry.

Overall, Nike's practices in sustainable supply chains cover multiple aspects, including the circular economy, green production, and industry collaboration. They are committed to building a more sustainable supply chain system through innovation, collaboration, and continuous improvement, positively contributing to the industry's sustainable development.

### 3. Problem Analysis

In the current supply chain management of the fast fashion industry, several prominent issues hinder its sustainable development process. The main problems are as follows.

#### 3.1. Environmental Resource Consumption

In the fast fashion supply chain, excessive consumption of environmental resources is a serious issue.

Firstly, in the supply phase of fashion apparel production, extensive use of water resources and discharge of chemical pollutants cause significant environmental damage. According to United Nations statistics, the total carbon emissions of the textile and apparel industry account for 10% of global carbon emissions, surpassing the combined emissions of all international flights and maritime shipping, becoming the second largest polluting industry after the petroleum industry [5]. This high level of carbon emissions exacerbates climate change and causes serious pollution to the atmosphere and water resources. Approximately 60 kilograms of water are consumed, and 45 kilograms of wastewater are discharged per kilogram of fast fashion product produced [6]. According to the World Bank, industrial water pollution caused by textile dyeing and finishing processes accounts for as much as 20% of the total [7].

Secondly, the concept of the supply chain extends not only to the production and sale stages of clothing but also to post-retail maintenance, consumer use, and end-of-life clothing processing. In these stages, clothing maintenance has the greatest environmental impact, accounting for 75% [8]. Meanwhile, waste disposal is also a significant issue in the fashion supply chain. Recycling textile fibers has played an increasingly important role in the fashion industry in recent years. According to data from PCI at the 53rd Dornbirn Man-Made Fibers Conference, over half of China's polyester filament production capacity, approximately 60% of global capacity, is currently based on recycling pre- or post-consumer waste [9].

#### 3.2. Carbon Emissions

The issue of carbon emissions in the fast fashion industry affects the sustainability of the entire supply chain.

Firstly, the materials required for fast fashion clothing production typically involve energy-intensive processing and production processes, including synthetic fibers' manufacturing and dyeing processes. These processes release large amounts of greenhouse gases, such as carbon dioxide, negatively impacting the climate.

Secondly, the fast fashion industry usually adopts a globalized production and supply model, resulting in extensive logistics and transportation activities. For example, raw materials may come from various parts of the world, processing and production may occur in different countries, and the final products may be transported worldwide for sale via air, sea, or land transportation. These transportation activities exacerbate greenhouse gas emissions and increase energy and resource demands, exacerbating environmental pressures.

Additionally, the fast fashion industry's rapid update cycle and consumption patterns exacerbate the carbon emissions issue. The fast design, production, and sales cycle means more frequent production and transportation, leading to more carbon emissions. Moreover, since fast fashion products are usually produced in a low-cost, low-quality manner, this leads to more frequent replacements and updates, further exacerbating the carbon emissions issue.

### 3.3. Excessive Inventory

In the fast fashion industry, excessive inventory is a widespread issue that impacts the sustainability of the supply chain in multiple ways.

Firstly, excessive inventory means producing quantities of products beyond market demand and results in significant resource wastage. Large-scale production requires significant raw materials such as textiles, fabrics, and yarns, as well as energy such as electricity and fuel. These raw materials and energy consumption in the production and processing deplete natural resources and exacerbate environmental pollution issues. Additionally, overproduction also means significant wastage of human resources. The production, processing, and management processes require a significant amount of labor input. If these resources are used to produce products that cannot be sold promptly, it will save labor resources and increase labor costs for enterprises.

Secondly, excessive inventory leads to products lingering in warehouses for extended periods, increasing the product's obsolescence rate and discard rate, reducing the product's value, and further exacerbating resource wastage. Due to surplus inventory, companies may resort to discount sales or disposal measures to clear inventory to maintain their high status and brand assets, further exacerbating environmental pressures. These stagnant products are typically disposed of through incineration or landfilling, leading to air and soil pollution and exacerbating environmental problems. Incineration of unsold products also generates emissions of greenhouse gases such as carbon dioxide, further exacerbating climate change issues. For example, in 2017, H&M was exposed to incinerating 12 tons of unsold products, Burberry incinerated £28.6 million (approximately \$38 million) worth of inventory in 2017, and Richemont destroyed £437 million (approximately \$572 million) worth of watches to avoid discounted sales [10].

## 4. Solutions

Facing the above problems, Nike has adopted the following solutions to promote the development of sustainable supply chains.

### 4.1. Environmental-Friendly Production

Nike optimizes production processes, adopts more environmentally friendly materials and production techniques, and reduces water usage and chemical emissions. Nike lowers carbon emissions by introducing renewable energy, improving energy efficiency, and reducing waste emissions to achieve more environmentally friendly production.

Nike has made significant progress through the adoption of environmentally friendly production methods. By the end of 2015, Klimovski claimed that 80% of Nike's athletic shoes were made from sustainable and recycled materials [11]. This achievement demonstrates Nike's sustained efforts in sustainability over the past few decades. A prominent example is the Jordan XX3 series launched by Nike in 2008. This sports shoe utilized environmentally friendly materials and eliminated chemical adhesives. This initiative aimed to create high-performance, sustainable products and embed sustainability concepts into core products [12]. This initiative caused a sensation at the time and laid a solid foundation for Nike's future sustainable development.

Furthermore, Nike reduced waste production by 10% in various aspects such as production, distribution, headquarters, and packaging by improving design and operational efficiency. In the 2023 fiscal year, these waste reduction measures collectively reduced over 13 million kilograms of waste production. Additionally, Nike achieved a 25% reduction in water usage per kilogram in the textile dyeing and finishing process. Nike also actively promotes using clean chemical substitutes to replace ten key chemicals in its supply chain. They recognize the significant impact of chemical choices on the recyclability of product materials and take proactive measures to identify and replace substances

that may hinder the future reuse of materials in the circular economy. Nike's Clean Chemistry program promotes more responsible and proactive chemical decisions, continuously driving the company to innovate new, lower-impact solutions. By closely monitoring changes in regulatory environments and reviewing the latest scientific findings, Nike can proactively influence chemical decisions in its supply chain and assess the current use of chemicals to set feasible goals for the future.

#### 4.2. Circular Economy Model

Nike promotes the application of the circular economy concept in the supply chain, facilitating product reuse, reproduction, and recycling. By recycling and reusing waste products and materials, Nike reduces resource consumption and environmental pollution to achieve sustainable supply chain development.

Nike's Nike Grind project is one of its important initiatives in the circular economy model, closely related to the environmental resource consumption and carbon emission issues in current fashion supply chain management.

Firstly, the Nike Grind project provides innovative solutions for waste disposal problems in the fashion industry by recycling and reusing Nike and other athletic shoes to create environmentally friendly materials. These renewable materials can produce various new environmentally friendly products such as artificial turf, ground cover materials, and filling materials for sports fields, reducing the demand for natural resources and environmental impact.

Additionally, Nike Inc. produces a range of new products using Nike Grind, such as environmentally friendly sports shoes and apparel, further promoting the application of environmental protection concepts in the fashion industry. By manufacturing new products with renewable materials, Nike reduces waste generation and enhances the environmental performance of products, meeting the growing consumer demand for sustainable fashion. Nike's "Reuse-A-Shoe" program and "Move to Zero" plan also reflect its long-term commitment to sustainability [13]. Since launching the "Recycle A Shoe" program in 1993, Nike has been committed to collecting residual materials with recycling value from the supply chain and transforming them into innovative sports products through Nike Grind technology, achieving waste reuse and resource recycling. The "Move to Zero" plan launched in 2019 further emphasizes Nike's commitment to reducing carbon emissions and waste by reducing the consumption of virgin materials and rubber to minimize environmental impact, promoting environmentally friendly production and circular economy practices.

#### 4.3. Inventory Management Optimization

Nike avoids overproduction and inventory buildup through refined demand forecasting and inventory management. By adopting intelligent inventory management systems and technologies, Nike adjusts production plans and inventory levels timely to reduce surplus inventory generation, resource wastage, and environmental pressure.

Firstly, Nike abandoned traditional ordering conferences and distribution models, adopting a pull-based supply chain model that places consumer demand at the core of supply chain management. This means they formulate production plans based on actual market demand rather than relying on forecasts or distributor orders. Through this model, Nike can adjust production volumes and product types more quickly to meet the rapid changes in the market. This flexibility enables Nike to better adapt to fluctuations in market demand, reducing inventory buildup and surplus.

Secondly, Nike optimized sales channels, reducing the number of franchise retailers globally and concentrating resources on a few key retailers such as Amazon and Tmall. This centralized management approach allows Nike to control inventory levels more accurately and establish close partnerships with key retailers to ensure products are sold promptly and maximize sales revenue.



Through close cooperation with retailers, Nike can better understand market dynamics and promptly adjust inventory and supply plans.

Additionally, Nike underwent a digital transformation, utilizing advanced technologies to achieve real-time monitoring and management of the entire supply chain. They employ technologies such as radio frequency identification to realize real-time tracking of products and materials. Nike can accurately forecast market demand and inventory levels through data analysis and artificial intelligence prediction. This enables Nike to understand inventory situations more quickly and make corresponding adjustments to meet consumer demand and maximize benefits. Through digital transformation, Nike improves the efficiency and accuracy of inventory management and enhances communication and collaboration with consumers and suppliers [14].

## 5. Conclusion

As a complex system, the fast fashion supply chain encompasses multiple stages, from raw material procurement, production manufacturing, and logistics distribution to retail sales. This supply chain has numerous challenges and opportunities, especially in terms of sustainable development.

Firstly, the fast fashion supply chain faces environmental resource consumption and carbon emissions issues. Due to the fast fashion industry's rapid development and large-scale production, the consumption of water resources, energy, and raw materials is increasing, accompanied by significant emissions of chemical pollutants and carbon, causing serious environmental impacts. In this context, the sustainability of the supply chain becomes a critical issue that urgently needs to be addressed.

Secondly, the fast fashion supply chain needs more inventory and efficient inventory management. The rapid updating and short production cycles of fast fashion products often lead to product surplus and inventory backlog, increasing resource wastage and environmental pressure. Traditional inventory management models often rely on rough demand forecasting and large-scale stocking, needing a more accurate grasp of market demand, leading to inventory surplus and resource wastage.

In response to these challenges, Nike, as a leading global fast fashion brand, is committed to promoting the sustainable development of its supply chain through a series of proactive strategies and measures.

Firstly, Nike has achieved savings in environmental resources and carbon emissions reductions through environmentally friendly production, circular economy models, and optimized inventory management. By adopting more environmentally friendly materials and production techniques, Nike reduces emissions of chemical pollutants, promotes the application of the circular economy concept in the supply chain, achieves product reuse and recycling, optimizes inventory management to avoid overproduction and inventory backlog, and reduces resource wastage.

Secondly, Nike has improved the intelligence level of supply chain management through digital transformation and technological innovation, enabling more accurate prediction of market demand, optimizing inventory management, and reducing resource wastage. By using intelligent inventory management systems and technologies to adjust production plans and inventory levels promptly, Nike has reduced the generation of surplus inventory and improved the efficiency and accuracy of inventory management.

In conclusion, Nike's efforts and achievements in the sustainable development of the supply chain have set a good example for the entire fast fashion industry and provided valuable references and insights for the industry's sustainable development. With the increasingly serious global environmental issues and the growing awareness of social responsibility, sustainable development will become one of the core elements of corporate competition. As a leading global fast fashion brand, Nike will continue to adhere to the concept of sustainable development, continuously explore and innovate, and make greater contributions to promoting the sustainable development of the fashion

industry. At the same time, Nike will actively respond to the global sustainable development agenda, work with all parties, and build a better future.

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