

# ***Environmental Protection and Sustainable Development by Clothing Brands***

**Min Chen<sup>1,a,\*</sup>**

<sup>1</sup>*College of Arts, Media and Design, Northeastern University, Boston, Massachusetts, 02115, United States*

*a. chen.min1@northeastern.edu*

*\*corresponding author*

**Abstract:** The central aim of this study was to investigate the contribution of major clothing production brands towards international sustainable development goals (SDGs). Using a case study method, the research evaluated the environmental impacts of conventional materials used in clothing manufacturing and examined the reasons for recycling these materials after consumption. Additionally, the study assessed the environmental implications of recycling efforts by Patagonia and Levi Strauss. Key findings revealed that clothing discarded in landfills, if not recycled, emits greenhouse gases contributing to global warming. Although companies are motivated to recycle old garments to reduce their ecological footprint, the process is complex and costly, posing challenges for practical implementation. Despite these difficulties, the case studies of Patagonia and Levi Strauss demonstrate how these two apparel manufacturers contribute to international sustainability goals by diverting waste from landfills, reducing carbon emissions, conserving natural resources, and alleviating poverty through job creation. The research concludes that, as exemplified by Patagonia and Levi Strauss, sustainable fashion helps protect the environment and promotes the circular economy model, serving as a prototype for other industries.

**Keywords:** Sustainable fashion, Material recycling, Circular economy, Environmental protection, Clothing industry sustainability.

## **1. Introduction**

Approximately 85% of used textiles are in landfills globally [1]. This inappropriate disposal leads to the emission of greenhouse gases, including carbon dioxide and methane, that cause climate change by trapping heat. Their air pollution also contributes to respiratory conditions. The broader context of manufacturing clothes using recycled materials reflects how the process is complex and both environmentally and economically beneficial. Research has found that many clothing manufacturing companies across the globe are interested in recycling materials to create new garments but are hindered by the complexity and costs related to the process [2]. As a result, a few notable companies, such as Patagonia, Adidas, and Levi Strauss, have successfully recycled materials for clothing manufacturing due to their financial capacities.

However, some studies emphasize the long-term benefits of embracing such sustainable practices rather than looking at the short-term benefits. Many garment customers are shifting to environmentally friendly companies, thus calling for urgency in investing in sustainable practices

such as recycling materials in garment manufacturing [3]. Recycling also creates employment opportunities for individuals in different communities, empowering their economic status. Patagonia and Levi Strauss have set a pace that is predicted to influence other brands and sectors in adopting sustainable practices, mainly recycling materials for production.

Hence, using literature review methodology, this paper critically analyzes the role of major clothing manufacturing companies, Patagonia and Levi Strauss, in contributing to international sustainable development goals (SDGs). The study structure follows a literature review that synthesizes the current study position about recycling in the clothing industry, a case study indicating how companies respond to this situation, and a discussion section that emphasizes the significance and application of these brands to international sustainable development before providing an overall conclusion. The results of this study are expected to contribute to a deeper understanding of how sustainable material recycling in the fashion industry can promote environmental protection and align with international sustainable development goals (SDGs).

## 2. Literature Review

Current literature robustly explores the environmental impacts of conventional materials used to make clothes and trousers and raises attention to the need to recycle them. Traditional materials such as cotton, polyester, and leather used in the manufacturing of clothes have a significant impact on the environment. The carbon footprint of a cotton garment alone could range from 3 to 62 kilograms of CO<sub>2</sub> [4]. Polyester, a synthetic alternative to cotton, has lower footprints but produces more greenhouse gas emissions per kilogram. Upon being used, most of these manufactured garments end up in landfills, where they decompose and release methane gas. Over 20 years, methane is 80 times more likely to cause global warming than carbon dioxide. Studies affirm that it has contributed to at least 30% of global warming since industrial times [5].

This problem could probably be solved by recycling materials used in garment production, as it has been proven to be efficient by companies in other industries. For instance, the trend of recycling plastic bottles by notable food and beverage companies has significantly reduced fossil fuel utilization and landfilling, leading to a decline in the emission of greenhouse gases [6]. Despite contributing to sustainable environmental practices, the process has created job opportunities. These positive impacts raise attention to the need to embrace sustainable development in the clothing industry. Several manufacturing companies, including Patagonia, Adidas, Tentree, and Amour Avert, are committed to sustainable environmental practices, particularly recycling. Various factors have hindered efforts by other companies to adopt sustainable practices. For example, most companies do not recycle clothes due to the complexity of the process. It is hard to sort and separate different components of materials previously used in manufacturing a garment [7]. This makes textile sorting and processing for recycling complex and costly compared to using raw materials and dumping the already-used clothes.

Nevertheless, current studies still emphasize that clothing companies should adopt sustainable practices to benefit them and the community in the long term. Others argue that changing would give the sector a good image, shifting it from its current position as one of the polluting sectors contributing to 10% of the pollution driving climate change [8]. Furthermore, research suggests that amidst rising environmental concerns, consumers are today willing to pay higher prices for sustainable fashion brand products [9]. Thus, investing in sustainable development such as recycling contributes to positive environmental impact and serves as an essential niche for attracting environmentally conscious customers, leading to profitability and overall growth.

### **3. Significance and Application of Clothing Brands to Sustainable Development in Case Studies**

#### **3.1. Patagonia Worn Wear Recycling Strategy**

Patagonia is a notable American-based outdoor clothing recreational company whose production and other operations reflect a commitment to environmental sustainability. As sustainability consultants and ESG managers seek actionable strategies for their brands, Patagonia's clothes recycling practices offer invaluable insights. This practice is enshrined in its worn-wear recycling strategy. The program aims to repair worn-out clothes or reuse their material to produce new ones. Before recycling worn clothes, the company encourages customers to repair them, sell them or donate them to those in need [10]. The company has programs allowing its customers to sell old clothes to them. These clothes are then repaired and supplied to stores globally that can resell them in global worn-wear events. It also partners with local groups and distribution centers to donate garments locally to social causes such as domestic abuse aid centers and the homeless.

Patagonia encourages recycling in cases where garments are trashed, completely non-functional, stinky, dirty, and without any life left in them. The company supplies recycling bins to its different global stores upon request. Unlike other companies, it does not incentivize people to recycle their clothing with discounts on new ones to discourage overconsumption, which can lead to landfills in the long run. Moreover, it only collects clothing it makes and thus does not accept other brands for recycling. Patagonia takes three steps to recycle 100% of everything that is unrepairable and unusable, which are progressively more complex. The organization upcycles these materials into new products and recycles them into materials for industrial application before chemically recycling them in a closed-loop process [11]. Overall, Patagonia's worn-wear recycling strategy plays a crucial role in extending the life of garments. These actions align with the circular economy framework that strives to keep materials flowing through a product lifecycle through reusing and recycling, ideally avoiding landfills and reducing environmental impact.

#### **3.2. Levis Strauss Plastic Recycling**

Levi Strauss is another company committed to sustainable practices by making various clothes using recycled plastic materials, including jeans and trousers. Green soda bottles, clear water bottles, brown beer bottles and even food trays are used in fashion collection by the company in a program called WasteLess™ [12]. These bottles and food trays of polyethene terephthalate (PET) materials are recycled, sorted in colors and fragmented into flakes that produce polyester fibre. The polyester is then stretched into material blended with traditional cotton yarn to make the denim used in Levi's® WasteLess™ tracker jackets and trousers. Each garment Levi Strauss produces uses fabric made from at least 20% polyethene terephthalate, which equals eight recycled bottles [13].

The WasteLess™ program, which started in 2009, has led to recycling over 3.5 million bottles for making jeans, pants, and tracker jackets for all sexes. Recycling is very important to the environment. For example, during collection, the company uses denim treated in a finishing process that saves up to 96% water compared to other finishes [14]. The project also bears a slogan, "a care tag for our planet," to teach people how to wash their clothes so as not to pollute much.

#### **3.3. Discussion of Patagonia and Levi Strauss's efforts on International Sustainable Development**

Patagonia and Levi Strauss's efforts to incorporate material recycling programs contribute significantly to international sustainable development goals (SDGs). These goals aim to transform the world by calling to action the end of inequality and poverty, protecting the universe, and ensuring

that all people prosper as they enjoy good health and justice [15]. By focusing on recycling, these companies protect the universe's SDG. Their efforts have diverted waste from ending in landfills and decreased the demand for carbon-emitting materials such as polyester and cotton. Patagonia's reusing and recycling practices align with the principle of circular economy, which aims to minimize waste and resource consumption. Levi's WasteLess™ program demonstrates the innovative use of recycled plastic bottles to create denim products, reducing fossil fuel consumption and greenhouse gas emissions. Additionally, its collection process, which utilizes less water than traditional ones, demonstrates the possibility of sustainable fashion to combat climate change while preserving natural resources such as water for future generations.

The two companies' efforts further contribute to achieving United Nations SDG 12, which emphasizes responsible production and consumption. Their material recycling programs reduce environmental harm, reflecting eco-friendly production methods. These can shift consumer behavior by encouraging them to prioritize sustainability in purchasing decisions. The success of these brands in attracting massive customers and making huge profits due to adopting sustainable practices could inspire other companies and industries, such as electronics and packaging, to adopt sustainable practices [16]. Lastly, the impact of recycling materials for manufacturing clothes and trousers goes beyond environmental benefits. The programs have had a significant economic impact since their initial introduction phases. Patagonia and Levi Strauss recycling programs have contributed to the global economy by creating job opportunities in garment repair, recycling logistics, and sustainable production processes, contributing partly to SDG1 to end poverty by empowering communities.

#### 4. Conclusion

Despite barriers hindering sustainable practices, Patagonia and Levi Strauss have demonstrated resilience in aligning with international environmental protection goals through their material recycling strategies. Rather than relying on virgin polyester, Patagonia's efforts to create garments using recycled polyester from old clothes significantly reduce greenhouse gas emissions. This approach not only diminishes the carbon footprint associated with clothing production but also conserves valuable resources by repurposing existing materials. On the other hand, Levi Strauss' recycling of plastic materials into fashion items such as trackers and trousers has a substantial impact by decreasing the amount of plastic waste in oceans and landfills. This initiative helps to alleviate the environmental burden of plastic pollution and supports a more sustainable lifecycle for materials. Both brands' practices reduce the adverse effects of plastics and used textiles on the environment. Additionally, their recycling arrangements have created valuable employment opportunities in various regions, supporting local economies and fostering community development.

The study findings enhance our understanding of using recycled materials in production processes and highlight their positive effects on environmental sustainability and economic growth. However, the study has notable limitations. It focused exclusively on two brands, thereby overlooking other significant contributors such as Adidas and H&M, which also play crucial roles in promoting sustainable development. Moreover, the study primarily relies on a literature review without incorporating primary data that could be gathered through interviews or surveys. To provide a more comprehensive and nuanced analysis, future research in the fashion industry should include a broader range of companies and employ a data-driven, inclusive approach to capture a more complete picture of sustainable practices and their impacts.

#### References

- [1] Shirvanimoghaddam, K., Motamed, B., Ramakrishna, S., & Naebe, M. (2020). Death by waste: Fashion and textile circular economy case. *Science of the total environment*, 718, 137317.

- [2] Xie, X., Hong, Y., Zeng, X., Dai, X., & Wagner, M. (2021). A systematic literature review for the recycling and reuse of wasted clothing. *Sustainability*, 13(24), 13732.
- [3] Niinimäki, K., Peters, G., Dahlbo, H., Perry, P., Rissanen, T., & Gwilt, A. (2020). The environmental price of fast fashion. *Nature Reviews Earth & Environment*, 1(4), 189-200.
- [4] Zhang, Z., Huang, J., Yao, Y., Peters, G., Macdonald, B., La Rosa, A. D., ... & Scherer, L. (2023). Environmental impacts of cotton and opportunities for improvement. *Nature Reviews Earth & Environment*, 4(10), 703-715.
- [5] Shindell, D., Sadavarte, P., Aben, I., Bredariol, T. D. O., Dreyfus, G., Höglund-Isaksson, L., ... & Maasakkers, J. D. (2024). The methane imperative. *Frontiers in Science*, 2, 1349770.
- [6] Benyathiar, P., Kumar, P., Carpenter, G., Brace, J., & Mishra, D. K. (2022). Polyethylene terephthalate (PET) bottle-to-bottle recycling for the beverage industry: a review. *Polymers*, 14(12), 2366.
- [7] Aus, R., Moora, H., Vihma, M., Unt, R., Kiisa, M., & Kapur, S. (2021). Designing for circular fashion: integrating upcycling into conventional garment manufacturing processes. *Fashion and Textiles*, 8, 1-18.
- [8] Suraci, O. (2021). The Best-Dressed Polluter-Regulation and Sustainability in the Fashion Industry. *Hastings Env't LJ*, 27, 225.
- [9] Mandarić, D., Hunjet, A., & Vuković, D. (2022). The impact of fashion brand sustainability on consumer purchasing decisions. *Journal of Risk and Financial Management*, 15(4), 176.
- [10] Bianchi, M. (2019, August 14). Recycling Is Broken. Now What? - Patagonia. *Www.patagonia.com*. <https://www.patagonia.com/stories/recycling-is-broken-now-what/story-73479.html>
- [11] Madrigal, G. (2020). Patagonia Rethread: Creating a Retail Recycling Program for Post-Consumer Clothing.
- [12] Levis Strauss & Co. (2024). Toward Zero Waste. Levi Strauss & Co. <https://www.levistrauss.com/sustainability-report/consumption/toward-zero-waste/>
- [13] Cao, H. (2021). End of life clothes and their management. In *Waste management in the fashion and textile industries* (pp. 157-172). Woodhead Publishing.
- [14] Beavis, L. (2014, May 15). Levis makes range of clothes incorporating recycled plastic. *The Guardian*. <https://www.theguardian.com/sustainable-business/sustainability-case-studies-levis-strauss-wasteless>
- [15] United Nations. (2024). The 17 Sustainable Development Goals. United Nations. <https://sdgs.un.org/goals>
- [16] Öndoğan, E. N., Öndoğan, Z., & Topuzoğlu, B. (2022). A Study on the investigation of sustainability practices of global brands in the fashion market. *Ege Academic Review*, 22(4), 393-412.