

## **Title: Sustainable Consumption in Fashion & Apparel**

### **Abstract**

The fashion industry is a sector with high environmental impact that involves a complicated supply chain associated with large consumption of water, energy, chemical substances, air pollution, and microplastic generation. The circular economy concept could help tackle challenges by reducing resource throughput and increasing cycling of products and materials within the economic system, thereby reducing emissions and material use. In this project, we look at the two streams of fashion industry and catholic thought within a circular economy framework in order to assess students' understanding of ethics and sustainability in apparel production and consumption related to Catholic Intellectual Tradition principles.

Keywords: Sustainability, consumption, fashion industry, circular economy, catholic thought

## **Literature Review**

### **Introduction**

The fashion industry is widely considered the second most destructive industry to the environment, after the oil industry. Indeed, the fashion industry is a sector with a high environmental impact; it involves a very long and complicated supply chain, which is associated with large consumption of water and energy, use of chemical substances, water and air pollution, waste production, and finally microplastic generation.

In particular, textiles and clothing waste ending up in landfills has become a huge concern globally. If every brand along the clothing supply chain begins to implement eco-friendly practices, the textile and fashion industries will become significantly more sustainable. Up to 95% of textiles landfilled, each year could be recycled. (pure waste.org). With an increasing concern amongst consumers about the social and environmental impact of their purchases, businesses are beginning to understand the benefits and untapped economic potential of efficient use of waste.

### **Background Fashion Industry and Textiles**

The fashion industry is a sector with a high environmental and social impact: it involves an extremely long and complicated supply chain, is recognized as one of the most polluting sectors with the greatest consumption of water, and is often associated with workplace abuses (Fletcher 2014). In recent decades, this impact has been increased mainly by two related factors: the shift of production towards emerging or developing countries with low labor costs and the development of the so-called “fast fashion” phenomenon, that is the demand for “disposable” clothing at low prices.

In the past two decades, clothing production has almost doubled, driven by an increase in the number of garments purchased each year by an average consumer, which is in turn mainly driven by the fast fashion phenomenon, with its low prices and increased number of clothing collections offered per year to consumers. The continuous changes in fashion often mean that a piece of clothing, after being used for one season, is simply thrown away. This has led consumers to buy more clothes than they need, and to treat more and more low-priced garments almost as “disposable” goods that can be thrown away after just seven or eight wears (Remy et al. 2016).

Even if awareness of the environmental impact of fashion is low among the general public, the question of sustainability is increasingly at the center of public attention and consumers are increasingly demanding products with a low environmental and social impact. In fact, the pressure from consumers and especially of non-governmental organizations (NGOs) and the media has acted and continues to act as a stimulus for the adoption of sustainable behavior in the fashion sector (Gordon and Hill (2015)).

Hence, the fashion industry has a strong push to make every phase of the production more sustainable, with a view to transition to a circular fashion model.

Some research has been conducted to explore sustainable design practices in relation to zero waste fashion and the benefits that can be gained from implementing a circular economy, not only to the environment but also in highlighting the potential to create a multibillion-dollar industry. This research assesses how the fashion industry can adopt a collaborative approach to design and production in order to accelerate sustainable design and innovation across the entire industry (Morehouse and Morehouse, 2017).

The European Clothing Action Plan launched in May 2016 set out to encourage industry, scientists, and creatives to reinvent how to design and produce products, rethink the usage and consumption of products and redefine reuse and recycling of these products (wrap.org.uk, 2016). The idea is that integrating a more circular economy as well as reducing waste and negative environmental impact, will address the issue of depleting resources, as well as create new business growth opportunities.

### **Garment Value Chain and its Environmental Impact**

The supply chain in the fashion industry is global where the various stages of production take place in different countries; complex chains that are strongly connected to each other and include design, manufacture of materials and fashion products (such as textiles, clothing, footwear, leather, and fur products) as well as their distribution and retail sale to final consumers.

The production model is complex with significant upstream and downstream linkages where global production processes have become increasingly fragmented into complex supply chains, with a multiplicity of actors, high use of subcontracting, and forms of illegal work. In addition, the production aspect has been transferred from Europe and North America to emerging countries like Bangladesh, Cambodia, China, India, Turkey, and Vietnam. This translated to the fact that garment value chains are major contributors to the economy in many countries all over the world.

The global environmental impact of the fashion industry has also been worsened by the search for cheap labor and the approaching areas of raw materials supply. Some reports state that fashion is the second most polluting sector immediately after the oil industry.

Critical issues according to a life cycle analysis of the supply chain of the fashion industry:

Raw materials: In the case of natural fibers: energy, water, soil consumption and the use of biocides and in the case of synthetic fibers: the consumption of non-renewable resources, of emissions into the atmosphere and effluent discharge in waterways.

Transformation processes: energy and water consumption, usage of chemicals, discharge of pollutants into the environment, and production of waste and hazardous waste.

Transportation and distribution: high fuel consumption and emissions of greenhouse gases.

Consumption: considered to have the largest environmental impact in the life cycle of garments, due to the use of water, energy, and chemicals for their maintenance (i.e., washing, tumble drying, and ironing) and to the release of microplastics into water.

End of life: most products are mostly sent to landfills or incineration. Once discarded, only 20% of clothing waste is collected for re-use and recycling at a global level (Koszewska 2018), while more than half of the clothes end up in undifferentiated waste, to then end up in landfills or burned in incinerators. There are also some issues with re-use and recycling. Most of the second-hand clothes are exported to East Asian or African countries, which can represent a threat for local textile industries and increase clothing waste in countries that are unable to deal with it (Sajn 2019). On the other hand, less than 1% of the materials used in clothing are recycled back into clothing, mainly because there is still a lack of adequate technologies for this kind of recycling (Ellen Macarthur Foundation 2017).

Textile and clothing production is a major component of the European manufacturing industry. With nominal sales of over \$450 billion globally, the industry is also one of the biggest and unfortunately, one of the most harmful to the environment. The environmental issues are typically related to the use of energy, water and chemicals, direct CO<sup>2</sup> emissions and solid waste (Resta et. al., 2016). Their environmental footprint has different intensity depending on the stage of the textile or clothing product life cycle (Table 1).

**Table 1.** Major environmental issues related to product life-cycle stage

<b>Environmental issue</b>	<b>Impactful stages in life cycle</b>
Energy consumption	Production of man-made fibers, yarn manufacturing, finishing processes, the washing and drying of clothes in the use phase
Water and chemicals consumption	fiber growth, wet pre-treatment, dyeing, finishing and laundry
Solid waste	Mainly the disposal of products at the end of their life, textile/clothing manufacturing
Direct CO <sub>2</sub> emissions	Transportation within globally dispersed supply chains

Hence, it is essential for the supply chain to be both transparent and traceable towards more sustainable production and the transition to a circular economy in the fashion sector.

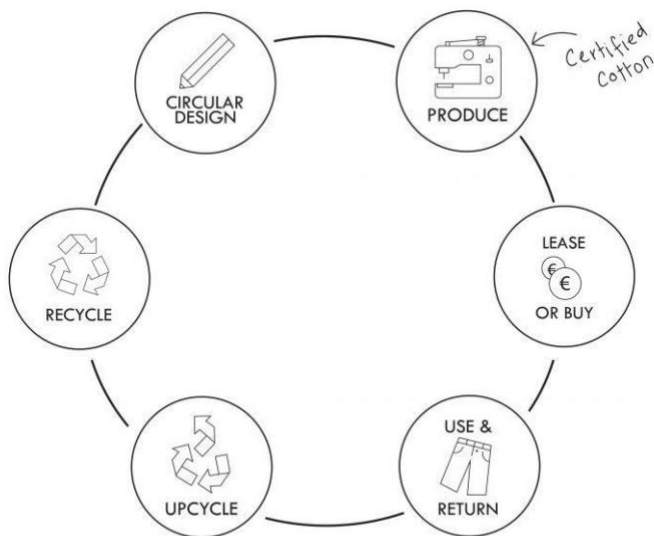
## **Applications**

Some of the practical examples from the Moorhouse research are as follows.

**Luxury:** Luxury group Kering has taken the initiative to improve sustainability throughout all its brands and set targets to achieve this.

- **Stella McCartney** launched a shoe collection made from biodegradable bio-plastic and recycled plastic. The company states that 53% of womenswear and 45% of men's wear collections were now sustainable (Rosily, 2016).
- **Gucci** introduced 100% biodegradable shoes and began encouraging the use of recycled plastic for shoe heels. Biodegradable rubber is used in the brand's boots resulting in more than 40% of soles made with alternative plastic. (Kering report 2015)
- Cashmere, a luxury fabric needed a change in how it was being produced both socially and environmentally. Kering introduced an innovative approach to “turn off-cuts back into high-quality yarn without the use of harmful chemicals and dyes”. This regenerated cashmere was introduced into **Gucci** collections and **Stella McCartney**
- **Balenciaga** recycled 3.1 tons of fabric and launched the Second Life fabric initiative to find new uses for its unused fabrics sent to workshops.
- **Bottega Veneta & Gucci** both set up programs to reuse waste leather scraps into shoe production or cuttings into organic fertilizer. **Hermes** Petit H label uses all pre-consumer waste leather.

**Denim: Mud Jeans** focuses on a circular model. Jeans are leased to customers for a monthly fee and then returned when no longer needed. Discarded jeans are shredded and blended with virgin cotton to make new denim fabric. Returned jeans may also be upcycled and sold as a unique vintage pair with the name of the former owner printed inside, giving more personal meaning to the purchase. Buttons are personalized for the owners to be removed and reused.



### *The circular design for MUD jeans*

In May 2016 **Levi Strauss and Evrnu** designed the first pair of jeans made using post-consumer cotton waste. The process converts consumer waste into renewable fibers and uses 98% less water than virgin cotton products. “As technologies such as Evrnu evolve over time, there will be

greater opportunities to accelerate the pace of change towards a closed-loop apparel industry” (Dillinger, 2016)

**G Star Raw for the Oceans**, the **world’s** first denim collection made from ocean plastic. Pharrell Williams collaborated with G Star Raw to design a denim collection made using recycled ocean plastic produced by Eco-friendly textiles company Bionic Yarn.

**Wool: Reverso** – is a sustainable business collaboration between 3 textile mills; Green Line, Nuova Fratelli Boretti, and Lanificio Stelloni, that offer an honest and traceable “Made in Italy” range of products. Using a 100% transparent method of production, pre-consumer waste fabric and fibers (mostly wool) are collected and remanufactured into new material.

Brands and retailers can reuse their own textile waste as raw material. This process has the potential to create an almost zero waste cycle of sourcing for brands. Besides being a more economical production method, the greater connection with textile mills from creating a circular economy is an opportunity for brands to have more involvement with the design of the fabrics resulting in greater exclusivity and improved innovation. Reverso partnered with Gucci to collaborate on cashmere for AW2015 menswear.

**Wool and the Gang** and **Katie Jones** are two UK-based sustainable knitwear brands that incorporate wool yarn made using shredded cotton textile waste, such as old t-shirts to design eco-friendly knitwear. Both brands have showcased their collections at London Fashion Week and through sustainable design are also addressing the issue of animal welfare in the wool industry by designing vegan-friendly knitwear.

**Sportswear:** Several sportswear brands are forging ahead with innovative ways to close the loop on production.

Since 2010, more than 3 billion plastic bottles have been diverted from landfill to make **Nike** products. The company’s ColourDry technology, which dyes fabric using zero water, has saved more than 20 million liters of water and the brand Reuse a shoe program has recycled approximately 30 million pairs of shoes. Nike is rapidly moving towards zero waste. Nike Grind premium recycled and regenerated materials are produced from original materials and products. Flyknit technology improved design and functionality produces 60% less waste than traditional cut and sew methods. Since 2012, the technology has reduced nearly 3.5 million pounds of waste (Nike.com, 2016)

Collaborating with **Parley for the Oceans Adidas** developed a product made with 95% recycled ocean plastic recovered near the Maldives. The brand aims to produce 1 million pairs of trainers from 11 million plastic bottles. Adidas unveiled the World’s first sneakers made entirely from ocean plastic.

## **Circular Fashion and Waste**

The fashion industry has to play an important role in the path towards sustainability and the circular economy. In our current economy, materials are extracted from the Earth, converted into

products, and eventually thrown away as waste – the process is linear. In a circular economy, by contrast, waste is not produced in the first place (What is circular economy?)

It is becoming increasingly obvious that the present linear (take-make-dispose) model of the economy has slim chances of effectively adopting sustainable development principles. Consequently, the circular economy (CE) model is gaining more and more attention. It is defined as an industrial system that is restorative or regenerative by intention and design, uses and reuses natural capital as efficiently as possible, and finds value throughout products' life cycles. It also involves the introduction of principles such as sustainable design strategies, zero-waste design, product-life extension, resource recovery, repair, and remanufacturing services. We could say that the CE framework is shaped by the 3R (reduce, reuse, recycle) principles that should be applied throughout the whole cycle of production, consumption, and return of resources and the circular model requires the engagement of all market participants. (Koszewska, 2018).

The circular economy model proposes the prolonged use of what is taken from nature, in order to reduce future access to primary resources and reduce waste production (Murray et al. 2017; Winans et al. 2017). As a multi-dimensional concept, it presents different fields of action: first, the order of priority in waste management, which sees landfill disposal as the last option; secondly, the enhancement of by-products and the connection of waste with the production and use of new raw materials (end-of-waste); thirdly, the attention to the production phase and the transition to a sustainable bio-economy model in which the raw materials obtained from renewable sources replace raw materials obtained from non-renewable resources, such as fossil fuels. In other words, the circular economy model is “shaped by the 3R (reduce, re-use, recycle) principles that should be applied throughout the whole cycle of production, consumption, and return of resources” (Koszewska 2018).

The current linear economy model (take-make-dispose) has substantial limits that appear clearly in the garment sector, where the need to move to a circular economy model is also highlighted by industry experts and practitioners. In the fashion sector, a circular vision involves promoting the extension of the end of life of textile and clothing products, their recycling and re-use for other production cycles, along with the use of ecological and sustainable raw materials. In other words, circular fashion aims to minimize waste and keep materials within the production and consumption loop as long as possible. The use of certain raw materials and the reuse and recycling in a circular economy system have the objective of reducing, if not eliminating, waste as the basis for a sustainable fashion system.

### **Catholic views on Consumption**

Catholics' personalist authors have been always concerned about consumerism, which is considered a radical dissatisfaction that compulsively tries to fill the emptiness of the inner self. It is a form of idolatry where malls are modern cathedrals. What are the antecedents and consequences of this moral approach, inducing consumers' engagement in anti-consumption behaviors? A conceptual paper updates the literature review about this research topic, acknowledging the thoughts written in encyclical letters of three Popes of the Catholic Church: John Paul II, Benedict XVI, and Francis. This paper also proposes a new model of ethical

decision-making model that aims to describe the implications of recognizing consumerism as a moral/spiritual issue according to the Catholic Church teaching (Azavedo, 2019)

In this article, the authors present an understanding and critique of consumerism in the tradition of Christian social thought that is both Catholic and personalist. The article considers various approaches to the problem of consumerism. Is consumerism simply the necessary result of the modern capitalist economy? Is it, from another perspective, simply the reflection of our culture's overall worldview? In answering these questions, the research examines five approaches to consumerism, that of John F. Kavanaugh, S.J., David F. Wells, Christopher Lasch, Gabriel Marcel, and John Paul II. Each is critical of consumerism, but their approaches bring out different aspects of the problem of consumerism (Beabout and Echeverria, 2002).

Research by Sadowski presents the potential of religions, in particular Christianity, in shaping a culture of sustainable consumption (a culture of moderation). An analysis of consumer culture leads to the identification of elements that underpin a culture of moderation, being an antidote to dangers arising from the prevalence of consumer culture. The most important elements shaping a model of culture that is man- and environment-friendly include a new model of progress, a mentality of communion, and a new lifestyle. In order to build a culture of moderation, a communion mentality is needed to restore interpersonal relationships and make man aware of his relation to the whole community of life. Another important element of a culture of moderation is a new lifestyle that takes into account all human needs, respects the potential of the natural environment, and is characterized by intra-generational and inter-generational responsibility. There is much to suggest that Christianity has the potential to make a significant contribution to reducing the culture of overuse and promoting a culture of moderation. (Sadowski, 2021)

## **Discussion**

It is assumed that consumers will lead the movement towards sustainable fashion. However, it is up to businesses to demonstrate social responsibility through a collaborative approach with textile innovation and fashion designers to successfully design sustainable products with minimal waste.

From a design perspective, there is an increased opportunity to tell a story through the clothes. Designers are often inspired through nature and incorporating sustainable design provides added meaning for both designer and wearer rather than from a purely aesthetic context. Another trend in sustainable design is where some brands offer free repairs to reinforce the concept of high-quality products that have been made to last.

Combining sustainable consumption with the circular economy concept could help tackle challenges, such as resource scarcity and climate change by reducing resource throughput and increasing cycling of products and materials within the economic system, thereby reducing emissions and virgin material use. To achieve sustainable consumption in a circular economy, both production and consumption practices need to change. Business models can potentially influence both practices as it defines how a company conducts business and shapes the company-consumer relationship (Tunn et al.).



## **Methodology**

To assess students' understanding of ethics and sustainability in apparel production and consumption related to Catholic Intellectual Tradition principles.

We are working on designing a survey of the faculty that teach the two required courses in Catholic Intellectual Training. The purpose of this survey is to determine students' exposure to concepts in Sustainability and Ethics. The goal is to track the students as they move to the Business school and to survey them again to determine their understanding of ethics and sustainability concepts.

Method: Multi-stage analysis including:

1. Pre-semester focus group with CIT professors to assess and learn more about their perceptions of what they teach as related to business ethics and sustainability. \*To develop a baseline understanding of concepts taught.
2. Talk to MKT profs to get their thoughts.
3. Identify concepts to incorporate into Spring classes.
4. Survey development
5. Poss. True Cost movie? E2?
6. Pre-class survey of students' understanding of ethics and sustainability concepts prior to taking Fashion Innovation and Supply Chain courses.
7. Integration of ethical concepts into Fashion & Supply Chain courses.
8. Post-class survey of students' understanding of ethics and sustainability concepts prior to taking Fashion Innovation and Supply Chain courses.
  1. Descriptive statistics to develop a baseline for differences pre-and post-course
9. Focus group discussions with students enrolled in courses to gain a more granular understanding of findings from the survey stage.

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