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**Barriers and Opportunities for Circularity in  
Fashion: A Qualitative Comparison between  
Fast Fashion and Circular Brands**

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## Introduction

In the last decades, the fashion industry has become one of the most influential sectors globally, both economically and culturally, but it also is defined as one of the most resource-intensive and socially problematic. The rise of fast fashion has further amplified these tensions, due to its accelerated design-to-retail cycles, relentless production volumes and the dominance of low-cost garments, entrenching with unsustainable practices such as large-scale greenhouse gas emissions, extensive water use and pollution, reliance on synthetic fibers and the generation of vast quantities of textile waste. Added to these environmental pressures, severe social challenges are very relevant, as, for example, global supply chains often rely on labor exploitation and weak regulatory oversight in producing countries. Against this tragical situation, the circular economy has emerged as a systemic alternative. Based on principles such as, for example, waste elimination, repair, reuse and material recovery, CE challenges the *take–make–dispose* logic of linear production, deeply used in the fashion sector. About this industry, circularity tents not only to reduce environmental harm, but also to transform business models and consumer practices. Yet, as previous research has shown, translating these principles into fast fashion is far from straightforward. Sandin and Peters, for instance, have highlighted the technological limitations of textile recycling, while Sandvik and Stubbs argued that innovation alone can not overcome the structural contradictions deeply embedded in fast fashion’s business logic. Niinimäki et al. further stress that sustainability in fashion requires systemic transformation, not marginal adjustments.

This study takes these insights as its starting point of departure, but advances them in two ways. First, rather than focusing only on technological challenges, it explores the structural, cultural and governance dimensions that shape the (im)possibility of circularity in fast fashion. Second, it adopts a comparative approach, contrasting fast fashion with circular-first brands, that embody alternative business models, trying to clarify where circularity, for fast fashion brands, will remains aspirational and where tangible opportunities for transition exist.

The study is guided by a central line of inquiry: how the structural logic of fast fashion interacts with the principles of circularity, and what barriers and opportunities emerge from this interaction. To investigate this, a qualitative methodology, based on semi-structured interviews with sustainability professionals from both fast fashion and circular-first firms has been used. The Gioia Method was applied to the data previously reached during the interviews, enabling a rigorous process of coding and abstraction, from first-order concepts to second-order themes and overarching theoretical dimensions. This approach made it possible to map the systemic barriers to circular practices integration in the fashion sector, as, for example, cost-driven production structures, technological immaturity, global supply chain fragmentation, regulatory gaps and consumer cultures of

disposability, while also identifying opportunities in *9R* strategies application, generational shifts in consumption, digital traceability and governance mechanisms.

In conclusion, combining empirical insights with theoretical perspectives, this thesis contributes to the literature in two main ways. It demonstrates that the primary obstacles to circularity are structural, regulatory and cultural rather than only technological and it highlights some opportunities and short-term strategies that extend product lifespans as more realistic entry points for change. In doing so, the research advances understanding of how circularity in fashion can be framed not as isolated initiatives, but as systemic transformation across design, production, governance and consumption.

# First Chapter

## 1.1 The Linear Economic Model: *Take-Make-Dispose*

The current global economic system is based on a linear production paradigm known as *linear economy*. This model was first established during the Industrial Revolution and became, since the 20<sup>th</sup> century, the dominant in our industrial system. The Ellen McArthur Foundation has defined the linear economy as *an economy in which finite resources are extracted to make products that are used, generally not to their full potential, and then thrown away* (Ellen MacArthur Foundation, 2023). This process is commonly summarized by the phrase *take-make-dispose*.

The linear economy is an economic model based on the extraction and exploitation of natural resources and raw materials, that has been founded on the goal of producing goods and providing services at the most affordable cost.

Virgin raw materials are continuously extracted from the nature at the lowest cost possible, converted into products through energy and resources intensive industrial processes and low labor costs and, ultimately, after being sold at a higher price, discarded as waste after a limited period of use.

At its core, this model is characterized by a *one-way flow* of resources (from extraction to disposal) and, for this reason, it is defined as *unidirectional*, with almost no consideration for reuse, recycling or regeneration.

As a consequence, it can be affirmed that the linear economy is founded on two increasingly unsustainable and erroneous assumptions: the existence of an unlimited supply of natural resources and the infinite capacity of the ecosystems to absorb waste and emissions. As these assumptions prove false in a world facing resource scarcity and environmental degradation, the linear model reveals its systemic weaknesses and underscores the urgent need for a transition toward circular and regenerative economic alternatives.

In the linear economic model, the lifecycle of a product is typically structured around three sequential and unidirectional stages: extraction, production and disposal.

The origin of the cycle is the extraction of virgin raw materials, such as fossil fuels, metals, rare earth minerals, minerals, water and biomass, from nature. These inputs are generally non-renewable and involve significant environmental degradation in terms of deforestation, habitat destruction, soil erosion, water contamination and greenhouse gas emissions (Ghisellini et al., 2016).

In addition, the linear economy is almost completely based on virgin raw materials. This represents a very significant weakness of this model, because the global demand and consumption of non-recycled materials is increasingly growing, while their availability is decreasing.

In the second stage, these raw materials are converted into finished goods through industrial procedures like synthesis, assembly, packaging and refining. These processes usually use a lot of

energy and a lot of synthetic chemicals and fossil fuels. As a result, this stage uses freshwater, produces industrial waste and emits significant amounts of CO<sub>2</sub> and other pollutants, all of which significantly negatively impact on the environment. Furthermore, linear systems rarely optimize product design for longevity, reparability or recyclability, which speeds up obsolescence and reduces the potential for material recovery at the end of life (Bocken et al., 2016).

Lastly, a product moves into the third stage, disposal, after its useful life has ended. Often, this happens too soon because of trends like planned or perceived obsolescence, naturally encouraging waste and inefficiency.

In the linear model, post-consumer goods are usually burned or rejected in landfills, with minimal energy or material recovery. This phase represents the final detachment of the product from the economy and the total loss of the labor, energy and embedded resources that have been used to produce it. More importantly, it also contributes to the growing environmental problems of land degradation, groundwater and soil pollution, air pollution from burning trash and rising quantities of solid waste. For instance, the World Bank projects that if current linear consumption trends continue, the amount of municipal solid waste generated worldwide could reach 3.4 billion tons per year by 2050 (Kaza et al., 2018).

The linear economic paradigm excludes any circular strategy (such as resources recycling, product-life extension, remanufacturing or eco-design strategies) that enhances durability and reparability, and for this reason it is defined as *degenerative*.

Essentially, this model accelerates resource depletion and environmental degradation, without preserving the residual value embedded in materials and products after they are first used.

The linear system, as Ghisellini pointed out, causes a lot of greenhouse gas emissions, toxic waste and plastic pollution. It also largely utilizes important resources on Earth, like fossil fuels, rare earth elements, clean freshwater and land that can be farmed (Ghisellini et al., 2016). These dynamics are exacerbated by the prevalent industrial practice of designing products for obsolescence, whether intentionally or perceived. These kinds of design strategies make people want to buy new products before they need to, which leads to too much consumption and faster production cycles that use a lot of resources.

This phenomenon takes place a lot in the fashion and electronics industries, where people often throw away things not because they don't work, but because styles change, they get worn out, or they have small flaws that are too expensive or hard to fix. This drastically shortens the lives of products, which puts even more stress on environmental and material systems.

Bocken (Bocken et al., 2016) highlighted that the principal systemic deficiency and barrier of the linear model is its incapacity to maintain and regenerate value within the economic system. Once

resources, materials and products are used, they leave the cycle completely, which means that economic, ecological and energetic value is lost. This structural limitation makes the economy more and more vulnerable to resource shortages, market fluctuations and problems with the global supply chain. It also negatively impacts on the long-term resilience of both natural ecosystems and human societies, stressing more environmental systems and making the planet and the society mechanisms less stable. As a consequence, it can be affirmed that, rethinking the linear model is not only necessary for the environment, but it's also good for the economy and fair to future generations.

## **1.2 The Fashion Industry's Environmental and Social Impact: Background and Motivations of the Study**

The fashion industry is one of the most important global sectors in terms of economic weight and consumer goods production. However, it is also one of the most resource-intensive and environmentally damaging industries worldwide.

Within the European Union, the textile industry ranks as the fourth most environmentally harmful product category in terms of lifecycle greenhouse gas emissions and primary raw material consumption, following food, housing and transportation industries (Environmental Protection Agency, 2022).

This sector requires large quantities of natural resources, which are becoming increasingly scarce, and consumes huge volumes of energy and water for fabric production. Moreover, it generates significant pollution and toxic substances, both during the manufacturing process and at the end-of-life stage of its products. Additionally, it creates a huge amount of waste, both in the pre- and post-consumer phases and it subjects industry workers to often undignified working conditions.

McKinsey & Company asserts that the fashion industry is responsible of the 4% of the total global GHG emissions (about 2.1 billion tons in 2018) and *Sustain your Style* discovered that it is responsible of about the 20% of the global industrial water pollution. Furthermore, 63% of textile fibers are derived from petrochemicals, which significantly impacts on the carbon dioxide emissions, water depletion and toxic pollution (Sandin & Peters, 2018).

Over the past two decades, the rise of fast fashion has dramatically amplified the sector's environmental and social impacts. This is almost completely characterized by linear business models and, emerged in the late 20<sup>th</sup> century, has deeply transformed the global apparel market. It is based on rapid design-to-retail cycles, low-cost mass production and an ingrained culture of disposability. As a result, output has increased dramatically, but the lifespan of clothing has decreased.

For example, McKinsey & Company and the Ellen McArthur Foundation reported that the global clothing production doubled between 2000 and 2014 (Ellen MacArthur Foundation, 2017), while,

over the past fifteen years, the average number of times a garment was worn before being thrown away decreased by 36% compared to the early 2000s (McKinsey & Company, 2018).

In addition, the Ellen McArthur Foundation pointed out that, while many low-income countries still show relatively high rates of utilization, in wealthier countries this trend shows a different path. For instance, in the United States, garments are worn only around a quarter of the global average. A similar pattern is emerging in China, where clothing utilization has dropped by 70% over the same period.

At the same time, the demand for textiles is still rising quickly, especially in developing nations like Asia and Africa.

The Ellen MacArthur Foundation asserts that the current fashion system, which is characterized by constant increases in both production and consumption, is seriously stressing the planet's natural resources. Large amounts of non-renewable materials that are usually used only temporarily before being disposed are extracted by it in a primarily linear fashion. Approximately 8000 synthetic chemicals are needed to transform raw materials into textiles and about 98 million tons of non-renewable inputs are required annually by the textile industry, such as fertilizers for cotton cultivation, oil for synthetic materials, and other chemicals for textile processing and finishing. The excessive use of resources is still necessary for this wasteful and ineffective approach because of the low rates of clothing reuse and recycling. As a result, significant economic value is lost, resource depletion is accelerated, and environmental harm is exacerbated. As a result, significant economic value is lost, resource depletion is accelerated, and environmental harm is exacerbated.

At the local, national and international levels, its detrimental effects are seen not just in the environment but also in society.

In particular, cotton cultivation, that accounts for about 7% of the total employment in some low-income countries, is extremely resource-intensive: it uses a lot of water and involves large amounts of chemical inputs, including pesticides and fertilizers, which have a negative impact on the environment. In particular, despite making up only 2.5% of the world's arable land, cotton farming alone is responsible for 24% of insecticides and 11% of pesticides used worldwide, according to the Ellen MacArthur Foundation (Ellen MacArthur Foundation, 2017). In addition to endangering the health of farmers and the local population, this extensive use of agrochemicals causes soil degradation, eutrophication and biodiversity loss.

Moreover, according to the Foundation, the global textile industry also uses approximately 93 billion cubic meters of water annually, which is equivalent to 4% of all freshwater withdrawals. This consumption greatly contributes to water stress in different regions of the world (Ellen MacArthur Foundation, 2017) and, specifically, a huge amount of freshwater resources are severely strained by

the production fabric, especially cotton. According to the Water Footprint Network, 10,000 to 20,000 liters of water are needed to produce one kilogram of cotton (about the amount needed to produce a pair of jeans), depending on the climate and location.

In this regard, another important piece of data is provided by a United Nations report: it is estimated that, for the production of a single cotton t-shirt, approximately 2,700 liters of fresh water are needed, an amount equivalent to what a person would drink in two and a half years, while, for a pair of jeans, it reaches even 7,000 liters (Parlamento Europeo, 2023).

In addition, the 2017 Pulse of the Fashion Industry report stated that dyeing can require up to 150 liters of water per kilogram of fabric, and in developing countries, where most of the production takes place and where environmental legislation is not as stringent as in the EU, wastewater is often discharged into waterways without being filtered.

One notable instance of this specific impact is the Aral Sea disaster, in which extensive irrigation for Uzbekistan's cotton fields caused one of the biggest lakes in the world to almost entirely dry up, leading to ecological collapse and public health issues in the area.

Parallel to this, the production of synthetic fibers now represents more than 60% of global fibers production (Textile Exchange, 2022). This makes the fashion industry deeply reliant on non-renewable resources, particularly petroleum. The manufacture of polyester, nylon and acrylic involves energy-intensive processes and the release of significant amounts of greenhouse gases. For instance, polyester production alone emits approximately 9.52 kg of CO<sub>2</sub>-equivalent per kilogram of fiber, making it one of the most carbon-intensive textile materials (Shen et al., 2010).

Additionally, synthetic fibers are a major source of microplastic pollution: during washing, they shed microfibers that enter water system and accumulate in marine ecosystems, posing risks to aquatic life and human health. 35% of primary microplastic released into the environment are caused by washing synthetic clothing. About 700,000 microplastic fibers can be released during a single polyester clothing wash cycle, and these fibers could eventually find their way into our food.

Over 14 million tons of microplastics have accumulated on the ocean floor as an outcome of washing synthetic clothing. In addition to being a worldwide environmental problem, this type of pollution has a terrible impact on ecosystems, wildlife and local communities.

The textile sector began to be recognized as a major source of ocean plastic pollution in recent years. It has been estimated that half a million tons of plastic microfibers are thought to enter the ocean annually from synthetic clothing, including polyester, nylon and acrylic.

This dual reliance on fossil fuels for synthetic fibers and on water and chemicals for natural fibers shows how closely the textile industry is linked to climate change and environmental degradation.

Furthermore, it is commonly known that the manufacture of textiles discharges significant volumes of wastewater containing hazardous chemicals into the environment, despite the lack of complete statistics on the number of hazardous substances utilized across the sector. Notably, the dyeing and finishing of textiles are responsible for almost 20% of industrial water contamination worldwide.

Additionally, according to McKinsey & Company, the fashion industry is responsible of the 4% of the greenhouse gas emissions globally, the equivalent of the sum of the annual emission of France, Germany and United Kingdom (Global Fashion Agenda and McKinsey & Company, 2020). Even more alarmingly, the United Nations Environment Programme has ranked the fashion industry as the second most polluting industry after oil, with a production of the 10% of the total greenhouse gas emissions worldwide (United Nations Environment Programme, 2023).

The Ellen McArthur Foundation and the United Nations Environment Programme have also drawn attention to the textile and apparel industry's substantial environmental effect, pointing out that its greenhouse gas emissions currently amount between 8% and 10% of the world's carbon emissions (United Nations Environment Programme, 2023), and exceed those of worldwide aviation and maritime transportation put together.

Specifically, according to McKinsey & Company, about 70% of these emissions come from upstream activities such as energy-intensive raw material production, preparation and processing, while a 30% of greenhouse gas emission is generated by downstream activities like transportation, packaging, retail operations, usage and end-of-life use.

Going in details, the major sources of toxic emissions are the wet processing treatments, such as dyeing, finishing and printing. Moreover, yarn spinning and fabric knitting heavily rely on fossil energy, and this cause large CO<sub>2</sub> emissions, water consumption, toxic chemical use and waste generation, that can be considered as the most environmentally relevant consequences of the fashion industry.

The Ellen McArthur Foundation stated that, if the emissions generated by the fashion industry will continue along this path, it is predicted that they will account for a quarter of the world's carbon emissions by 2050. For this reason, Sandin et al. estimated that the impact for garment used must be reduced from 30% to 100% by 2050 (Sandin & Svanström, 2015).

In parallel, the industry recycles on average only the 1% of the material used to produce its products: this causes a substantial loss of resources and value, worth roughly USD 100 billion a year (Ellen MacArthur Foundation, 2017).

That means that it determines an enormous amount of value losses and that generates an enormous amount of waste. Three types of waste can be identified: pre-consumer waste, post-consumer waste and post-industrial waste.

Pre-consumer-waste refers to the waste produced by the textile industry during production process, before the final product being delivered to the final customer and consists of pieces of fabric, leather, unsold inventories, scraps and faulty goods. At the opposite, post-consumer waste refers to clothing that is no longer used by the consumer because of changes in fashion trends, wear and tear or aesthetic preferences. These products, basing on their perceived value and condition, often end up in second-hand markets, donation streams or are thrown away.

Post-industrial waste is a term that describes the solid, liquid, or gaseous waste products produced during the textile and clothing production processes. This covers by-products such wastewater, synthetic oils, finishing chemicals, and chemical dyes.

For instance, the Environmental Protection Agency (EPA) reported that post-consumer textile waste in the United States increased by 80% between 2000 and 2018, reaching 17 million tons per year (Environmental Protection Agency, 2022). Only 15% of material is recycled or reused, while the remaining 85% is incinerated or landfilled. In the same way, WRAP UK noted that an estimated 140 million pounds worth of clothes ends up in landfills annually in the United Kingdom.

This phenomenon is further accelerated by fast fashion's production cycles' structure, characteristics and business models, which encourage overconsumption and underuse of clothing.

According to the European Environment Agency, each European citizen throws away an average of 11 kg of textiles per year, most of which is burned or dumped in landfills because there is inadequate infrastructure for sorting, collecting, and recycling them (European Environment Agency, 2022).

Globally, the equivalent of a garbage truck's worth of textiles are burned or landfilled every second, consequently depleting limited natural resources and worsening environmental conditions.

Furthermore, the mixed composition of contemporary textiles, which frequently combine synthetic and natural fibers, makes mechanical or chemical recycling difficult and complicates efficient waste management. The problem is made worse by the fact that clothing is not properly treated before being released into the environment. Wastewater from wet processing frequently contains hazardous chemicals that, if not properly treated, can have a major negative impact on the environment by contaminating wastewater, waste gas, and even finished textile products.

The entire T&A supply chain is extremely harmful for the environment in every step: design, source procurement, fiber and clothing production, packaging and delivery, usage and restoration and waste management.

In addition to its severe environmental impact, the fashion industry poses serious risks to human health and is characterized by widespread labor exploitation, particularly in developing countries, where the majority of textile manufacturing is outsourced.

This sector employs about 300 million workers along its value chain (around the 9% of the global working population (Suarez-Visbal et al., 2022)), many of whom are frequently subjected to unsafe and degrading conditions, with limited regulatory oversight or access to social protections.

A significant structural problem is the industry's extreme decentralization in production, with both small and medium-sized businesses basing the majority of production in nations with weak labor laws. For instance, the 80% of textile businesses are SMEs in China (Pal & Gander, 2018; Neto et al., 2020), the country that produces the most clothing and textiles worldwide and where it is challenging to enforce environmental laws, monitor working conditions and guarantee adherence to safety standards because of this fragmentation. For instance, heavy metals (like lead and cadmium), formaldehyde, azo dyes and organochlorines are common chemicals that have been linked to cancer, respiratory diseases, skin conditions and hormone imbalances (González et al., 2019; El Yamani et al., 2020). According to a comprehensive analysis published in the *Journal of Occupational Health*, workers in the textile industry have a high prevalence of musculoskeletal problems, dermatitis, chronic cough and weariness as a result of repetitive motions, chemical exposure and long hours in inadequately ventilated facilities and, in addition, workers are at risk for a number of psychological issues. The Clean Clothes Campaign claims that the fast-paced nature of fashion production, which leads to long hours, required overtime and extreme psychological strain is driven by just-in-time models and relentless price competition. In this situation, workers of the sector's value chain earn less than the minimum wage, and millions of garment workers (mostly women) frequently experience harassment, discrimination, and limited syndication rights (Clean Clothes Campaign, 2022).

The collapse of the Rana Plaza building in Bangladesh in 2013, killed more than 1,100 garment workers and served as a tangible illustration of the systemic disrespect for safety regulations in global clothing supply chains. However, although building integrity and fire safety have made numerous progresses since 2013, structural disparities still remain widespread and relevant in the T&A industry. The Ellen MacArthur Foundation and the UN Alliance for Sustainable Fashion have both highlighted how, in Western markets, the pressure to keep costs low and production fast exacerbates exploitation and inequality across sourcing countries.

Environmental deterioration is closely linked to these unsustainable labor practices: in addition to the chemical hazards they face at work, textile workers in South Asia and Sub-Saharan Africa also have to deal with the untreated discharge of textile effluents, that contaminates the air and water in their communities. Additionally, according to the World Health Organization, prolonged exposure to chemically contaminated water used in textile dyeing may cause cancer, developmental disabilities and issues with reproductive health in the local populace. As a result, the environmental and human costs of the global fashion system are not separate but rather closely related, manifesting as a form of

environmental injustice where the most marginalized communities bear the brunt of both environmental harm and labor exploitation. From these examples, it is easily understandable that, if the current trend of rapid fashion and linear economic models is not interrupted, there will be significant and potentially irreversible environmental effects.

If nothing more is done over the next ten years beyond the current measures, the industry's GHG emissions are expected to rise to over 2.7 billion tons annually by 2030, representing a 2.7% annual volume growth rate.

The textile industry is on track to see its sales soar to a staggering 160 million tons globally by 2050. This explosive growth is set to significantly increase greenhouse gas emissions, pollution and the consumption of resources. If we keep heading down this path, we might exceed what's considered environmentally sustainable. In fact, the fashion sector alone could end up responsible for more than 26% of the global carbon budget needed to meet the 2°C climate goal. 300 million tons of non-renewable resources would be consumed annually, as a result of this industrial boom. However, between 2015 and 2050, it is estimated that more than 22 million tons of plastic microfibers, about two-thirds of the annual amount of plastic-based fibers currently used in clothing production, will be released from synthetic clothing and end up in the ocean. These alarming predictions emphasize how urgently we must move away from our wasteful, linear manufacturing processes in favor of more sustainable, circular alternatives. This shift is crucial not only to guarantee the long-term viability of the fashion industry, but also to safeguard our environment and address social inequalities.

Given these pressing challenges, the fashion industry is now under the microscope from researchers, policymakers, activists and consumers alike, that are stressing the fact that a tangible change in this type of practices is necessary. This shift is crucial, not only to guarantee the long-term viability of the fashion industry, but also to safeguard our environment and address social inequalities. As a consequence, the need for more sustainable, circular and regenerative practices is becoming increasingly clear and, examining how circularity can be practically incorporated into the fast fashion industry and highlighting both the challenges and opportunities for significant change, this thesis will participate to the ongoing discussion.

### **1.3 Qualitative Research Strategy and Literature Gap**

A large and growing number of studies have focused on circular strategies in the fashion industry, in particular from a purely academic perspective. Some of the *9R* strategies, such as reuse, recycling, repair, remanufacturing and renting, have all been examined using tools like life cycle assessment and calculating the resulting environmental impact. Importantly, many works have linked these practices to significant green benefits in terms of reduction of waste generation, carbon emissions, raw materials use, but also in the extension of product lifetime. Besides the environmental benefits,

more recently, also the circular economy has been connected to socio-economic benefits, specifically regarding employment. It is argued by scholars that the implementation of circular models can foster the creation of new jobs and expertise, especially in sectors such as reverse logistics, textile sorting, digital circular applications and repair services.

Alongside this, the literature has been critical and comprehensive in its coverage of the environmental and social issues due to the dominant linear economy. The issue of fast fashion comes at the forefront of our discussion, as it was characterized by the unsustainable nature of its production and consumption patterns, role in illuminating forced consumption, as well as the big part it took in environmental pollution, water needs and textile waste all over the globe. Due to its short product lifespans and inherent resource intensity, the industry's reliance on low-cost, high-volume production cycles, embodied in the *take-make-dispose* model, has been recognized as a significant barrier to sustainability.

There have been a lot of theoretical and critical works on the subject, within the empirical literature, concerning the strategic and practical blending of CE strategies compared to the existing linear business models.

Beside this, studies which highlight how circularity is brought to life in businesses that were not initially established on circular principles are fewer in number, even though many provide conceptual models and sustainability frameworks. Important questions like whether and to what degree fast fashion companies can incorporate circular principles into their operations without turning to greenwashing tactics are still not well studied. Also, the issue of how the inner perception, strategic framing and practical implementation of these activities vary across different organizational settings remains unknown.

Besides the mentioned gaps, a similar scarcity of research has also been found concerning two factors that largely determine the effectiveness of circular transitions. The first is the very limited number of studies in which the influence of regulatory governance mechanisms, like the *Extended Producer Responsibility (EPR)* directives of the European Union, on post-consumer textile flows and corporate recycling procedures, is comprehensively examined.

On the other hand, there is still a dearth of research on the consumer side of the equation. The production-side innovations are extensively analyzed in the literature, but less so are the consumer behavior studies that focus on how consumers weigh price, sustainability and brand reputation when choosing between the more expensive, but sustainable options and the cheaper, fast fashion items.

In order to fill these empirical and conceptual gaps, this work investigates how circular economy concepts are understood, implemented, and contested within an array of fashion companies with various levels of circular maturity, highlighting the intricate opportunities and challenges that

influence the fashion industry's circular transition through a main research question: *What are the major barriers and opportunities for the integration of circularity into fast fashion models, in comparison with circular brands in the fashion sector?*

In addition to emphasizing the innovative strategies and mindsets of circular brands, the study also focuses on how linear fashion companies can practically implement CE oriented strategies by analyzing the organizational, cultural, economic, technological and regulatory factors that either support or impede circular innovation. Its ultimate goal is to support a more equitable, robust and circular fashion system by offering evidence-based insights and useful suggestions.

In order to answer the research question and get a general comprehension of the implementation of circularity in various organizational contexts, this research uses a qualitative research approach, which is the most suitable for the exploratory and interpretative character of the research objectives since it enables the obtaining of detailed data about the complex, specific-to-the-situation dynamics that strongly depict the change to circular economy principles.

Semi-structured interviews with eight professionals working in sustainability departments of fashion companies constitute the empirical core of the research. The selected companies vary from startups, founded on CE principles, to well established companies, that are recently moving forward circularity. This variation makes it possible to carry out comparative studies, which reveal such things as the similarities and differences both in strategic, cultural, and operational terms among those enterprises that are circular by design and those that are struggling to achieve the transition from linear to circular models.

The resulting information and data gathered have been analyzed using the Gioia Method, which makes it possible to identify first-order concepts, drawn directly from the participants own words, second-order themes, that are the interpretative categories individuated by this thesis author and, finally, a synthesis of these insights into overarching dimensions, that are the third-order themes. This method maintains a strong connection to the empirical realities of the businesses under investigation while enabling an organized and thorough analysis.

## **1.4 Findings**

These semi-structured interviews were useful to understand the practical problems concerning the implementation of circular economy schemes in the fashion industry.

Regardless of company size, market position or maturity in circularity, the interviews highlighted a common set of structural, economic and cultural obstacles to adopting circularity relative to fast fashion phenomenon.

From the interviews with the sustainability experts emerged that, without specific legislative support, financial incentives or an engaged base of properly conscious consumers, circular brands find challenging to maintain their competitiveness or gain market share due to the significant asymmetry resulting from the difference between production costs and consumer expectations. Circular fashion risks to remain limited to a small market share and failing to challenge the dominant, cost-driven logic of the fast fashion model, especially unless there is a shift in consumer culture toward greater environmental literacy, transparency and accountability.

The economic factor results to be one of the main obstacles hindering the fashion industry from adopting circularity. Both under a final consumer prices and business production costs point of view, circular products are commonly perceived as being more costly than those from fast fashion brands. Usually, circular brands operate in smaller scales and under more demanding environmental and social concerns, this makes very difficult to access economies of scale and keep unit costs low.

From the customers' side, the higher retail prices proposed by circular fashion brands are a significant deterrent to purchase. This reluctance to pay more results from a variety of factors, such as financial constraints, as well as a lack of awareness regarding the true costs of affordable fashion. This is because many consumers are not sufficiently conscious about the damage that fast fashion causes to the society and the environment, including resource depletion, pollution, textile waste and labor exploitation, and this results in serious difficulties they have to see the benefits of circular alternatives. In general, the interviews further emphasized the importance of consumer behavior as both a potential lever for change and a barrier. Several respondents mentioned that most consumers are still unaware of where or how to recycle clothing, and there are typically no accessible services or incentives to promote sustainable choices. Repairing a garment is typically more costly than buying a new one, particularly for fast fashion items, that are designed to be affordable and short-term in nature. In this way, circular consumption practices are discouraged and the system of easily discarded and replaced clothing is maintained. In the end, this illustrates a larger cultural gap between the circularity ideals and the disposable, fast-fashion-shaped behavioral norms.

Moreover, the interviews suggested significant structural, technical and regulatory barriers relatives to the recycling practices. One of the most relevant obstacles is the lack of a unique European regulatory framework, especially with regard to *Extended Producer Responsibility* and textile recycling. In particular, from the empirical interviews, emerged that until the EPR will enter in force across the EU, recycling used clothing will still be illegal or impracticable due to waste categorization laws and the lack of infrastructures that are recognized for processing end-of-life textiles. The presence of mixed materials in clothing, along with a general lack of standardized certifications and traceability systems, further complicates the operationalization of truly circular processes at scale.

Moreover, the data collected confirmed the idea that circularity and the fast fashion business models are quite incompatible. Many of the respondents pointed out that, in fast fashion, sustainability is often used more as an advertising and marketing tool than as a truly revolutionary approach, contributing to the possibility of pervasive greenwashing campaigns. Fast fashion cannot properly follow to the principles of the circular economy unless substantial and very difficult changes are implemented to supply chains, material selections, production volumes, and business logic.

Finally, the interviews revealed an extensive amount of demand for more binding and efficient governance mechanisms. While some innovative companies have developed internal tools such as the digital product passports to trace their products, take-back schemes and advanced traceability platforms, these are still voluntary and optional in the absence of a broader institutional framework. In conclusion, the answers gathered from the interviews provide a helpful empirical basis for further investigation of the thesis's research question.

The initial crucial phase in this research is a review of the body of literature currently available on the circular economy, with an emphasis on its mechanisms and application in the fashion sector. This theoretical first step will be the basis to understand the principles and current applications of the circular economy in general, and, more specifically, in the fashion industry. Based on this framework, in order to answer the research question, the analysis will proceed with a critical and comparative analysis of the business models of circular brands and fast fashion companies, in order to examine at whether circular strategies can be successfully incorporated into fast fashion business models, what opportunities and challenges such integration would bring, which specific strategies could be realistically adopted and how they might be implemented.

## Second Chapter

### 2.1 Circular Economy: Theoretical Background

Essentially, our global resources are limited, and we are exceeding the Earth's resource capacity. As a consequence, in the last decades, the goal of sustainable development has gained worldwide recognition (UN, 2015). The ultimate objective of sustainable development is to satisfy present needs without compromising the capacity of future generations to fulfill their own (WCED, 1987), while taking into account the limitations of the Earth's resources (Meadows et al., 1972) and considering the trade-offs between economic, social and environmental goals (Elkington, 1997).

The main objective of sustainable development is to mitigate or eliminate the negative effect of the dominant production models, that have a negative effect on the ecosystem and affect human lives and well-being (Lüdeke-Freund, Gold, and Bocken, 2019).

In response to the extractive mechanism of the *take-make-dispose* linear economy, a new systemic approach, that can be seen as a solution to address sustainable development (Geissdoerfer et al., 2018) and improve environment, society and businesses, has been designed: the *make-use-return* circular economy (Pearce et al., 1990). By rethinking the relationship between economic activity, environmental regeneration and social well-being, the CE is becoming more and more acknowledged as an instrument to promote sustainable development (European Commission, 2014).

According to the Ellen McArthur Foundation, the circular economy can be defined as *a systems solution framework that tackles global challenges like climate change, biodiversity loss, waste, and pollution. It is based on three principles, driven by design: eliminate waste and pollution, circulate products and materials (at their highest value), and regenerate nature* (Ellen MacArthur Foundation, 2019), while Geissdoerfer et al. have defined CE as *a regenerative system in which resource input, waste generation, emissions, and energy leakage are minimized by slowing, closing, and narrowing material and energy loops. This is made possible through strategies such as long-lasting product design, regular maintenance, repair, reuse, remanufacturing, refurbishment, and recycling* (Geissdoerfer et al., 2017).

From these definitions, it can be concluded that this economic system is based on three main principles: eliminating waste and pollution, circulate products and materials and regenerate nature (Ellen MacArthur Foundation, 2019). To do so, it applies some fundamental actions such as product durability, reuse, repair, refurbishment, remanufacturing and recycling, which are meant to improve material loops and reduce resource input and output leakage (Bocken et al., 2016).

The circular model, in contrast to the conventional linear model, which is predicated on extraction, production, consumption and disposal, seeks to eradicate waste and restore natural systems by

extending the lifespan of goods and materials (Lewandowski, 2016). By separating economic activity from the use of limited resources, it tackles pressing global issues like pollution, resource scarcity, biodiversity loss and climate change (Lewandowski, 2016). To do so, it requires companies to rethink their supply chains and business models (Lüdeke-Freund et al., 2019).

This method makes it possible to minimize the quantity of resources that are transformed into waste, emissions and energy leakage, with the goal of mitigate the negative effects of the production processes, but without compromising economic growth (Geissdoerfer et al., 2018).

Even though the CE has grown in popularity recently, its foundations can be traced to a number of different fields and powerful thinkers. As early as 1982, Walter R. Stahel, one of the pioneers, presented the idea of a self-replenishing, closed-loop system, stressing robustness, reusability, and the preservation of economic value via refurbishment and repair (Stahel & Reday, 1982). The concept of *circular economy* was later formally introduced in 1990 in the context of environmental economics by Pearce and Turner, who defined it as *an economic system that closes material loops to internalize the environmental costs of production*. Their research highlighted the environment's roles as a life-supporting system, a sink for waste, and a source of resources (Pearce, D. W., & Turner, R. K., 1990). Industrial ecology further influenced the CE discourse by advocating for industrial systems to resemble natural ecosystems, in which refuse from one process is used as input for another.

CE has been then advanced by more recent schools of thought that incorporate ecological regeneration and design thinking into product and system innovation, such as regenerative design, the *Blue Economy* and *Cradle-to-Cradle* design (McDonough & Braungart, 2002). Each of these perspectives work together to support the CE's development as a multi-level, multi-actor systems framework by forming its intellectual foundation (Lüdeke-Freund et al., 2019; Geissdoerfer et al., 2017).

In this context, a change in the system at many societal and economic levels is necessary to adopt a circular economy, and the transition towards circularity can be implemented through three different and independent levels: macro, meso and micro-level (Kirchherr et al., 2017).

At the macro-level, the focus is on supranational, national, regional and local scale, such that governments play an important role in determining the structural conditions for circularity. This involves creating regulatory frameworks, incorporating circular principles into public policy, infrastructure investment and urban planning, and promoting economic tools that support these initiatives, such as Extended Producer Responsibility, tax incentives, eco-design standards and circular public procurement. The macro level additionally covers initiatives that align the circular transition with global policy agendas such the UN Sustainable Development Goals (SDGs), especially

SDG 9 (Industry, Innovation, and Infrastructure), SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action) (UN SDGs, 2015).

At the meso-level the focus is on the organizational and inter-organizational scale, such as supply chain networks, business clusters and eco-industrial parks. By sharing by-products, utilities and logistical systems, businesses work together across value chains to maximize resource flows, minimize material inputs and outputs and promote industrial symbiosis. In order to promote collaborative innovation and the redistribution of economic and environmental responsibilities among producers, suppliers and partners, circular value chains can be planned and executed at the meso-level (Chertow, 2000).

In last, the attention is on micro-level individual actors, including businesses, designers, entrepreneurs and customers. At this level, significant strategies are implemented regarding the design of goods and services, manufacturing processes, business model innovation, consumer behavior and care for the dying. Businesses should redesign items for durability, reparability and recyclability, while consumers can influence the system through sharing platform participation, reuse and sustainable consumption decisions. At this stage, the CE activities and strategies take on a physical form, demonstrating a shift in organizational and technology characteristics together with a change in behavior and culture (Bocken et al., 2016).

If companies have the goal of successfully implement circular economy principles and strategies, they should reconsider how they create, deliver and collect value, particularly at the micro-level. This generate the development of business models for the circular economy (CEBMs), which are often based on the concept of closed-loop supply chains (CLSCs).

In the context of circularity, waste can be greatly decreased by redesigning goods, production processes and supply chains to keep materials flowing continually within a closed loop. Closed-loop supply chains are *the design, control, and operation of a system to maximize value creation over the entire life cycle of a product with dynamic recovery of value from different types and volumes of returns over time* (Van Wassenhove & Guide, 2009).

This illustrates how fundamental it is to manage product returns, take-back programs and logistics, and remanufacturing strategically, in order to minimize environmental impact and maximize resources and goods' value extraction (Genovese et al., 2017). By recovering products, materials, and components at the end of their life cycle and reusing them in new production cycles, CLSCs aim to reduce waste and the use of virgin resources (Genovese et al., 2017). This is where the business model come into play: business model innovation is crucial to creating a circular economy (De Angelis, 2016), but this topic has only lately started to receive much attention in the academic literature. Consequently, creating efficient CEBMs is a major obstacle for businesses looking to switch from a

linear to a circular model and is essential to making the circular economy workable and profitable (Geissdoerfer et al., 2018).

In relation to this, design is crucial for the successful implementation of the circular economy. Many of today's infrastructures, processes and products were designed for a linear economy, which takes raw materials, transforms them into products with a short lifespan and, then, discards them after usage.

The circular economy's main objective consists in entirely eradicating waste by integrating circularity into design strategies, encouraging the creativity and the generation of long-term value while preserving resources like labor, energy and materials over a variety of life cycles. To do so, it is necessary to rethink about the creation and preservation of value not only using circular methods, but also technological advancements.

The *9Rs Framework* offers nine types of circular strategies in a context of increasing circularity (Potting et al., 2017). Starting with Refuse, it makes it possible for businesses avoid materials or products that are superfluous or dangerous for the environment, substituting them with different and less dangerous alternatives. Rethink includes rethinking companies' business models, shifting in the direction of alternative solutions, like shared mobility and service-based business models. Reduce improves resource efficiency reducing the quantity of energy and materials used both in production and consumption phases. Furthermore, if repair, refurbishment and remanufacturing restore or improve products and components to prolong their lifespan, Reuse allows items that are still functional to be used again for the same purpose. Recycling, on the other hand, is able to turn waste into secondary raw materials, but with the embedded value that is usually lost in the process. Lastly, Recover entails removing input and raw materials or energy from waste when recycling or reuse are no longer feasible.

In parallel with the *9Rs*, the *ReSOLVE* framework, created and developed by the Ellen MacArthur Foundation, offers a practical guide for the organizations that aim to implement circular strategies (Ellen MacArthur Foundation, 2013). It promotes the use of renewable energy and inputs, ecosystem restoration and the opportunity to return of biological materials to the biosphere. This is possible substituting non-renewable and hazardous inputs with bio-based materials that safely break down in the environment, like biochemicals and bioplastics. Share consists of increasing and maximizing asset utilization through sharing platforms and servitization, such as car-sharing or leasing models, to extend product lifespans and lessen the need for new manufacturing, while Optimize aims to increase efficiency by reducing waste from both the manufacturing process and the product's use stages. To meet the production system's demand for renewable resources, Loop make it possible for companies to collect, store, and return materials for recycling, remanufacturing, or reuse. Moreover, the

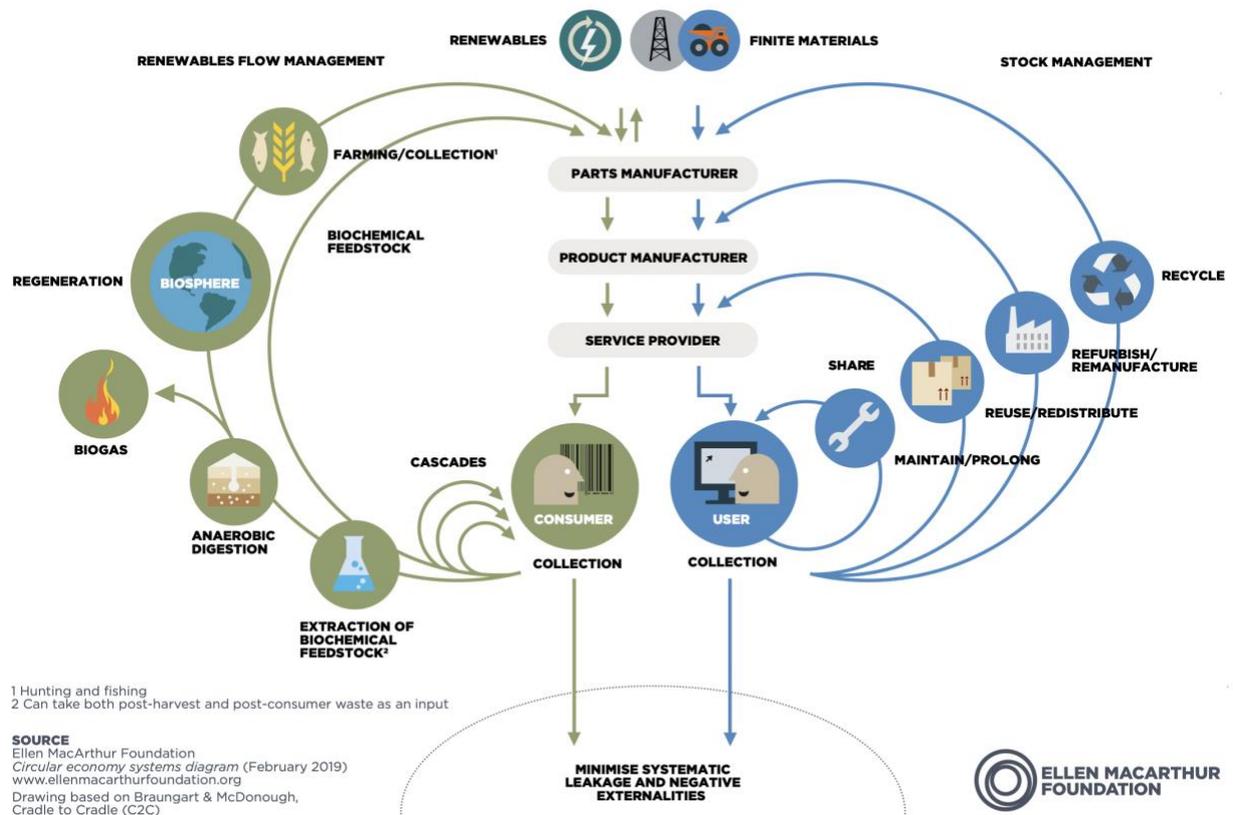
process of switching from in-person to online shopping or from paper documents to cloud storage is known as Virtualization. Finally, Exchange concerns the opportunity to adopt and generate innovative goods, technologies, and business practices that go against the traditional production-consumption paradigm, such as renewable energy sources, electric vehicles and 3D printing.

Additionally, the *Butterfly Diagram*, known also as the *Ellen MacArthur Foundation's Circular Economy Systems Diagram*, provides a visual and systemic representation of the key concepts and processes of the circular economy. It illustrates the flow of materials through two different, separate but related cycles: technical and biological. The biological cycle, shown on the left side of the diagram, includes materials that can be safely returned into the biosphere through, for instance, anaerobic digestion, composting, and cascading usage. These renewable inputs can be used and regenerated by natural systems (Ellen MacArthur Foundation, 2013; Geissdoerfer et al., 2017).

The right side of the diagram represents the technological cycle, which demonstrates how limited resources (such as metals, polymers and synthetics) can be recycled, remanufactured, reused and repaired, in order to move through the economy. By prolonging the value and integrity of materials, each of these loops aims to lessen the need for the extraction of virgin resources and the associated environmental harm (Stahel, 2016; Rockström et al., 2009). To ensure that materials are either safely reintegrated into the environment or efficiently cycled through industrial processes, the Butterfly Diagram highlights how crucial it is to match the physical properties of the materials used with the design of products and systems. It also draws attention to the significant problem of system leakage, which puts the circular system's economic and environmental efficacy at risk in the event that recovery mechanisms fail or when infrastructure and design are subpar (Kirchherr et al., 2017).

Because their actions, such as sharing, repairing and returning goods, are necessary to ensure a constant flow of inputs and reduce leakage, users and consumers are crucial to this model (Lewandowski, 2016; Bocken et al., 2016).

In the end, the Butterfly Diagram supports the systems-thinking methodology at the heart of the circular economy in addition to putting the theoretical foundations of circularity into real-world applications, illustrating how infrastructure, human interaction, product design and material flows must all work together to create a robust, regenerative, fully circular economic system (Ellen MacArthur Foundation, 2013; Geissdoerfer et al., 2017).



(Ellen MacArthur Foundation, 2019. *Circular economy systems diagram*)

It is clear from the *Butterfly Diagram's* operations that reverse cycles should be implemented to facilitate the adoption of circular strategies for both materials and products. Adequate processes and infrastructure are required to manage products at the end of their life, classify them appropriately and reroute them along the optimal recovery pathway, which can be recycling, remanufacturing, reuse or repair (Genovese et al., 2017; Guide & Van Wassenhove, 2009). For reverse cycles to be implemented successfully, companies must be able to put up effective post-use logistics, take-back programs and return paths. Manufacturers may develop business structures in which they retain ownership of the products and are responsible for their maintenance, repair and end-of-life management in order to promote durable and circular design. Additionally, the design process needs to take into account both the type and quality of inputs. For example, the circular economy promotes the use of green inputs and renewable energy in order to reduce its environmental impact and eliminate its need on virgin raw materials. Consequently, in a circular economy environment, when selecting input, companies should give priority to biological nutrients, such as biodegradable organic components that can be safely released back into the environment, and technical nutrients, such as recyclable metals and polymers that may remain in closed loops without losing quality. Instead of merely lowering the use of hazardous materials, the goal is to choose systems and materials that provide value, are safe by design and adhere to ecological principles. Above all, there is no one-size-fits-all solution or

predetermined direction to circularity. Every business, sector and region must design its transition process based on its structure, supply chains, stakeholder ecology, and competencies. Circular transformation is a gradual, iterative process that spreads throughout company functions over time. The circular economy, according to Lacy and Rutqvist, is about doing good by design as opposed to doing *less bad*. It calls for a shift in thinking, where success is now measured not only by efficiency or profit but also by a product's ability to restore value, advance societal well-being, and operate within the constraints of the planet (Lacy & Rutqvist, 2015). Finally, rethinking our economy through the application of circular design principles is a deliberate and essential paradigm shift that fosters a more resilient, inventive, and sustainable future.

In conclusion, the circular economy can be implemented by individuating several action points throughout the value chain (Prieto-Sandoval et al., 2018).

Function	Action point
Take	<ol style="list-style-type: none"> <li>1. Stop using toxic and non-sustainable materials.</li> <li>2. Select raw material and supplier based on green image.</li> <li>3. Use fully recoverable materials.</li> <li>4. Ensure process and product transparency.</li> </ol>
Make	<ol style="list-style-type: none"> <li>5. Educate employees on sustainability issues.</li> <li>6. Minimise the environmental impact by resource optimisation.</li> <li>7. Use of sustainable energy sources.</li> <li>8. Adopt eco-design and zero waste production processes.</li> </ol>
Distribute	<ol style="list-style-type: none"> <li>9. Optimise stock, routes and space for both forward and reverse logistics.</li> <li>10. Collaborate with stakeholders for commitment.</li> </ol>
Use	<ol style="list-style-type: none"> <li>11. Communicate green attributes, for example, eco-labelling and zero waste certification, with customers and end-users.</li> <li>12. Adopt green marketing strategy, market segmentation and product system services.</li> </ol>
Recover	<ol style="list-style-type: none"> <li>13. Implement effective and efficient reuse and recycle system.</li> </ol>

(CE implementation action points. Dey et al., 2020 and Prieto-Sandoval et al., 2018)

After outlining the circular economy's theoretical foundations, guiding principles and strategic frameworks, it is now possible, in the next paragraph, to investigate how these concepts are being implemented in specific sectors. The fashion industry stands, among them, as an important and representative example (Sandin & Peters, 2018).

## **2.2 Application of Circular Economy Strategies in the Fashion Industry**

Given its enormous environmental impact, complicated global supply chains and rapid consumption patterns, the textile and apparel sector has become both a critical challenge and an opportunity for the application of circular economy principles (Ellen MacArthur Foundation, 2020). CE strategies, in this industry, have gradually evolved from theoretical discussions to concrete innovations in supply chain design, business models, technology and consumer engagement strategies (Bocken et al., 2016).

A fundamental rethinking of value creation, based on the regenerative potential of circular loops, is at the core of this transformation, with the aim of reducing the sector's impact (Ellen MacArthur Foundation, 2021).

Closing material loops across production and consumption stages, minimizing resource input, and extending the lifecycle through reuse, repair, remanufacturing, upcycling, recycling and design for durability are the key CE strategies, which collectively aim to reduce dependence on virgin resources as well as avoiding to waste textiles in landfills (Ellen MacArthur Foundation, 2021; Sandin & Peters, 2018).

Among these strategies, Reuse and Recycle are the most widely implemented. In particular, both the strategies make it contribute to reduce the demand and use of virgin textiles fibers (Sandin & Peters, 2018).

In particular, textile Reuse not only prevents the negative environmental impacts of raw material extraction and manufacturing, but this approach also effectively reduces the need for new production (Bocken et al., 2016).

In fact, Reuse can be described as the extension of the useful life of garments by transferring them to new users through various forms: from informal exchanged to aimed business models, such as libraries and resale platforms, and with or without prior modifications (Fletcher & Tham, 2019). To implement these exchanges mechanisms such as second-hand markets, renting, swapping or donation are used (Fletcher & Tham, 2019).

As a consequence, because it avoids the production of virgin fibers as well as the downstream industrial processes usually required to transform raw materials into finished garments, textile Reuse is becoming more and more acknowledged as one of the most environmentally beneficial circular strategies. It may significantly reduce the environmental impact of the apparel life cycle, especially when it prevents the premature disposal of technically functional clothing (Sandin & Peters, 2018).

The rise of second-hand and resale platforms like Vestiaire Collective, thredUP, Depop and Vinted is an outstanding and practical example of a reuse strategy within the framework of the circular economy. By allowing customers to purchase, trade and resell used clothing, these online marketplaces significantly extend the useful life of clothing items (Vestiaire Collective, 2023). Such

platforms contribute to minimizing the fashion industry's environmental impact through enabling the recirculation of clothing that would otherwise be thrown away. This is especially true when it comes to reducing the need for energy-intensive production processes and the demand for virgin raw materials. According to the Ellen MacArthur Foundation, these models are among the fashion industry's most scalable and instantly visible applications of circular business logic (Ellen McArthur Foundation, 2021).

This opinion is corroborated by academic research: peer-to-peer exchange and resale systems are seen as important developments in sustainability-focused innovation in the fashion sector (Sandvik & Stubbs, 2019). Second-hand marketplaces serve as an excellent example of how digital technologies and consumer-driven involvement can operationalize reuse in a way that aligns business models with environmental goals (Abbate et al. 2022).

Complementary to Reuse is textile Recycling (established more in the form of downcycling). In Europe, about the 15-20% of disposed post-consumer waste textiles are collected, while the remaining part is incinerated or landfilled. Of this 15-20%, the 50% is downcycled while the other 50% is reused, mainly in developing countries (Sandin & Peters, 2018).

From the average data reported, it is possible to individuate some differences among different countries in Europe: such higher recycling levels are reported by, for example, Germany and Denmark (Sandin & Peters, 2018).

In general, textile recycling can be divided into three processes: mechanical, chemical and thermal, and each of them has unique benefits, limitations and sustainability implications. Sandin and Peters argue that assessing these processes' viability and environmental potential at scale requires an understanding of them through a nuanced typology (Sandin & Peters, 2018).

The most common and well-established type of recycling is mechanical recycling. It involves cutting, shredding, carding and re-spinning post-consumer or post-industrial textile waste into new fibers, in order to transform them into new yarns or fabrics. Even if it is the most used method, it often ends in material deterioration and fiber shortening, which makes it more appropriate for creating lower-quality products like industrial rags, padding, and insulation. The mechanical recycling often ends up in *downcycling*, which is a phenomenon that diminishes the material's initial value and usefulness and where recycled materials are used in lower-value applications (Sandin & Peters, 2018).

Although downcycling is better than landfilling or burning, it only partially fosters circularity and does not preserve the full material value of textiles, especially when the final products do not re-enter the fashion value chain (Sandin & Peters, 2018).

Stella McCartney, a well-known supporter of eco-friendly luxury fashion, represents a valid example of mechanical recycling in a few of its most recent collections, that utilize cashmere and wool that

have been mechanically recycled. To ensure quality control of the fibers used to produce its textile products, the brand collaborates with certified textile recycling facilities and supports closed-loop systems using pre-consumer textile waste from its own production (WRÅD, 2020; Stella McCartney, 2023).

Even though mechanically recycled wool and cotton have often to be mixed with virgin fibers to preserve fabric integrity, the Swedish fashion brand Filippa K, which is renowned for its commitment to sustainable and circular principles, is a useful example of a brand that has also introduced clothing made only from these materials. For instance, the brand's *Front Runners* collection is an exhaustive example of how low-impact practices, traceable supply chains and mechanical recycling can all be used to reduce environmental pressure without compromising on aesthetic or functional quality (Filippa K, 2023).

At the opposite of downcycling, upcycling is the process that consists in using waste materials to create new goods that are more valuable than they were in their original state. In textiles, this frequently entails creative design approaches or cutting-edge processing techniques that improve the recycled output's appearance or functionality. Upcycling is becoming more popular due to new technologies, particularly in the area of chemical recycling, even though it is still less common than downcycling (Sandin & Peters, 2018). By dissolving cellulosic fibers like cotton or viscose into their chemical components, and depolymerizing synthetic fibers like polyester, this technique breaks down fibers at the molecular level. These molecular constituents are subsequently reconstituted to create new, superior fibers that are as durable and aesthetically pleasing as virgin materials. Because of this, chemical recycling has a lot of potential for textile-to-textile regeneration. It is especially useful for processing blended fabrics, whose heterogeneous composition makes mechanical recycling challenging.

Chemical recycling offers a far higher potential for true textile-to-textile regeneration than mechanical methods because it allows high-quality fibers to be recovered from otherwise non-recyclable textile waste (Sandin & Peters, 2018). This process typically involves the depolymerization of synthetic fibers, such as polyester into their monomeric forms, or the dissolution of natural cellulosic fibers like cotton and viscose in order to produce regenerated fibers that are comparable to virgin materials. One of the main advantages of chemical recycling is its ability to disassemble and recycle complex textile blends, which are a common issue in the fashion industry, such as cotton and polyester, which are difficult or impossible to separate mechanically. Chemical recycling technologies are currently being expanded and used by a number of fashion brands and tech companies. For instance, Patagonia is collaborating with Infinited Fiber Company, a Finnish biotech company that makes *Infinna*, a regenerated fiber generated by converting used cotton fabrics into a cellulose-based fiber that has the

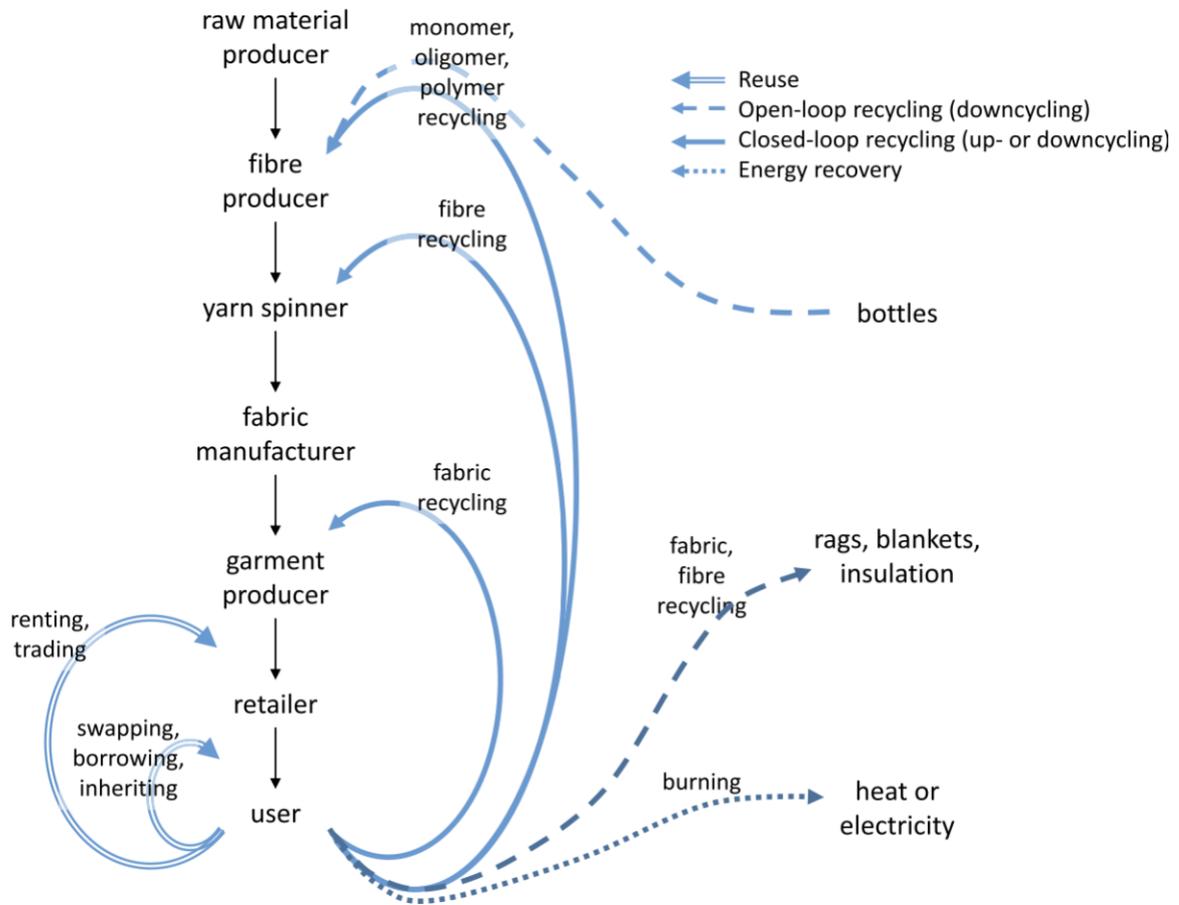
texture and appearance of real cotton, proposing it as a possible substitute for synthetic and virgin cotton.

Other practical examples can be represented by businesses such as Eastman's *Naia Renew*, a fiber made by chemically recycling wood pulp and plastic waste, and Worn Again Technologies, which is creating solutions for polyethylene terephthalate (PET) and cellulose fiber blends.

Although it is less common in textile-to-textile applications, thermal recycling turns synthetic materials, particularly PET, into fibers. As demonstrated by Adidas's *Parley for the Oceans* line and Ecoalf's initiatives, thermal recycling is widely used to transform PET bottles into polyester textiles like, for example, *rPET*. While, properly managed, thermal recycling processes can preserve polymer quality, they are generally unsuitable for clothing that are made of various fiber types, and repeated heat cycles can weaken the integrity of the fibers. Furthermore, thermal recovery (also known as incineration for energy generation) is not regarded as recycling under CE principles because of its irreversible nature and loss of material value, but thermal recycling is frequently confused with it (Sandin & Peters, 2018).

Moreover, Sandin and Peters proposed a typology based on the level of material disassembly to enable a more comprehensive understanding of these recycling strategies: monomer recycling, which completely breaks down fibers into their basic chemical components, fabric recycling, that preserves entire textile structures, fiber recycling, consisting in retains individual fibers, and polymer and oligomer recycling, which maintains molecular chains (Sandin and Peters, 2018). This classification makes it possible to evaluate recycling technologies more thoroughly, taking into account trade-offs between resource efficiency and environmental impact in addition to technical capability.

Although downcycling still occurs in the majority of textile recycling systems today, improvements in fiber separation, sorting (for example, using infrared spectroscopy) and chemical processing are making upcycling and closed-loop systems more feasible. By preserving or even improving the material qualities of recycled fibers, these techniques are able to reduce dependency on virgin materials and promote the creation of premium recycled clothing. Despite this, systemic issues still exist: the infrastructure for large-scale collection and treatment is underdeveloped in many regions, blended textiles are still challenging to separate, and clothing trims, finishes and coatings need to be removed prior to processing (Sandin & Peters, 2018; Saha et al., 2022).



(A classification of textile reuse and recycling routes. G. Sandin, G.M. Peters, 2018)

The fashion industry's shift to a circular economy business models requires a more comprehensive practical and strategic change to support the adoption of product reuse and recycling practices. One of the most critical enablers in this regard is design for circularity, which plays a foundational role in determining both the durability and recyclability of garments from their inception. Clothing can be effectively reused or recycled at the end of its life if strategic design choices are made, such as using mono-materials, avoiding hazardous dyes and chemical finishes, using modular construction to make disassembly easier, and integrating digital product passports.

Furthermore, up to 80% of a product's environmental impact over its lifetime can be influenced by design choices made early in the development process (Sandvik and Stubbs, 2019), while according to academics like Earley and Goldsworthy, the fundamental principles of slow fashion promote classic styles and high-quality materials that prolong the life of clothing (Earley and Goldsworthy, 2016). This philosophy is easy to understand through the example of businesses such as Asket, Nudie Jeans and Eileen Fisher, that create durable and readily repairable clothing from recyclable and traceable materials. Instead of using circular design techniques merely as marketing tools, these companies have adopted circularity as a basis of responsible product development that seek to

separate economic growth from resource consumption. The implementation of effective reverse logistics systems which facilitate the collection, sorting and reintegration of used textiles into reuse or recycling loops, is another pillar of circularity. Reverse logistics is still not adequately developed despite its significance. In Europe, only about 20% of textile waste is collected for recycling or reuse, with the remaining portion going to landfills or incineration (Sandin & Peters, 2018). Both consumer involvement and logistical coordination are necessary to close this gap. Important industry examples are the take-back initiatives established by The North Face, MUD Jeans and Arket, which encourage consumers to return used apparel for recycling or reuse. In parallel, international collection and sorting platforms such as I:CO (I:Collect) have partnered with major retailers like Levi's, C&A and Intimissimi to create global networks that manage post-consumer textile flows and support closed-loop initiatives (Sandvik & Stubbs, 2019). These systems demonstrate how, when done properly, reverse logistics can be extremely important in enabling circular fashion systems.

Technology is another dominant enabler of circularity, particularly in addressing problems related to material identification, contamination and sorting, that have historically prevented efficient textile recycling. For example, infrared spectroscopy offers an accurate fiber classification and promotes more accurate textile blend separation, according to Riba et al (Riba et al., 2023). Furthermore, digital innovations like blockchain, artificial intelligence and digital product passports enhance supply chain transparency, authentication and products traceability (all essential elements of effective circular material flows). These tools allow stakeholders and businesses to monitor and follow clothing over its lifecycle, support extended producer responsibility and facilitate the sorting and recycling processes. However, widespread adoption still requires industry-wide adoption, interoperable data systems, and the development of common standards (Sandvik & Stubbs, 2019).

The creation of cooperative ecosystems across the textile value chain is also very important to the realization of circularity in fashion. Designers, material suppliers, recyclers, brands, logistics companies, legislators and consumers must all actively participate in the circular transformation process. Through the facilitation of access to shared infrastructure, research funding and collection systems, partnerships amongst municipalities, research institutions, and industry actors in Scandinavia have greatly enhanced textile-to-textile recycling, as noted by Sandvik and Stubbs (Sandvik & Stubbs, 2019). The role of cross-sectoral collaborations and alliances in the creation and development of industrial-scale new textile recycling technologies and business models has also been demonstrated by EU-funded projects like *RESYNTEX*. These collaborative platforms foster creativity and assist companies in managing most common obstacles to circular implementation.

Fashion's shift to a circular economy also calls for redefining value creation through innovative circular business models. Businesses can prolong product lifespans while maintaining ownership and

accountability over their material resources by implementing models like product-as-a-service (PaaS), rental and subscription systems, repair and refurbishment services and product buy-back and resale. As an example, VIGGA uses a subscription-based rental model that enables parents to use premium clothing for brief periods of time before returning it for further use. Similar to this, Filippa K has introduced a clothing leasing model in a few markets, allowing customers to wear clothes for a predetermined period of time at a reduced cost and with less of an adverse effect on the environment. In addition to reducing material throughput, these circular business models create new sources of income, encourage brand loyalty, and match consumption patterns with environmental objectives (Sandvik & Stubbs, 2019).

Emerging regulatory frameworks aimed at institutionalizing circular practices complement these operational and business innovations. The Extended Producer Responsibility development, mandatory eco-design requirements, and minimum recycled content thresholds are some of the policy tools suggested by the *European Union's Strategy for Sustainable and Circular Textiles* (European Commission, 2022). These tools are all intended to hold manufacturers responsible for the entire lifecycle of their products. By internalizing the environmental externalities of textile production, these regulatory actions encourage innovation and guarantee fair competition for both established businesses and circular pioneers.

Furthermore, organizational drivers play an essential role in this changing environment. With the aim of saving costs, reducing risks and enhance reputation, brands are proactively integrating circular principles into their operations. With this goal, cross-functional teams, specialized sustainability departments and internal leadership commitment are essential for coordinating supply chain logistics, procurement and product design with CE objectives. Additionally to this, organizations can track their progress and make data-driven decisions by integrating lifecycle assessment tools with circular KPIs. In this dynamic environment, organizational drivers are critical. Brands are actively incorporating circular principles into their operations due to the potential for cost savings, risk reduction and reputation enhancement.

Finally, customer drivers are playing an even greater part in accelerating the adoption of CE. Market demand is changing as a result of consumer values shifting toward sustainability, transparency, and ethical production. Customers expect brands to show environmental responsibility and provide circular services like product repair, resale or rental as they become more knowledgeable and empowered thanks to digital tools. This change in behavior, especially among younger generations, puts pressure on the market and gives circular-first brands a competitive edge.

In summary, a coordinated effort involving product design, reverse logistics, enabling technologies, cooperative partnerships, business model transformation and regulatory support is needed to establish

a circular economy in the fashion sector. Circularity can be achieved through a number of pilot projects and creative business strategies, but widespread adoption necessitates systemic coordination, large infrastructure and technology investments, and a change in consumer behavior. These enabling tactics work together to create a resilient and regenerative textile system that can balance economic feasibility with environmental stewardship.

### **2.3 Barriers to the adoption of CE Strategies within the Textile and Fashion Industry**

Although the fashion and textile industry is becoming more interested in circular economy, a complicated network of interconnected technical, organizational, economic, institutional and behavioral barriers (Abbate et al., 2022) continue to impede the adoption of circular business models (Geissdoerfer et al., 2017).

More in detail, at the organizational level, one of the most evident issues is that most of the fashion companies still operate under linear business models, which are designed for quick inventory turnover, economies of scale and low-cost production (Bocken et al., 2016). Many fashion brands lack the internal resources and skills necessary to redesign their product portfolios and supply chains around circular principles like recyclability, durability and reparability (Energies, 2023). Businesses frequently experience high switching costs, organizational inertia and short-term financial pressures that deter investment in circular innovations (Abbate et al., 2022; Franco, 2017). Moreover, without metrics and performance indicators to measure circularity, it is difficult for businesses to benefit from the advantages of their circular strategies or effectively communicate them to stakeholders (Ellen MacArthur Foundation, 2017).

In addition, even when companies make an effort to incorporate circular practices, they frequently only do so as pilot projects rather than becoming ingrained in the main business model (Sandvik and Stubbs, 2019).

Moreover, the intrinsically low value of the majority of discarded textiles is one of the most enduring economic obstacles to the adoption of circular economy practices in the fashion industry. The majority of clothing is composed of inexpensive materials like cotton and polyester, whose marginal value barely covers the expenses of gathering, classifying, disassembling and recycling them (Sandin & Peters, 2018). In contrast, end-of-use products in high-value industries like electronics and the automotive sector retain a substantial amount of recoverable value, supporting recycling systems that are profitable (Kirchherr et al., 2018). The labor- and resource-intensive nature of processes such as sorting, disassembly and material recovery (tasks that are frequently manual and that require of skilled labor and creative input, particularly in the case of upcycling, which aims to generate higher-value outputs) complicates the economics of textile recycling even more. These procedures

are challenging to implement and hard to automate, which raises operating expenses and reduces profit margins (Sandin & Peters, 2018).

According to the *Energies* study of 2023, external market factors such as changes in the price of raw materials globally, erratic demand for recycled fibers and the volatility of second-hand markets compromise the economic viability of recycling operations in the textile and fashion industry (Abbate et al., 2023). In this regard, many circular initiatives are not economically possible due to the lack of direct public subsidies or regulatory incentives, as well as the absence of fiscal tools, such as lower VAT on repair or resale services (Kirchherr et al., 2018). In this context, brands face significant financial obstacles even if they are open to implementing business models centered on reuse, repair or rental. In contrast to the effective, low-cost production cycles of fast fashion, such infrastructures have high operating costs and frequently produce thinner profit margins (Wójcik-Karpacz et al., 2023).

In addition, financial incentives for producers and consumers to adopt circular behavior are particularly lacking (Kirchherr et al., 2018). From the producer's point of view, meaningful transition is hampered by the absence of standardized accounting frameworks to measure the long-term value of CE strategies, restricted access to green financing and a lack of subsidies for circular investments (Abbate et al., 2023). In contrast to fast fashion's low prices and convenient accessibility, consumers often view circular options like resale, rental or repair as more costly, time-consuming and inconvenient (Kirchherr et al., 2018). Additionally, the conflict between durability and disassemblability leads to another financial challenge: clothing made for prolonged use is usually more complicated and durable, which makes it more difficult to disassemble at the end of its useful life and increases recycling costs and lowering the overall economic efficiency (Sandin & Peters, 2018).

From a regulatory and institutional point of view, the fashion industry still lacks a strong and unified regulatory framework that could promote the broad implementation of circular economy principles (Kirchherr et al., 2018). The majority of policies are still voluntary, dispersed, and insufficient to effect systemic change, despite the aspirations outlined in initiatives like the *European Union's Strategy for Sustainable and Circular Textiles* (European Commission, 2022). In contrast to other industries, like electronics, which are subject to legally binding regulations such as the *Waste Electrical and Electronic Equipment (WEEE) Directive*, the textile and apparel sector is still operating without enforced take-back obligations, Extended Producer Responsibility programs or mandatory requirements for minimum recycled content (Abbate et al., 2023).

In addition, earlier researchers have shown that investments in circular strategies, innovation and methodologies in the long term are deterred by the precarious policy context where there are frequent

and unpredictable amendments in national waste legislation (Kirchherr et al., 2018). Regulatory uncertainty complicates the development of strategic plans by businesses and eases pressures from competitors who become less inclined to behave morally. As a result, firms are generally left on their own to manage the challenging transition towards circularity without adequate institutional or financial support (Sandin & Peters, 2018).

Furthermore, the majority of fashion companies lack the organizational structures and internal capabilities for circular systemic change, especially those that operate in the fast fashion model (Kirchherr et al., 2018). Integrating CE principles into fundamental business strategies is hampered by short-term financial strains, organizational inertia and a lack of performance metrics to assess circular progress (Abbate et al., 2023). The lack of cross-departmental coordination and inadequate channels for informing external stakeholders of the financial and environmental advantages of circular initiatives exacerbate these internal constraints (Sandin & Peters, 2018).

Significantly important for the adoption of circular economy strategies in the fashion and textile industries technical barriers, especially the extensive use of blended textiles, including polyester-cotton, polyamide-elastane and other composite textile combinations (EMF, 2018). These material blends represent significant challenges to end-of-life recycling, despite their benefits for comfort, durability, elasticity and performance (Sandin & Peters, 2018). The fiber separation technologies that are currently in use are still expensive, energy-intensive, and far from being widely scalable or economically feasible (Sandvik & Stubbs, 2019). This compositional complexity significantly restricts the applicability of both mechanical and chemical recycling processes (Sandin & Peters, 2018). Most of the time, these procedures result in downcycling rather than actual textile-to-textile regeneration, where materials are transformed into lower-value uses like industrial rags, padding, or insulation without maintaining the quality and functionality of the original fibers (Downes et al., 2021).

The challenge of disassembling clothing, especially that made for durability, aesthetic appeal, or functional complexity, exacerbates the problem of fiber blends (Sandvik & Stubbs, 2019). Reinforced seams, metal trims, plastic parts, linings, buttons, zippers, adhesives and several layers are all common features found in clothing (Sandin & Peters, 2018). In a linear system that prioritizes mass production and quick consumption, these components improve a garment's usability and aesthetic appeal, while, in a circular system, they generate serious challenges to recycling practices. Processing time and expense are increased when their removal necessitates manual labor or specialized automated systems (Sandvik & Stubbs, 2019). The purity and reusability of reclaimed materials can also be decreased by adhesives and finishes that are frequently used in fast fashion because they can

contaminate recycling streams or obstruct fiber recovery procedures (Sandin & Peters, 2018), reducing the usability of reclaimed materials.

Chemical recycling, which enables the molecular depolymerization and regeneration of fibers, is one of the most adapt and promising developments to overcome these technological obstacles (Sandin & Peters, 2018). When dealing with intricate or blended textiles that are inappropriate for mechanical processes, this method works especially well (Sandvik & Stubbs, 2019). In order to achieve closed-loop production systems, companies like Patagonia, through partnerships with Infinited Fiber Company, and H&M, in partnership with Renewcell, are actively piloting chemical recycling initiatives (EMF, 2017). The potential of this strategy to replace virgin cotton and polyester on a large scale is demonstrated by the notable integration of regenerated fibers, like *Infinna*, made by Infinited Fiber Company, into commercial collections (Abbate et al., 2023).

However, Sandvik and Stubbs point out that a number of important factors continue to limit the viability of chemical recycling. These include the requirement for extremely pure input streams, the difficulty of eliminating trims, finishes, and dyes, and the high cost of scalable infrastructure (Sandvik and Stubbs, 2019). A consistent infrastructure is necessary to effectively practice the chemical recycling, including practices like sophisticated sorting and pre-processing systems (Sandin & Peters, 2018). The process is made much more difficult by the presence of synthetic coatings, blends, and contaminants, which calls for the use of advanced technologies like robotic sorting, infrared spectroscopy, digital product passports, and embedded RFID tags to guarantee material purity and consistency in quality (Sandvik and Stubbs, 2019). Despite providing useful support, these technologies are still underutilized and frequently only reach the pilot or demonstration stage (Sandin & Peters, 2018). Chemical recycling should therefore be viewed as one element of a larger plan that calls for systemic innovation, funding, and legislative backing.

The current lack of infrastructure that are able to support effective and high-quality post-consumer textile collection, sorting, and reverse logistics further exacerbates the recycling challenges (EMF, 2017). While new technologies like digital product passports, hyperspectral imaging and near-infrared spectroscopy provide promising tools for fiber identification and traceability, their use is still restricted. As a result, insufficient investment in sorting facilities, a lack of standardized sorting protocols, and inadequate databases on textile compositions all hinder material recovery (Abbate et al., 2023). Approximately 87% of textiles still wind up in landfills or incinerators after being used, and less than 1% are successfully recycled back into new clothing, according to the Ellen MacArthur Foundation (Ellen MacArthur Foundation, 2021). This indicates the systemic inefficiency in the way end-of-life management is currently handled (Sandin & Peters, 2018).

Insufficient traceability, logistical inefficiencies and contamination of material streams are caused by the complexity of post-consumer textile flows, which are frequently distributed across regions and collected through inconsistent systems (Sandin & Peters, 2018). Furthermore, pre-consumer waste, such as production scraps and unsold inventory, is frequently more suited for textile recovery infrastructure because it is cleaner, more uniform, and simpler to sort (Abbate et al., 2022). On the other hand, post-consumer waste is much more difficult to recycle efficiently and economically due to its greater variability in fiber composition, wear and tear and contamination (Sandin & Peters, 2018).

In order to overcome these technological obstacles, Sandvik and Stubbs affirmed that significant adjustments and improvements must be made to the way fashion products are created, sourced and distributed (Sandvik & Stubbs, 2019). Some strategies must be implemented in conjunction with technological solutions, such as switching to mono-material clothing, avoiding intricate trims, designing for disassembly and incorporating traceability systems into the design process (Downes et al., 2021). However, many businesses, especially those in the fast fashion industry, are structurally and culturally unprepared to adapt to these changes, which frequently call for drastic and disruptive changes in supply chain management, procurement procedures and products production and development (Kirchherr et al., 2018).

Lastly, a major obstacle to the fashion industry's adoption of circular economy practices is consumer behavior and awareness (Abbate et al., 2022). Fast fashion has drastically shortened the average product's useful life and fostered an overconsumptive culture. According to Abbate et al., during the past 15 years, clothing use has dropped by 36% globally and by up to 70% in countries like China (Abbate et al., 2022). Circular practices like reuse, repair, rental, and resale are incompatible with the deeply ingrained behaviors of this fast-paced consumption model (Kirchherr et al., 2018).

Despite a steady rise in environmental consciousness, there is still a significant disconnection between awareness and action (Abbate et al., 2022). Product-as-a-service, clothing rental, subscription services, take-back programs and second-hand shopping are examples of circular models in which consumer participation is still very low, due to practical and psychological obstacles (Sandin & Peters, 2018).

As reported by Abbate et al., consumers frequently express skepticism regarding the aesthetic appeal or trendiness of recycled or reused clothing, as well as concerns about the quality, cleanliness and hygiene of used clothing (Abbate et al., 2022). Many believe that these kinds of things are out of style, socially stigmatized or incompatible with individual identities and fashion goals (Kirchherr et al., 2018).

Furthermore, many customers still have limited or inconvenient access to circular services, also considering how effectiveness and affordability of fast fashion, navigating rental systems, repair services or resale platforms frequently takes more work than just buying new and not very expensive clothing (Sandin & Peters, 2018). Compared to traditional and linear consumption patterns, circular models may be seen as less realistic, aspirational and fulfilling (Abbate et al., 2022). It is challenging to replace the allure of *newness* with ideas of durability or sustainability since the association of value with novelty is still a deeply ingrained cultural norm (Kirchherr et al., 2018).

Kirchherr et al. affirm that while weak or voluntary policy frameworks allow linear production systems to remain competitive, low consumer demand for circular products lessens incentives for businesses to invest in circular business models and infrastructure (Kirchherr et al., 2018). These feedback loops produce structural *lock-ins* that impede the expansion of sustainable alternatives and uphold the dominance of fast fashion (Abbate et al., 2022).

In conclusion, a large number of interconnected obstacles is impeding the fashion and textile industry's shift toward circular economy strategies (Geissdoerfer et al., 2017). The dominance of linear production and consumption models is maintained by a systemic inertia created by each barrier reinforcing the others (Kirchherr et al., 2018). On the one hand, circularity is economically unappealing and operationally difficult due to material complexity, technological constraints, and inadequate infrastructure (Sandin & Peters, 2018).

Nevertheless, the market signals required to bring about systemic change are weakened by the absence of regulatory enforcement, a lack of financial incentives, and a steadfast consumer attachment to fast fashion standards (Abbate et al., 2022). As a result, rather than becoming a crucial part of corporate strategy, circular initiatives frequently stay on the periphery or are experimental. Coordinated, multi-stakeholder efforts are needed to overcome these ingrained barriers (Kirchherr et al., 2018). These efforts should include strong regulatory frameworks, investments in technological and logistical innovation, targeted financial instruments, and extensive education and communication campaigns that aim to change cultural perceptions and consumer behavior (Abbate et al., 2022). The circular economy in fashion runs the risk of staying a fringe practice rather than becoming a driving force for sustainable development in the absence of such an integrated and systemic approach (Geissdoerfer et al., 2017).

## **Third Chapter**

### **3.1 Methodology**

This third chapter describes the target companies interviewed and the methodology used to answer the thesis Research Question.

In order to provide a comprehensive and nuanced understanding of the most implemented circular economy practices in the fashion industry and the main barriers and opportunities that the companies encounter in their development, this study uses a qualitative research methodology.

Although quantitative methods are more commonly used to investigate organizational phenomena, they have been considered as not effective to answer to the study's Research Question. The main goal of quantitative approaches, like surveys and structured questionnaires, is to consistently measure variables across a variety of contexts and landmarks. As a consequence, the quantitative methods work well for testing hypotheses or extrapolating patterns between populations, but they are not suitable for studies which goal is to record complex, context-dependent and emergent phenomena. Fashion's adoption of circular economy practices entails complex interactions between institutional frameworks, supply chain configurations, organizational structures, strategic priorities, technological capabilities, financial limitations and cultural perspectives on sustainability. A strictly quantitative approach, strongly based on numerical indicators and pre-established metrics, runs the risk of oversimplifying the complex dynamics of circularity, distilling deep organizational experiences to superficial metrics and possibly ignoring important enablers, barriers and tacit knowledge ingrained in organizational practices.

Furthermore, quantitative data frequently impede to reach important information, such as the how and why organizational decisions and business strategies are implemented, making it more difficult to deeply understand the mechanisms and the reasons that support or impede the adoption of circular practices.

Due to these limitations of the quantitative approach, this thesis uses a qualitative methodology, serving of semi-structured interviews, with the aim of investigating both the points of view and experiences of both young and innovative brands and well-established players, who are moving forward to integrate or are directly engaged in circularity practices. For this reason, the choice of semi-structured interviews took in consideration their ability to find a balance between structure and flexibility: although predetermined thematic areas guarantee that all pertinent subjects are covered, the format permits participants to go into further detail, draw attention to new problems and offer insights that the researcher may not have foreseen.

This method works especially well for researching the fashion industry, where organizational reactions to the concepts of the circular economy vary greatly depending on the situation.

Those who held positions with operational and/or strategic responsibility for CE and sustainability-related activities within each selected company were the target respondents. CEOs, founders and sustainability managers made up the majority of the actors interviewed because they were thought to be the most qualified to use this method to answer the research question. This made sure that the viewpoints of both operational implementation and strategic decision-making were represented in the data that was gathered. In addition to the official strategies and policies that businesses implement and publicly communicate, it was possible to understand and report on the informal practices, barriers and organizational dynamics that affect the adoption (or non-adoption) of circular initiatives by conducting direct interviews with these actors. All of the interviewees were seasoned experts who could offer in-depth explanations of supply chain constraints, market-related challenges and problems with interdepartmental coordination. Additionally, they could discuss particular case studies and provide information about pilot projects, mistakes and lessons learned. Such a depth of information would not have been possible with structured questionnaires, where the lack of interaction limits the ability to explore emerging themes, resolve ambiguities or capture context-dependent nuances.

Five standardized questions that addressed every subject this thesis seeks to examine served as the guide for the interviews. The first question asked about the CE strategies that each of the brands that were interviewed had implemented; the second inquired about the obstacles that these brands face when creating circular strategies; and the third was relative to the factors and opportunities that have contributed to the expansion of these businesses in the circular fashion industry. The final two questions aimed to dive the participants' professional knowledge and experts. Interviewees were able to relate strategic challenges to operational processes using this paradigm, providing both analytical and descriptive insights.

The interviews have been conducted on online platforms, mostly on Microsoft Teams, and took between twenty and forty minutes. Before they participated, each interviewee received a brief introduction explaining the topic treated, the goal and the importance of the study. Participants were chosen basing on their technical and specific knowledge and practical experience, that have been deemed as relevant to the study's objectives. The admission criteria for enterprises were developed to ensure diversity in organizational maturity, strategic orientation and degree of engagement with the concepts of the circular economy. As a result, the final sample included representatives from both well-known clothing brands and startups. During the interview phase, special attention was paid to interacting with circular businesses, whose practices, such as the use of mono-material apparel, closed-loop recycling systems, disassembly-friendly designs and integrated repair, refurbishment and resale services, offered insights into the structural integration of CE principles. In particular, interviewees from these circular businesses were asked if and how circularity could be successfully

incorporated into fast fashion or linear business models, as well as what barriers and enablers might affect this change.

The Gioia Method (Gioia, Corley & Hamilton, 2012), a structured qualitative methodology intended to improve rigor and transparency in inductive research, was used to analyze the interview data. Rich, explicative and unstructured qualitative data can be methodically transformed, through Gioia Method, into theoretically meaningful constructs, preserving the subtleties of participants' viewpoints while making it ideal for investigating complex organizational phenomena. First-order, second-order and third-order thematic analysis aggregation into broad theoretical dimensions constitutes the three steps of the method. In order to keep participants' sentences and opinions without changing them in any possible manner, center and ensure that the analysis is based on empirical reality, first-order coding records their own words, expressions and concepts. Additionally, second-order themes consisted of grouping and analyzing these first-order codes into higher-level themes that represent trends, connections and conceptual linkages among cases. Ultimately, these themes are combined into aggregate dimensions, or third order themes, which can be described as a framework for understanding organizational phenomena and constitute the study's central theoretical constructs. This iterative coding process made it possible the in-depth comparisons between cases and the discovery of recurrent patterns, differences and emerging themes, and second-order analysis connected first-order codes to more general theoretical categories based on research on organizational change, sustainability and the circular economy. Overall mechanisms, obstacles and opportunities of circularity adoption in the fashion industry were captured by aggregate dimensions. This approach exposed institutional and regulatory gaps, cultural or behavioral variables impacting corporate decision-making, technological constraints in textile recycling, organizational obstacles in cross-departmental integration and market and economic limitations. Additionally emphasized were enablers such as creative circular business models, leadership commitment and the alignment of sustainability initiatives with the primary goals of the organization.

In conclusion, when paired with the Gioia Method, the qualitative approach makes it possible to capture both the diversity of organizational strategies among the various companies and human interpretations of their implementation, including the barriers and the opportunities that make it more or less easy to implement them. Instead of testing theories based on predetermined hypotheses, it makes it easier to develop theories based on empirical data. In this way, it is ensured that the study has been able to capture both formal and informal strategies and practices and context-dependent dynamics that influence the adoption of circular practices in the fashion industry. The thorough responses and information obtained from each participating company provide the empirical basis for analyzing findings and discussing them in Chapter 5. This methodology yields theoretically grounded

insights while preserving a close relationship with the lived experiences of organizational actors, allowing the study to make a practical and scholarly contribution to the understanding of the adoption of the circular economy in the fashion industry.

### **3.2 Company Profiles: a spectrum of Circularity Approaches in the Fashion Sector**

A broad spectrum of companies, from more recent, innovative and pioneering circular startups to established and well-known brands, committed to switching to more sustainable and circular practices, were included in the research sample in order to represent the fashion industry's acceptance of the circular economy.

This comprehensive data gathering approach ensures an accurate and reliable representation of each company's operational environment, sustainability commitment and circular economy strategies. Companies with a range of operating scales, from micro-enterprises to large multinational corporations, distinct market positions, diverse level of maturity under the sustainability point of view and a diversity of business models, such as slow fashion brands and circular startups, were the focus of this sampling technique, allowing for a more detailed knowledge of how the circular economy is integrated into the fashion business.

Because confidentiality is necessary, the respondents' profiles will remain anonymous, while the companies' names, characteristics and main circular strategies will be in-depth described in this paragraph. Multi-source triangulation was used to gather data in addition to the interviews, such as company websites, sustainability reports, press releases, third-party certifications, scholarly and business publications.

Rifò, an Italian sustainable fashion brand established in Prato (Tuscany) in 2016, was the first company to be interviewed. Rifò is a business that focuses on local production, material regeneration and active consumer engagement in sustainable practices. It distributes its goods, more in particular knitwear and accessories, through its e-commerce and the new monobrand stores that have recently been set up in Milan and Prato, and the company's commitment to sustainability and circularity has been demonstrated by the Global Recycled Standard.

The mechanical recycling of wool and other natural fibers like cotton is the mainstay of Rifò's approach and business model: the company collects and shreds clothing from pre- and post-consumer sources, then uses the regenerated yarns to make new products. This strategy drastically lowers the company's need for virgin resources and material inputs and its detrimental effects on the environment. Only in 2024, Rifò produced 69,012 garments, using 12.8 tons of recycled old clothing, amounting about the 79% of the total fibers used (Rifò, 2024). In addition to helping the brand achieve its environmental objectives, the recycling programs show that circular textile production is feasible by lowering the need for new fibers and optimizing the energy and water required in the production

processes. The fact that less than 5% of products remain unsold at the end of each season shows how effectively waste reduction is integrated into the manufacturing process in this type of enterprises. Furthermore, a fully localized supply chain, in which all operations must occur within 30 kilometers of Prato, allows for sustainability, encourages more sustainable and ethic work practices, guarantees a higher quality of products, strongly reduces the emissions associated with transportation and supports the regional textile industry. Moreover, educating customers and building a strong relationship with them are key components of Rifò's circular strategy. The company's pre-order program, also known as *anti-waste presale*, allows customers to purchase the brand's clothes before the manufacturing process begins. This virtually eliminates waste and overproduction by guaranteeing that just the required number of products is produced and automatically sold to the final clients. This circular practice become more attractive because, preordering the goods on the website, the final customers automatically receive a discount on the product's final price.

Another important circular strategy is the *Repair Your Clothes* service, which offers free repairs and advice clients on how to maintain clothing to prolong products durability, encouraging customers to extend the life of their clothing and not influencing them to buy new products.

Furthermore, the *Recycle Your Clothes* campaign additionally promotes circular practices gathering used wool, cashmere, cotton and denim clothing from consumers and, later, converting it through upcycling or mechanical recycling. In addition, Rifò is steadfast in its support of social sustainability. In 2024, the company employed 25 people (68% of them were women) and collaborated with 40 craftspeople across its supply chain. Additionally, Rifò raised 60,125 euro for projects that have a social impact (Rifò, 2024).

Rifò combines environmental responsibility, social impact and consumer involvement to create a comprehensive circular business model that provides a replicable framework for sustainable fashion industry practices.

Progetto Quid, an ethical fashion brand based in Verona, Veneto, was the second company interviewed. With more than one hundred and forty workers, Progetto Quid is a fashion and accessory company that incorporates social inclusion and circular economy concepts, directly into its business model, through co-branding or private labels projects, placing a strong emphasis on local production, material upcycling and social impact, hiring people who are at risk of social exclusion, especially women, and this dedication to environmental and social sustainability is confirmed by certifications like the *Global Recycled Standard*, that attests to the brand's dedication to sustainability.

The main principle of Progetto Quid's business model is utilizing pre-consumer waste and surplus fabrics from the fashion industry's largest brands, in order to create new clothing and accessories, making it possible to minimize the production's environmental impact, especially avoiding the use of

virgin materials and eliminating textile waste. In particular, with its well-organized business model, Progetto Quid is able to largely reduce the waste generated in both the design and manufacturing stages, especially because all the materials used are carefully sourced, optimized and used with the goal of minimizing offcuts.

Moreover, emphasizing resource management and well-done craftsmanship practices, the company's business and production model shows that, integrating recycled materials with scalable fashion production, can be possible and profitable. In addition, especially thanks to its strong partnerships with local artisans and bigger enterprises that donate a large amount of discarded clothes to the company, the company was able, since year 2024, to reach its sustainability goals of closing material loops and encouraging circular consumption.

Furthermore, as previously said, the organization places a particular attention to social sustainability activities, in addition to its environmental initiatives. By partnering with over one hundred Italian and international brands, the company creates economic and social value hiring and training people, especially women, at risk of social exclusion. Additionally to its work, the brand expands its social impact by supporting non-profit organizations, offering clothing to people in need, especially through dedicated donation initiatives, showing how a business model can incorporate sustainability, social responsibility and inclusivity, but also guaranteeing transparency and moral governance thanks to publicly available documents, such as sustainability policies and codes of conduct.

The third business interviewed was ID'EIGHT, a sustainable footwear brand that was established in 2019 by Giuliana Borzillo and Dong Seon Lee in Florence, Tuscany. The brand's sustainability commitment is internationally recognized by certifications like the *Global Organic Textile Standard (GOTS)*, the *Global Recycled Standard (GRS)*, the *Oeko-Tex Standard 100* and the *Animal Free Fashion* label, which collectively ensure transparency and strict adherence to ethical and environmental standards, support the brand's dedication to sustainability (ID EIGHT, 2025). Moreover, ID'EIGHT earned *B-Corp* certification in 2025, demonstrating its strong dedication to social and environmental responsibility (ID EIGHT, 2025).

More importantly, about the company's circular strategies, it can be said that, in order to replace virgin and resource-intensive inputs with bio-based substitutes and recycled parts that value industrial and agricultural waste, ID'EIGHT's business strategy is completely centered on material innovation as a principal driver for circularity. *Vegea*, a vegan leather made from leftovers from the wine industry, such as grape skins, seeds and stalks, is one of the primary materials utilized; *Bioveg*, a bio-based material derived from maize, and *Piñatex*, a non-woven textile made from pineapple leaf fibers, whose value prevents disposal through landfilling or incineration; and *Uppeal*, a bio-based leather substitute made from apple pomace, a residue from the fruit juice industry in Trentino-Alto Adige,

blended with water-based polyurethane to ensure performance and durability. Other components include recycled cotton and recycled PET used to realize labels and reinforcement elements, which decreases dependency on virgin fibers and divert textile and plastic waste from landfills, and natural and recycled rubber components for the soles, which further reduce the extraction of virgin raw materials. These materials are used with the unique objective of having the smallest impact as possible on the environment, still ensuring durability, that is essential for extending product life cycles and encouraging a design-for-longevity approach. The majority of the ID'EIGHT production process takes place mostly in the Marche region, specially making it possible to maintaining artisanal standards, ethical working conditions, full traceability of manufacturing stages and the reduction of the environmental impact of long-distance transportation. The company further adopts a small-batch production strategy, producing only the amounts needed, in order to reduce overproduction, a structural source of waste in the fashion industry.

Moreover, ID'EIGHT uses only *FSC*-certified, 100% recycled cardboard printed with water-based inks to address packaging sustainability in addition to material and production innovations and, although the company does not currently have a formal product take-back program in place, it does integrate design-for-disassembly concepts into select models to improve end-of-life management and promote future recycling. Additionally, the brand's marketing heavily emphasizes storytelling and clear product labeling to help customers make informed and responsible purchases.

In conclusion, ID'EIGHT demonstrates how circular economy concepts can be applied to the footwear sector, especially fusing on waste valorization, bio-based material innovation, ethical local manufacturing processes and durable products design. The company business model's circularity concepts not only reduce reliance on virgin resources, but also increases consumer awareness.

The fourth company that has been interviewed was Save The Duck, a big Italian outerwear company established in 2012 with its headquarters established in Milan. Save The Duck has developed a multi-channel distribution strategy that includes its own e-commerce platform, monobrand shops and the presence in a large number of department stores and fashion retailers all over the world. More importantly, Save The Duck was the first Italian fashion company to receive *B-Corp* certification in July 2019 with a B Impact Score of 95, which became 108.4 upon recertification in later years, making the one of the top outerwear brands in terms of sustainability. The business has also been legally constituted as a *Società Benefit* since 2019, further demonstrating its strong dedication to balancing social, environmental and economic goals (Save The Duck, 2019).

At the core of the brand's circular business model, lies the innovative and sustainable application of high-performance, animal-free fibers that replicate the warmth of natural materials, with the unique goal of not compromising ethics or environmental standards. *PLUMTECH* is the material that the

company use to develop its circular economy strategies and to reach its sustainability goals. Recycled *PLUMTECH* is made entirely from post-consumer PET bottles and successfully satisfies the *Bluesign* standard for environmental safety, ensuring high technical performance while reducing resource consumption (Save The Duck, 2024). Complementary to this, the company uses other sustainable fabrics certified by *GOTS*, *GRS*, *Oeko-Tex*, and *Bluesign*, guaranteeing alignment with international sustainability standards, but also traceability and chemical safety (Save The Duck, 2024).

Moreover, circularity is also reinforced with multiple strategies implemented by the brand, in order to minimize environmental impact across the entire life cycle of garments. Save The Duck is increasingly using recycled fibers in its collections, reaching about the 30% of its total product mix, especially substituting virgin polyester with more sustainable recycled alternatives.

In addition, in order to increase and maximize products useful life and durability and reduce waste, the company also uses eco-design principles, especially thanks to collaborations with non-profit organizations, such as the partnership with *Humana Vintage*. This makes it easier to collect and reuse post-consumer clothing, guaranteeing that it is recycled or reintroduced into second-hand markets instead of being thrown away (Save The Duck, 2024). Furthermore, Save The Duck has created, for each of its products, the *Digital Product Passport*, with the aim of spreading all information about garments to customers, in order to increase their awareness and products traceability. In particular, the DPP gives consumers comprehensive and understandable information about the materials used to produce that good, certifications and environmental impact of each product, helping them to make responsible and informed decisions. Additionally, in partnership with *eBay*, the brand has instituted a resale channel, establishing a specific area for used goods and allowing clothing that might otherwise go unused to have a circular *second life* (Save The Duck, 2024 ).

Moreover, measuring and tracking its carbon footprint throughout the entire value chain, Save The Duck has set the ambitious goal of carbon neutrality by 2030. The company also contributes one percent of its annual profits to causes that promote environmental preservation, animal welfare, and human rights (Save The Duck, 2023). Strong performance in governance, workers' rights, community involvement, environmental management and customer relations is demonstrated by its *B Impact Score*, that demonstrate that its operations are powered entirely by renewable energy, and it works with suppliers on regenerative practices like water reuse, solar power adoption, and partnerships to give Indonesian communities access to clean water (ESG News, 2023).

A key component of Save the Duck's circularity strategy is consumer engagement: thanks to its circularity strategies and its commitment to transparency, especially about material choices and garments environmental impact, and education, customers can make wise and responsible purchasing decisions.

Save The Duck is a useful example of a well-established fashion brand, that is, in these last years, moving forward circularity, combining life-cycle circularity techniques like reuse, resale and traceability with carbon neutrality targets, stringent certifications, animal-free insulation methods and supplier engagement. By demonstrating the scalable integration of ethical innovation and environmental responsibility, its efforts offer a replicable framework for systemic sustainable transformation in the apparel industry.

The fifth company interviewed was WRÅD Living. It is a benefit corporation, established in 2015 in Vicenza, that began as a social media awareness project addressing the negative effects of the fashion industry on the environment and society, before developing into a systemic innovation lab and creative design studio (WRÅD Living, 2025). The company uses a multichannel model that includes brand partnerships, consulting projects and specific industry partnerships and its operations span both the Italian and foreign markets. Nowadays, WRÅD no longer manufactures its own branded products on a large scale, but mainly serves as a consulting and innovation partner for other fashion businesses, assisting them in incorporating sustainable chemical management, supply chain transparency and circular economy principles into their operations (WRÅD Living, 2025).

According to WRÅD's philosophy, fashion can be used to spread intangible values and spark structural change. The company's long-standing emphasis on material innovation and waste valorization is demonstrated by earlier innovative projects like the *Light-Up* reversible outerwear collection, which uses photoluminescent pigments from recovered materials, and *GRAPHI-TEETM*, a t-shirt dyed with recycled graphite powder from industrial waste using an ancient, water-saving dyeing method (WRÅD Living, 2025). Furthermore, by working with some experts, WRÅD was able to test natural dyes made from plant, fruit and vegetable waste on clothing made of *GOTS*-certified organic cotton without the use of artificial chemicals. These efforts, which embodied the ideas of design-for-durability and circular fashion, enhanced the longevity and aesthetic relevance of the products.

WRÅD incorporates educational activism into its fundamental activities, going beyond materials and design. In order to promote public conversation on responsible fashion through exhibitions, workshops and academic engagement, the brand co-founded the platform *A New Awareness* in partnership with *Fashion Revolution*, *10 Corso Como*, and the *Politecnico di Milano*. Additionally, WRÅD established the *School of WRÅD (S.O.W.)*, an online learning environment that provides classes on sustainable management, design and communication. By using a solidarity model, S.O.W. allows participants to sponsor access for disadvantaged communities in Bangladesh, India, Iran and Vietnam, expanding the company's social impact beyond its direct partners and customers (WRÅD Living, 2025).

Through the integration of consulting, circular design principles, educational outreach, and cross-sector collaboration, WRÅD Living is a prime example of a systemic approach to sustainability in the fashion industry. By incorporating ecological and social factors into partner brands' design, production and communication strategies, WRÅD's business model refuse the conventional division between commercial production and environmental responsibility, offering, especially to small businesses, a replicable framework to impact wider industry transformation and encourage circularity across various fashion value chains by establishing itself as both a creative lab and a consultancy (WRÅD Living, 2025).

Also, the Milan-based Italian fashion studio Blue of a Kind was part of the interviewed brands. the company is specialized in upcycling used clothing and repurposed textiles and it is dedicated to sustainability, particularly working to reduce its impact on the environment using creative design techniques and production methods (Blue of a Kind, 2025). The brand mainly utilizes a direct-to-consumer business strategy, in particular through its Milan flagship store and its web platform. In addition, Blue of a Kind works with a number of European suppliers, in order to obtain the deadstock materials and vintage clothing that serve as the foundation for its collections.

The idea of the *Revolution of Existing*, which highlights that the most sustainable clothing is one that already exists, is at the heart of the brand's philosophy (Blue of a Kind, 2025). This idea minimizes waste and retain resources and surplus fabrics and old jeans into new and modern designs. All facets of the company are sustainable, including the use of recycled materials to make business cards, labels and packaging. Notably, Blue of a Kind preserves the original fabrics' character and natural patina by not subjecting upcycled clothing to extra washing or treatment (Blue of a Kind, 2025).

Blue of a Kind's dedication to ethical business practices is demonstrated by its *Good* certification rating from the *Good On You* platform (Good On You, 2024). Despite not claiming to be vegan, the brand doesn't seem to use any materials derived from animals in its collections (Blue of a Kind, 2025). Additionally, Blue of a Kind aligns itself with global initiatives that promote circular economy practices by working with prominent sustainability organizations such as Fashion For Good and the Ellen MacArthur Foundation (Blue of a Kind, 2025; Ellen MacArthur Foundation, 2024).

With its focus on resource efficiency, upcycling and sustainable business practices, Blue of a Kind is an explicative illustration of how the circular economy can be effectively implemented in the fashion industry: the studio provides a replicable model for sustainable fashion innovation, showing how small businesses can lower and minimize their environmental impact, still maintaining high design quality (Blue of a Kind, 2025).

Established in 1990 in Trento as *Cooperativa A.L.P.I. (Avviamento al Lavoro su Progetti Individualizzati)*, REDO Upcycling is a social enterprise that introduced the REDO Upcycling brand

in 2014 and it has been the seventh company interviewed in order to answer to this thesis RQ. The business produces upcycled fashion accessories and home décor items, paying attention to both environmental sustainability and social impact, integrating people with social and employment challenges into its workforce (REDO Upcycling, 2025). Targeting both local and foreign markets, REDO Upcycling distributes its goods via a specialized e-commerce platform and a physical store in Trento (REDO Upcycling, 2025).

The main pillar REDO Upcycling's business strategy is the circular conversion of post-consumer and industrial waste into new, superior products. The company collects waste items, such as upholstery textiles, advertising banners and components from the textile and footwear industries, that would otherwise wind up in landfills. The meticulous washing, sorting and repurposing of these materials into unique bags, accessories and home décor pieces demonstrates the potential of upcycling as a sustainable alternative to traditional textile production, still reducing the environmental impact of extracting virgin resources by using only reclaimed materials, which also helps to prolong material lifecycles by using less energy and water (REDO Upcycling, 2025).

At REDO Upcycling, sustainability encompasses not only the reuse of materials but also the structuring of its manufacturing procedures. Every manufacturing operation is conducted locally in the Trento area, promoting social inclusion and ensuring moral labor standards. Employees can actively participate in the creation of circular products while gaining technical and professional skills thanks to the cooperative structure. This method guarantees that all the employees that take part in the value chain can use their competences and technical skills in the circular production processes, making it possible to incorporate both the social and environmental dimensions into the business's circular economy strategy.

Another key component of REDO Upcycling's business strategy is consumer involvement. The company places a strong emphasis on production process transparency: every product tells a story about its past life, because the brand tells to its clients where the materials used to produce it come from and how their purchases affect the environment and the society.

REDO Upcycling is a very insightful example of a circular business model that pays attention to, all together, social impact and environmental responsibility through this integrated approach. The company provides a replicable framework for sustainable practices in the fashion and design industries by illustrating how companies in the fashion and home décor industries can use upcycling techniques to cut waste, prolong the lifecycle of materials, and concurrently generate significant job opportunities.

The last company to be interviewed was Filippa K, a Swedish fashion brand founded in 1993 by Filippa Knutsson. The brand is renowned for its emphasis on classic design, fine craftsmanship and

a strong dedication to sustainability, still aiming to produce adaptable clothing that is long-lasting and goes beyond fads. Distributed via its online store, global retail network and chosen wholesale partners, its product line consists of men's, women's and accessory clothing (Filippa K, 2025).

The five main pillars of Filippa K's sustainability strategy are materials and innovation, circularity, environmental impact, social responsibility and traceability and transparency (Filippa K, 2025). The second pillar, circularity, is applied throughout the product lifecycle to increase garment longevity and decrease waste and it is a fundamental component of its strategy. In reference to this, in order to prolong products' useful life, the brand offers clothing repair services, supports second-hand sales and give some suggestions to educate customers to more educated clothing care practices.

Additionally, Filippa K is creating traceable product IDs that record the origin, materials, production methods and suggestions for recycling or reuse of each garment through the *SwePass* digital product passport project, seeking to promote circular consumption patterns and facilitate improved end-of-life management of clothing (Filippa K, 2025).

Moreover, the brand pays attention to using sustainable fibers and creative textile solutions. With full traceability to the nation of origin, 34% of the brand's materials in 2024 were either certified as organic or categorized as responsible animal fibers (Filippa K, 2025).

To increase transparency in the wool supply chain, the brand partners with organizations like the *Fiber Traceability Initiative*, *Axfoundation*, *GSI Sweden* and *VirtualRouteZ*. To promote responsible and informed consumption, each garment participating in this initiative has a QR code on the label that provides consumers with detailed information about the origin of the fibers, design processes, maintenance recommendations and potential second-life choices. Filippa K also actively explores material breakthroughs such as recycled textiles, low-impact dyes and regenerated fibers to reduce the environmental effect of their products without compromising quality or design integrity (Filippa K, 2025).

Also along its production process, Filippa K aims to reach sustainability minimizing its environmental effect by using energy-efficient production techniques, responsible packaging and effective shipping logistics. Packaging supplies include boxes with 70% recycled material, shipping envelopes made of responsibly sourced paper and bags made of recycled or sustainable paper. The majority of the transport polybags used to safeguard clothing during shipping are composed of recycled materials, indicating consideration for all phases of the product lifecycle (Filippa K, 2025).

In conclusion, Filippa K's strategy shows that sustainability can coexist with up-to-date and satisfying designs and financial success, providing a model that other brands can follow to lessen their environmental effect while promoting social responsibility and long-term product life (Filippa K, 2025).

In conclusion to this third chapter, the table below summarizes the case companies, highlighting their size, industry, main activities and circular economy practices, making it possible to understand the variety of all the circularity approaches across different players in the fashion sector.

<i>Company</i>	<i>Year Founded</i>	<i>Size (Number of Employees)</i>	<i>Industry Segment</i>	<i>Main Activities</i>	<i>Circular Strategies / CE Focus</i>	<i>Certifications</i>
Rifò (Italy, Prato)	2016	About 25 employees + 40 artisans	Knitwear & Accessories	Localized production, e-commerce, monobrand stores	Mechanical recycling of wool/cotton; pre-order anti-waste system; repair & recycling services	GRS
Progetto Quid (Italy, Verona)	2013	>140 employees	Apparel & Accessories	Fashion production via upcycling, co-branding projects	Upcycling of surplus/pre-consumer fabrics; local craftsmanship; social inclusion (women at risk of exclusion)	GRS
ID EIGHT (Italy, Florence)	2019	Small enterprise	Footwear	Material innovation & small-batch shoe production	Bio-based & recycled materials (Vegea, Piñatex, Uppeal); design for longevity	GOTS, GRS, Oeko-Tex, Animal Free, B-Corp (2025)
Save The Duck (Italy, Milan)	2012	Medium-large (global distribution)	Outerwear	Multichannel (e-commerce, retail, dept. stores)	Animal-free recycled fibers; repair/reuse/resale collaborations; digital product passport; carbon neutrality targets	B-Corp (2019), Società Benefit, GOTS, GRS, Bluesign, Oeko-Tex
WRÅD Living (Italy, Vicenza)	2015	Small (consultancy model)	Design, Consulting, Innovation	Consulting for brands, partnerships, education (S.O.W.)	Material innovation; education & awareness projects; systemic consulting on CE	–
Blue of a Kind (Italy, Milan)	2018	Small studio	Upcycled Apparel	Direct-to-consumer, upcycling vintage & deadstock	Revolution of Existing through recycling, upcycling, minimal processing; partnerships with other companies	Good On You (Good)
REDO Upcycling (Italy, Trento)	2014 (brand; coop since 1990s)	Small-medium (social coop)	Accessories & Home Décor	Upcycling waste textiles, banners, components	Recycling waste into unique items; social inclusion of disadvantaged workers	–
Filippa K (Sweden, Stockholm)	1993	Medium-large, international	Apparel (men, women, accessories)	Retail & e-commerce, global presence	Repair, resale, circular design; product passports (SwePass); sustainable fibers (responsible wool, recycled textiles)	Various sustainability certifications (organic fibers, traceability initiatives)

## Fourth Chapter

### 4.1 Economic Barriers to Circular Fashion

A recurring theme across the interviews is the significant set of economic barriers that hinder the development and diffusion of circular fashion. Entrepreneurs, managers and sustainability experts repeatedly emphasized that producing circular garments inherently implies higher costs, and that the consequent elevated retail price of such garments represents one of the greatest obstacles to the decision of the customers to buy them. As Rifò, Filippa K and ID EIGHT pointed out, *the high price of circular products is perceived as a principal barrier*. This view reflects both the continual comparison with the artificially low prices of quick fashion and the underlying expense of sustainable production methods. Circular fashion businesses, therefore, find themselves trapped in a paradox: while their practices are environmentally and socially preferable, the resulting products are often positioned in the market at a higher price level that excludes the majority of consumers, reinforcing the idea that sustainability is a privilege rather than a mainstream option.

The interviews also revealed in detail the multiple factors that generate this price gap. First, the choice of materials directly impacts costs. Unlike fast fashion, which relies heavily on virgin synthetic fibers such as polyester, nylon and acrylic (materials that are inexpensive precisely because they are produced on a massive scale), circular brands typically use recycled or innovative and highly sustainable fibers, that entail higher acquisition and processing costs. These fibers are often recovered in limited quantities, must be subjected to labor-intensive disassembly and reprocessing, and frequently lack the price advantage of standardization: having all heterogeneous textiles makes it impossible to reach massive production quantities, significantly increasing prices. As a result, garments made from such materials begin their life cycle with a cost disadvantage compared to fast fashion products, where the raw materials themselves are designed for efficiency and cheapness rather than durability or recyclability.

Second, and perhaps more critically, circular enterprises often commit to localized production and ethical labor standards, choices that further increase production costs. Rifò's founder was particularly explicit on this point: *the main difficulty that we have is the price. Producing only in Italy, we have very high costs and, for us, it is very difficult to sell our products at a price that is accessible for everyone. Just producing a t-shirt costs 8 euros*. This sentence completely captures the structural reality of circular production: while the decision to manufacture locally guarantees quality, transparency and respect for workers, it simultaneously prevents the attainment of low-cost production targets achievable in outsourced contexts. For fast fashion brands, locating production in low-wage countries and exploiting globalized supply chains drastically reduces labor costs, while, for

circular businesses, producing ethically within Europe often makes even the most basic garment significantly more expensive.

Several other entrepreneurs repeated this idea, stressing that the *cost of producing and purchasing circular products is higher than that of fast fashion*. Progetto Quid explained that the challenge is not only producing in a sustainable way, but convincing, especially consumers, to accept the structural cost differences: *the great difficulty is selling products at the price of a circular garment, because this incorporates an entirely different set of costs. Not every buyer is willing to accept the reason behind the price we propose*. This observation illustrates what might be called the *double penalty* of circular fashion: circular products are both more expensive to make and less understood by market actors who expect prices to remain in line with fast fashion norms.

Moreover, the absence of economies of scale underlines the price disparities in the circular fashion. Many interviewees emphasized that while fast fashion corporations achieve extremely low unit costs through mass production and global distribution networks, circular businesses typically operate with small-batch production and fragmented supplies of materials. As participants noted, *fast fashion keeps prices low thanks to large-scale production and the use of inexpensive materials*. The interviewed expert from Rifò described this as a clash of fundamentally different logics: *the fast fashion scheme is to produce as much as possible at very low costs. Our scheme is completely different, based on producing less at higher quality*. Similarly, Progetto Quid stated that *sometimes we encounter challenges in the design process, as the heterogeneity of fabrics prevents the large-scale production of identical variants. Nonetheless, the primary concern remains the associated costs, which directly affect pricing in both B2B and B2C contexts* and also that *the main challenge we may face is balancing production costs, as these costs are very high*. In addition, ID'EIGHT highlighted that decades of exposure to fast fashion pricing have conditioned consumers to expect garments at *ridiculous prices: if the consumer is used to the ridiculous price of a product, they will not expect that this price be increased several times over. The entire fast fashion chain is based on low prices, and changing it would mean completely transforming the business model* and also *There is no real compromise to being truly circular while keeping fast fashion prices; it would inevitably result in greenwashing*. Obviously, fast fashion produces much higher quantity of products every day, making it possible to take a significant advantage from economies of scale: the more you produce, the less your production processes will be costly. The absence of scale effects in circular production not only prevents the possibility to reduce costs, but it also places circular fashion in structural opposition to the consumer expectations of quick fashion.

The problem of economies of scale is compounded by the additional costs associated with recycling processes. Participants repeatedly emphasized that *sorting, disassembly and fabric selection involve*

*high costs*. Unlike linear models, where production begins with uniform virgin materials, circular production must deal with the heterogeneity of discarded garments. Sorting post-consumer clothing by material type, removing non-recyclable components such as zippers and buttons, and separating mixed fibers were all described as costly, time-consuming and labor-intensive. At present, these processes are largely manual, and as Rifò acknowledged, this significantly limits efficiency: *the sorting process is still manual, and this increases costs while limiting volumes. Only by automating could we reduce costs and lower prices*. However, small and medium-sized circular enterprises often lack the financial resources to make the substantial technology investment required for automation. The economic burden of recycling therefore becomes a paradox: the very process that should enable circularity by closing the loop simultaneously raises costs and undermines competitiveness.

Furthermore, the outcomes of recycling are not always economically favorable. Many interviewees confirmed that recycled textiles often lose their quality and usually aren't as valuable as virgin fibers for apparel, and downcycling is the result of this problem. The earnings from these uses extend the material's life, but they are not enough to cover the expenses of gathering, classifying and processing the material. Circular fashion businesses are therefore blocked between low material yields and high operating costs, due to both technological and financial inefficiencies, undermining the goal of developing a fully circular system.

All of these observations point to a significant systemic and financial disparity between fast fashion and circular fashion companies. Higher production costs associated with more sustainable and qualitative materials, ethical labor and a local manufacturing structure make it possible to highlight an evident economic disadvantage for circular firms. Furthermore, the incapacity to take advantage of economies of scale (due to the incapacity of those brands to produce high quantities of products) and the extra costs brought on by recycling procedures, significantly impact the pricing structure of circular brands. On the other hand, fast fashion companies greatly benefit from lower costs due to mass production, worldwide outsourcing and the extensive use of inexpensive synthetic fibers. Thanks to this production structure, fast fashion continues to dominate the textile and apparel market due to its affordability and widespread appeal, while circular gear is only available to a select group of consumers who are both able and inclined to spend extra for sustainability.

These first- and second-order themes, such as the higher retail price of circular products, the higher production costs in comparison to fast fashion, the structural advantage of economies of scale enjoyed by large corporations and the expense of sorting and recycling textiles, converge to form the third-order theme of economic barriers. This highlights that, rather than being a secondary issue, economic viability is the main factor driving producer strategy and consumer behavior in the fashion business. Unless systemic interventions are put in place, such as public subsidies for circular production,

regulatory frameworks that internalize the environmental costs of fast fashion or technological advancements that drastically reduce recycling costs, circular fashion will continue to be economically marginalized. What emerges most clearly from the interviews is that while environmental necessity drives the vision of circular fashion, the absence of economic feasibility continues to limit its expansion. Since fast fashion's production cost advantages continue to help and support its market dominance, financial barriers will be the fundamental source of circular fashion's difficulties, affecting every aspect of company decision-making.

#### **4.2 Structural, Technological and Regulatory Barriers to Circular Fashion**

From the interviews, it is possible to individuate another recurring obstacle identified by practitioners. It can be described as the interplay of structural, technological and regulatory factors, that deeply limit the feasibility and scalability of circular strategies in the fashion sector. One of the most salient issues raised by multiple interviewees concerns the absence of a harmonized regulatory framework at the European level: *still there is no common European line; every country applies different rules and certifications, and this makes it very hard for us to organize any scalable collection system*, which generates legal uncertainty and operational complexity for brands attempting to implement circular practices. As a representative from ID'EIGHT noted *at present, recycling final textile products is illegal for private brands: there is no regulation that allows brands to take back used products from consumers, disassemble them and reintroduce the materials into production; the law treats these garments as waste, and only licensed waste operators can handle them. Today, the only items that are actually recycled are unsold garments, which, however, represent only a minimal percentage compared to post-consumer clothing*. This situation effectively prevents producers from exercising control over the full life cycle of their products, limiting the implementation of circular initiatives such as closed-loop recycling or product take-back schemes. The same respondent further emphasized that *even if a brand has the technology to recycle products, it is not legally permissible to do so, because the law states that a used textile product is considered waste, and as such it must be managed by companies specialized in waste management*, highlighting the extent to which regulatory gaps act as structural barriers that go beyond individual firm capabilities.

Several interviewees pointed to the forthcoming Extended Producer Responsibility regulation as the only potential common European framework capable of overcoming this barrier. As practitioners from Save the Duck explained, *brands are all waiting for the EPR to come into force, because it will finally oblige producers to take responsibility for what they place on the market*. However, until this regulatory framework becomes effective, companies remain unable to control the end-of-life phase of their products: *even when garments are designed with circularity in mind, without the EPR there*

*is no functioning system to manage their return, and in practice post-consumer textiles end up being downcycled at best.*

The lack of a unified legal approach and materials sustainability certifications forces companies to navigate a patchwork of national and international rules, which not only complicates compliance but also constrains strategic planning and investment in circular operations. This fragmented regulatory environment thus becomes a critical limiting factor for circular brands, especially for small and medium-sized enterprises that lack the resources to adapt to multiple national frameworks simultaneously, but it also consents to linear fashion brands to not change their business models. Moreover, the respondent from ID'EIGHT founder added that *the truth is that there are no certified recycling supply chains capable of managing this type of waste. Until the EU establishes facilities that operate like waste management companies where fashion brands can send their products to be sorted between garments suitable for second-hand markets, such as Humana, and those that must be disassembled and recycled, this recycling model will not take hold, and we will never achieve true circularity* and also *In my case, the soles are turned into playground flooring, while the uppers are used to produce construction panels. As a brand, we could collect old shoes and reuse the materials to manufacture new shoes under the same brand. I already have the technology to make this possible, but from a regulatory standpoint, I am not allowed to do so. There is currently no existing supply chain for the recycling of such products.* Furthermore, it has been added that the introduction of transparency obligations would reveal critical inconsistencies that are currently hidden from consumers. For instance, many brands claim a *Made in Italy* label even though only 1% of the production process actually takes place in Italy, and current regulations allow companies to do so, even if the product was only partially assembled in the Country, giving consumers a misleading impression of local manufacture and quality. The interviewee argued that, if these brands were forced to be really sincere and transparent about their manufacturing processes, customers would have all the instruments to discover that many of them are not what they want to show This example shows how a lack of consistent transparency criteria and insufficient regulatory monitoring can limit the effectiveness of circular projects. These factors not only permit greenwashing, but also make it more difficult for customers to make educated and conscious decisions.

Furthermore, most companies highlighted the prevalence of mixed fibers and synthetic materials as a central limitation to recyclability. According to several participants, garments made from cotton–polyester blends or fabrics containing elastane are extremely difficult to process for mechanical or chemical recycling. As WRÅD's founder stated, *the fast fashion model is fundamentally in conflict with circularity because their products are designed to last briefly; they use synthetic blends and cheap materials that cannot be efficiently recycled.* Similarly, the sustainability manager of Save the

Duck emphasized that *We find ourselves with a huge amount of garments of all kinds, whose compositions we no longer even know, and this represents an additional problem that brands have to face.* She continued saying that even when garments are intentionally designed using mono materials, *there are no infrastructures that allow us to recycle these products at scale without disassembly, which requires additional effort and cost.* The material heterogeneity forces brands to engage in labor-intensive sorting, classification and processing, often manually, which substantially increases operational complexity.

Beyond labor intensity, these technical constraints also generate practical limitations on what can be classified as truly circular: in many cases, recycled outputs cannot be reintroduced into garment production at the same quality, resulting in downcycling into lower-value applications such as insulation, industrial padding or construction materials. As Filippa K sustainability manager emphasized that *the difficulty in recycling textiles is linked to the mixed composition of fabrics, which makes separation and reuse very difficult.* These material constraints are compounded by the dominance of cheap synthetic fibers, especially polyester, in the fast fashion sector, which continue to be widely used due to low costs despite their limited recyclability.

Additionally, the interviews frequently highlighted the role of logistical barriers in limiting the development of circular practices. Several respondents described the difficulty of establishing efficient take-back or collection systems for used garments. As one interviewee observed, *organizing an effective take-back system is very complicated; we don't have the means to set up effective logistics networks.* This is made more difficult by the need to manage and monitor heterogeneous materials, which vary in quality, quantity and condition in addition to composition. For instance, Progetto Quid detailed the complexity of handling surplus fabrics from partner brands: *we receive fabrics that have all different sizes and qualities; they must be carefully cataloged so that our product office knows exactly what is available for new products.* These operational challenges confirm the fact that circularity is not only a design or production issue, but also a logistical and organizational one. Redo Upcycling similarly noted that verticalized processes in conventional brands hinder the transversal application of circular practices: *The excessive verticality of processes makes it much more difficult to introduce circularity, which should ideally be integrated across departments.*

Strongly linked to both material and logistical issues are design-related limitations, which were defined, across interviews, as a key tension between fashion trends and circularity. Several entrepreneurs noted that the pursuit of complex, fashionable designs often increase technical difficulty and processing costs. Rifò's founder remarked, *the problem is design: fashion takes priority over sustainability, and complex or trendy designs increase production costs and complicate recycling.* Blue of a Kind also highlighted that the fact that recovered materials are all different and

variable, coupled with design aspirations, prevents the ability to standardize production: *the secondary raw materials we receive are not uniform in quality or quantity; producing large quantities of the same variant is not possible.* In a similar way, Progetto Quid confirmed that elaborated and up-to-date designs further exacerbate cost challenges: *even with simple designs, production costs are very high; more experimental approaches would increase development costs dramatically and also* *The greatest challenge lies in designing garments that are truly circular, as such designs often clash with market expectations, being perceived as too simple, unfashionable, or not aligned with current trends, and even when more sustainable fabrics are used at scale, there is a risk of labeling as "circular" a material that in reality is not; thus, creating "trendy" pieces that can be redesigned and disassembled multiple times remains the most complex aspect of circular fashion.* These insights underscore a structural difficulty that brands that operate in the sector have: circular strategies favor simplicity, durability and mono-material designs, whereas market pressures incentivize constant innovation and trend-driven production, creating a conflict between aesthetics, marketability, and circular feasibility.

Infrastructural limitations were consistently raised as a major impediment to circularity. Most interviewees stressed the lack of facilities capable of handling the volumes and technical complexity of post-consumer textiles. Save the Duck's sustainability manager noted that *we design our garments to be recyclable, but the systems to process them do not yet exist. This means that, without collection, sorting and recycling infrastructure, our efforts remain theoretical* and, however, the main difficulties of brands like Save the Duck is easily visible from the fact that the brand has recently started to produce mono material products, but using fibers that, during the disassembling and recycling processes, have a very negative environmental impact: *for example, in our last two collections we started to design and propose mono material products, made entirely of nylon or polyester, so that at the end of their life cycle they can either be easily disassembled or directly recycled.*

Even brands that produce small portions with recovered materials face similar constraints; this emphasizes that infrastructure scarcity is not only a scale issue, but a systemic barrier affecting both larger and smaller companies. WRÅD and Redo Upcycling reinforced this point linking infrastructural gaps to the broader market structure: *The system is built to generate profit from volume and obsolescence, so producing less and creating durable or reusable items is inherently difficult.* These observations highlight how technological, logistical, and infrastructural factors interact with broader industry dynamics, reinforcing structural constraints and limiting the effectiveness of circular initiatives.

Taken together, the interviews were able to draw a detailed picture of how regulatory uncertainty, material complexity, design pressures, logistical limitations and infrastructural scarcity are combined

together to form a dense network of obstacles for circular fashion. The implementation of circular strategies is limited by inadequate infrastructure, up-to-date design trends and consumer expectations, diverse and complex textiles make recycling more difficult and legal gaps that make direct material recovery impossible. Even when brands possess the technological capacity and the inclination to implement circular practices, they are routinely constrained by these structural and regulatory factors, as entrepreneurs have repeatedly underlined. Rifò referent affirmed: *we have the technology to recycle, but legally we cannot; the only options are downcycling or partnering with licensed waste operators*. Similarly, ID'EIGHT pointed out that the absence of clear European regulations results in *a confusing landscape where every material has its own certificate, and no brand knows if it can truly be considered sustainable*. These results demonstrate that the technological, legislative and structural environment is more than just a background component that affects the feasibility of circular strategies, but, at the opposite, it deeply conditions consumer behavior and corporate capacities. Until these barriers are eliminated by systemic and regulatory changes regarding circular business models and infrastructural development, the sector will continue to operate in a sector shaped by linear, fast-fashion logics.

### **4.3 Consumer Behavior and Consumption Culture**

The analysis of the interviews indicates that customer behavior and culture are among the most significant elements impacting the fashion industry's adoption of circularity. These elements may serve as a deterrent or, in some cases, as a possible facilitator. Respondents often highlighted that the efforts to close the loop are undermined by consumers' common lack of basic knowledge about where and how to recycle or repair clothing. Several entrepreneurs interviewed completely agreed on the fact that many individuals *do not know where to bring their clothes at the end of their life cycle, and often there are no adequate infrastructures to support them*, leading to the widespread disposal of textiles in general waste streams. This absence of awareness is compounded by the erosion of repair and recycle culture. This information has been gathered also from ID'EIGHT founder, that highlighted that *consumers often do not even know where to turn to repair a zipper, as they find it easier to buy a new item, especially at fast fashion prices. Repairing a fast fashion garment is usually more expensive and challenging than purchasing a new one and, for this reason, the culture of repairing products has been lost*. This illustrates how convenience-driven practices have supplanted techniques for extending apparel life. The pervasive belief that repair, even when feasible, is both costly and rarely serves to further solidify the structural dominance of linear consumption, where rapid and inexpensive replacement is anticipated and accepted. Additionally, the interviews demonstrated that fast fashion's structural incompatibility impacts not just technical and operational issues but also cultural and consumer expectations: *Consumers now only buy disposable products, a*

*mindset actively reinforced and perpetuated by fast fashion brands themselves*, emphasizing that the fast-fashion model reinforces a cultural cycle of disposability.

Another recurrent problem that has been revealed from the interviews is the lack of incentives that can motivate consumers to actively participate in circular projects. Many respondents pointed out that when there are no obvious benefits like discounts, coupons or cash reimbursements, individuals usually decide to discard away clothing rather than returning it. As one participant explained, *there is no economic incentive for customers that decide to bring clothes back. As a direct consequence, people just prefer to throw them away, because it is easier and faster*. This illustrates how consumer decision-making is governed by convenience: when recycling points are not widely known, when repair services are difficult to access and when returning used garments offers no immediate advantage, disposal becomes the simplest and most rational choice. Convenience and immediacy, in fact, emerged as decisive drivers shaping consumption habits. It is easy to understand that decades of dominance of the fast-fashion business model have ingrained cultural expectations of speed, affordability and disposability. As Filippa K's sustainability manager stated, *the fast fashion's essence is based on low-cost products, constantly changing collections and sales driven by quantity rather than quality*, while WRÅD stressed that *today, brands profit by producing more and encouraging higher consumption, which is exactly the opposite of what circular economy principles promote*. These findings demonstrate how consumers engage in a loop where quantity, low quality and immediacy are valued more highly than sustainability, longevity and high quality. Blue of a Kind emphasized the difficulty of translating awareness into action, noting that *you need to be able to communicate to people what the brand does and the features of its products*, while WRÅD stressed that *it is necessary to create a value that is not only an economic value: it is necessary to create products that hold meaning for the wearer and foster value redistribution across the ecosystem, designing garments that continue to generate value even after use, emphasizing their emotional significance*. The same did Blue of a Kind sustainability manager: *to create products that hold meaning for the wearer, inspired by the sentiment and emotional connection that our grandparents' garments still convey*. However, it is acknowledged that communication alone is insufficient if consumers do not perceive clear practical or aesthetic value in altering entrenched routines.

This ambivalence was further confirmed by Save the Duck, which highlighted how the effectiveness of circular practices, at the end, depends on consumer awareness and engagement: *these circular practices are facilitated by us, but it is up to the customer and their awareness to implement the solutions we propose*. In the case of Save the Duck, each garment contains a unique Certilogo QR code that allows customers to access a digital product passport, displaying information about the specific item, such as the characteristics of the fabrics, related certifications and the place of

production. This initiative not only enhances product traceability but also seeks to strengthen the consumer's emotional and informational connection with the garment. In a second phase, Save the Duck integrated the resell option through *eBay* platform, making it easy for the consumers to easily resell their products directly via the digital passport. Importantly, the company doesn't obtain any profit from these transactions: only the customer benefits, reinforcing the perception of consumer empowerment. The third stage introduced consists in a donation function in collaboration with *Humana Vintage*: through the digital passport, consumers can either bring garments directly to Humana stores or schedule a DHL pick-up service, funded by Save the Duck, ensuring that items are redirected responsibly. Unlike traditional donation systems, this process guarantees higher traceability, as the *Certilogo* system registers how many garments are donated and by whom, allowing Save the Duck to monitor the actual outcomes of its initiatives. As the interviewee explained, *traceability is the most important element: it allows us to collect data and understand whether our projects work or not*. This case highlights how consumer engagement in circularity is surely shaped by awareness and incentives but also by accessible digital tools and transparency, which reduce behavioral barriers and facilitate action.

However, the interviews also suggest that consumer behavior is not only a barrier for the expansion of circular fashion, but, in some cases, it emerges as a condition that can foster circular practices. Several startups explained that their initiatives had been facilitated by the presence of consumer groups that already had a good level of environmental and social awareness. Rifò, for instance, registered a significant increase in consumer awareness and sensitivity after the COVID-19 pandemic. This has helped the brand expansion over the years, reporting that *we have been supported by consumers' growing attention to sustainable and circular fibers and, after Covid, by an increased focus on the environment and local production*. Progetto Quid also emphasized the significance of geographic and cultural context under the favorable consumer base point of view, pointing out that their location in Verona, a city with a strong social and environmental sensibility, was advantageous because it was more likely to engage with circularity. Additionally, Redo Upcycling remarked that working in a medium-sized European city like Trento, with a vibrant cultural scene and civic activities, enhanced consumer sensibility and offered the perfect setting for awareness-raising strategies. Additionally, they underlined that consumer participation differs by area, pointing out that cultural variances in sustainability awareness required quite different communication strategies when communicating to audiences in Northern Europe compared to Southern Italy. ID'EIGHT added that consumer enthusiasm was particularly strong when circularity was combined with strong aesthetic value: *we noticed strong interest from customers concerned with social and environmental issues, but even greater enthusiasm for the product's design. From the perspective of consumer relations, it was*

*an advantage that our shoes are stylish and well-designed, unlike many competitors who produce sneakers with a more basic and less appealing look.* This demonstrates that engagement with circular practices is not only mediated by environmental values but also by the ability of products to resonate with consumers on an aesthetic and emotional level. Consequently, products design is not only a barrier of circularity, as described in the previous paragraphs, but also a potential opportunity for circular brands.

Taken together, these findings show that consumer behavior is profoundly ambivalent: on one side, the limited awareness, the absence of incentives, the erosion of repair culture and ingrained habits of speed and convenience act as powerful barriers that undermine the mainstream adoption of circular fashion. On the other side, shifts in cultural sensitivity, the presence of geographically and socially embedded consumer groups, and the capacity of brands to align sustainability with design and emotional appeal illustrate that consumer behavior can also serve as a catalyst for change.

Lastly, from the interviews emerged that advancing circularity requires a complete intervention to shape consumers' behavioral dimension in its full complexity: lowering barriers through accessible information, visible incentives and convenient infrastructures, while simultaneously leveraging the opportunities offered by those consumer segments already predisposed to sustainability. Without engaging and educating consumers, circularity risks remaining confined to a small minority of motivated individuals rather than expanding into a cultural and behavioral mainstream.

#### **4.4 Structural Incompatibility of Fast Fashion with Circularity**

From the interviews, it has emerged that the structural characteristics of the fast fashion business model are one of the most evident and relevant barriers that impede or, at least, make difficult the adoption of circular strategies in the fashion industry. According to several participants, the basic economic logic of fast fashion, which is characterized by short production cycles, low-cost apparel, continuous collection rotation and deliberate obsolescence, is incompatible with the concepts of circular fashion. Interviewees often talked about how fast fashion apparel is intentionally designed to be easily disposed, and this prevents both individual and societal adoption of circular habits. As Rifò remarked, *in fast fashion, the priority is to sell as much and as quickly as possible and at the lowest price; everything else, including sustainability, comes second*, while Redo Upcycling similarly noted, *the entire foundation of fast fashion is linear; garment design and production processes are built for continuous replacement, not for reuse*, highlighting that these structural imperatives create a built-in conflict with circular principles. Furthermore, WRÅD succinctly remarked, *fast fashion and circularity is an oxymoron*, highlighting that the systemic nature of the problem extends beyond individual consumer behavior or isolated business initiatives. This evidence suggests that structural

incompatibility is embedded in both production and design choices, and this shapes every aspect of the garment lifecycle, from creation to disposal.

Additionally, the rapid collections turnover emerged as a very relevant theme in the interviews. A large number of participants consistently observed that the continuous introduction of new garments fosters consumer habits oriented toward disposability, making circular practices such as repair, reuse and resale increasingly challenging. ID'EIGHT founder explained: *the essence of linear brands lies in low-cost products, constantly changing collections and sales driven more by quantity than by quality. Consequently, their entire business model would need to be reconsidered, but this would inevitably lead to a significant increase in prices, making them less appealing to their target consumers. Furthermore, the speed at which collections are proposed prevents any logic of reuse or repair, as consumers always expect a constant stream of new products*, demonstrating that fast fashion's operational rhythm directly influences consumer expectations and behavior. In a similar way, the expert from REDO Upcycling noted that *the foundation of fast fashion is to produce in large quantities, quickly and at low cost, without considering how garments might live beyond the initial sale*, illustrating that the structural design of production cycles prioritizes immediate sales over longevity, making circularity practically impossible. Blue of a Kind reinforced this point, adding that *garments are designed to be worn only a few times and, then, quickly replaced, which makes circularity in this context almost impossible*. These observations consistently drive to a systemic tension: fast fashion's focus on quantity and speed is deeply incompatible with the principles of durability, repair and reuse, central to circular economy practices.

As a consequence, design choices were repeatedly identified as a critical element of structural incompatibility. Interviewees highlighted that garments are often made with low-quality or mixed materials, assembled in ways that hinder repair and recycling, and not designed to withstand prolonged use. Rifò founder emphasized that *fast fashion garments are designed to be inexpensive and easily disposable; they are not intended to be recycled or repaired*, illustrating how design practices deliberately favor disposability. Progetto Quid also noted, *in fast fashion, garments are not designed to last nor to be repaired; circular design is not considered, as everything is programmed for rapid replacement*, pointing out that this design philosophy systematically excludes circularity from the lifecycle of garments. Blue of a Kind further added that *even when consumers are willing to repair or upcycle, fast fashion garments often do not technically allow it. This limitation is closely linked to the fragmented and globally dispersed manufacturing chain, which makes it difficult to ensure quality and durability. Furthermore, the constant need to produce a very large number of collections in multiple sizes and colors, highlights the structural incompatibility with circularity, as*

*the priority is the speed and the rapid replacement rather than designing for longevity or reuse, showing that even motivated consumers face practical barriers due to structural design limitations. A closely related issue is the perception of the sustainability more as a marketing tool, rather than a fair and social and environmental relevant practice. In fact, several interviewees criticized the use of sustainability topics in fast fashion as greenwashing, which undermines both consumer trust and the adoption of circular practices. As WRÅD referent stated, many brands claim to embrace sustainability, yet they continue to operate within the same linear logic; in reality, it is largely a matter of marketing, highlighting the discrepancy between claimed and actual practices. ID'EIGHT founder also added that Fast fashion brands should produce less and better, yet they continue to manufacture large quantities of very low-quality products. There is no real compromise that allows for circularity while maintaining fast fashion prices; any attempt would risk falling into greenwashing and also that Consumers perceive sustainability as merely a marketing claim, which undermines the credibility of brands that genuinely implement circular practices,* reinforcing the idea that structural barriers are not limited to production logistics but also extend to market communication and perception. The interviews collectively indicate that the symbolic use of sustainability in marketing campaigns can create a misleading sense of engagement with circularity, making it even harder for truly circular startups to compete or influence consumer behavior.

Obsolescence and planned product life cycles were also emphasized as fundamental structural obstacles. Even brands attempting to implement partial circular strategies find that fast fashion's systemic characteristics limit their scalability, as product design, supply chain speed and cost pressures do not support practices such as repair, upcycling, or extended product lifespans.

Furthermore, WRÅD expert explained, *the more they produce, the more they sell: their business model relies on the low durability of products. The faster an item wears out, the higher the profits. This principle is in direct conflict with circularity, as it discourages longevity and the reuse of garments. Overall, it can be affirmed that the fast fashion business model is not designed for circularity, because it supports both the technical and psychological obsolescence of products,* highlighting that business incentives are misaligned with circular principles. These structural and cultural dimensions mutually reinforce each other, creating a systemic environment in which circular practices are both economically and socially marginalized.

Participants also argued, in this final aggregate dimension, that the core principles of rapid fashion are intrinsically incompatible with the circularity principles of resource efficiency and product lifespan. One interviewee summarized that *fast fashion is based on low costs and mass production, and this model is completely incompatible with circular practices.*

Participants also emphasized that fast fashion garments are not designed with durability or repairability in mind. The design of clothes for obsolescence, both physical and aesthetic, was highlighted as a very relevant element. As one respondent explained: *fast fashion produces clothes that are not made to last. They are designed to be used for a short time and then discarded.* The rapid realization of new collections exacerbates this problem, and the frequent introduction of new trends encourages consumers to dispose of garments before the end of their functional life. In general, this dimension highlights that fast fashion not only generates a strong economic competition to circular initiatives but represents a systemic obstacle to the diffusion of circularity in the fashion industry.

In conclusion, the third-order theme *Structural Incompatibility of Fast Fashion with Circularity*, integrates multiple first-order observations, including rapid collection turnover, garments not designed for repair or recycling, planned obsolescence and greenwashing practices. These first-order concepts converge into the second-order themes emphasizing structural incompatibility and, moreover, illustrating that fast fashion's business logic of speed, low cost and disposability is fundamentally misaligned with circularity principles. Across all interviews, a large number of experts agreed that, while startups can implement targeted circular initiatives, the broader fast-fashion system inherently limits their scope and impact. As WRÅD referent summarized, *as long as the economic model of fast fashion remains unchanged, discussing about circularity is almost impossible.* As a consequence, achieving circularity at scale requires systemic transformation, including redesigning garments for longevity, reforming production and supply chain models, creating credible sustainability standards and realigning market incentives. Only addressing these interdependent structural, economic and cultural barriers, circular fashion will be able to move from being a small experimentation to a mainstream, scalable reality.

<i>First-Order Concepts</i>	<i>Second-Order Themes</i>	<i>Aggregate Dimensions</i>
<ul style="list-style-type: none"> <li>○ Circular products have higher production and retail cost</li> <li>○ Recycled and innovative fibers are more expensive than virgin synthetics</li> <li>○ Heterogeneity of textiles prevents economies of scale</li> <li>○ Sorting, disassembly, and textile selection processes involve high costs</li> <li>○ Fast fashion maintains low prices thanks to economies of scale and cheaper materials</li> <li>○ High prices of circular products are perceived as a major barrier</li> </ul>	<ul style="list-style-type: none"> <li>○ High production and retail costs of circular fashion</li> <li>○ Structural disadvantages of circularity versus fast fashion</li> <li>○ Lack of economies of scale in circular fashion</li> <li>○ Low economic returns from circular strategies</li> </ul>	Economic Barriers to Circular Fashion
<ul style="list-style-type: none"> <li>○ Lack of harmonized European regulation on textile recycling</li> <li>○ Recycling post-consumer textiles is illegal for brands (classified as <i>waste</i>)</li> <li>○ Only unsold garments can currently be recycled by brands</li> <li>○ Mixed fibers are hard to recycle</li> <li>○ Vertical organizational structures hinder transversal adoption of circularity</li> <li>○ Complex designs raise production and recycling costs</li> </ul>	<ul style="list-style-type: none"> <li>○ Current regulations make textile recycling complex or even illegal in certain contexts</li> <li>○ Brands face material and technological challenges</li> <li>○ The widespread use of cheap synthetic fibers, difficult to recycle, reduces circularity.</li> <li>○ Complex garment design increases recycling costs and technical barriers</li> </ul>	Structural, Technological, and Regulatory Barriers
<ul style="list-style-type: none"> <li>○ Consumers lack knowledge about how and where to recycle garments.</li> <li>○ Absence of adequate infrastructures for textile disposal or recycling</li> <li>○ Repairing clothes is often more expensive than buying new ones</li> <li>○ Repair culture is eroded: people don't know where to fix basic issues</li> <li>○ Fast fashion creates expectations of cheap, disposable products</li> </ul>	<ul style="list-style-type: none"> <li>○ Low consumer awareness regarding recycling and repair</li> <li>○ Lack of tangible economic incentives</li> <li>○ Limited access to local repair services</li> <li>○ Sustainability perceived as marketing, leading to low trust</li> </ul>	Consumer Behavior and Consumption Culture
<ul style="list-style-type: none"> <li>○ Rapid production and constant turnover of collections hinder reuse</li> <li>○ Garments are not designed to last or to be repaired</li> <li>○ Garments are intentionally designed for low durability and disposability</li> <li>○ Sustainability is perceived as a marketing tool (greenwashing).</li> <li>○ The fast fashion model is seen as intrinsically incompatible with circularity</li> <li>○ Planned obsolescence is a core principle of fast fashion</li> <li>○ Fragmented, global manufacturing chains reduce garment durability and circular potential</li> </ul>	<ul style="list-style-type: none"> <li>○ Rapid production and continuous turnover of collections</li> <li>○ Garments designed to have a short lifespan and not intended for repair or recycling</li> <li>○ Sustainability perceived primarily as marketing</li> <li>○ An economic model based on fast consumption and planned obsolescence</li> </ul>	Structural Incompatibility of Fast Fashion with Circularity

(Table 1. First-order concepts, second-order themes and aggregate dimensions individuated as relevant from interviews)

## **Fifth Chapter**

### **5.1 Introduction to the Discussion**

The previous chapters have in depth treated the theoretical and empirical foundations of this study, while chapter 2 provided a comprehensive literature review on circular economy principles and the strategies applied in the fashion sector, especially emphasizing reuse, recycling, product longevity and sustainable design. In the same chapter, the literature also identified a range of barriers to circularity, including economic, structural, technological and behavioral factors. At the same time, Chapter 4 presented empirical evidence collected through semi-structured interviews with Italian and European circular fashion brands, including Rifò, Progetto Quid, ID'EIGHT, Save the Duck, WRÅD, Filippa K and Blue of a Kind, highlighting the practical challenges and opportunities encountered in implementing circular practices in the fashion sector. This fifth chapter synthesizes the two strands of inquiry by situating empirical evidence in dialogue with the existing literature in order to answer to this thesis' Research Question: *What are the major barriers and opportunities for integration of circularity into fast fashion models, in comparison with circular brands in the fashion sector?*

The analysis is organized around four third-order themes or aggregate dimensions, which emerged as salient from both the literature and the interviews. These macro-themes individuated are: Economic Barriers, Structural, Technological and Regulatory Barriers, Consumer Behavior and Consumption Culture, and the Structural Incompatibility of Fast Fashion with Circularity. For each aggregate dimension (or third-order theme), the discussion proceeds through three analytical steps. The first step concerned the analysis of the literature, in order to outline the prevailing academic knowledge and theoretical frameworks. The second step presents the empirical findings, obtained from the interviews, including illustrative examples and direct sentences, that elucidate how circular fashion practitioners experience these barriers and opportunities in practice. At the end, in this fifth and last chapter, it will be possible to critically compare the business models of low- and premium-priced fast fashion brands with those of circular fashion brands, pointing out systemic differences, trade-offs and conflicts that impact the viability and scalability of circular strategies.

Adopting this structured approach will make it possible to provide a deep and complete understanding of how economic, structural, technological and cultural factors can collectively influence the adoption of circular practices for fast fashion brands, mostly characterized by linear business models. Moreover, it will be possible to demonstrate that circular fashion can not be considered in isolation from the dominant fast fashion paradigm, which still shapes consumer expectations, supply chain dynamics and the broader regulatory and market environment.

The chapter, therefore, seeks not only to validate existing literature with empirical evidence, but also to offer new insights about the topic.

## 5.2 Economic Barriers to Circular Fashion

Economic barriers represent some of the most pervasive and structurally entrenched obstacles to the integration of circular strategies in the fashion industry, and their analysis is crucial to addressing the research question of this study.

The evidence, from both literature and empirical study, suggests that circular fashion brands consistently face higher production costs, that force circular brands to set a high retail price, limited economies of scale and market misalignments, that hinder their ability to compete with linear models, whether in the form of ultra-low-cost or premium-price fast fashion. This creates what Bocken et al. have described as a *sustainability cost–value gap* (Bocken et al., 2014): circular products cost more to produce but are systematically undervalued in markets, accustomed to artificially cheap garments or prestige-driven consumption.

The academic literature has long underlined how cost structures weigh disproportionately on circular initiatives: Kirchherr et al. and Rizos et al. argue that high upfront investments, combined with the absence of economies of scale, create a competitive disadvantage that is difficult to overcome (Kirchherr et al., 2018; Rizos et al., 2016). This disadvantage is compounded by the heterogeneity of textile waste streams, which complicates sorting, disassembly and recycling processes, driving up costs (Niinimäki et al., 2020; Sandin & Peters, 2018).

For instance, fast fashion brands usually utilize virgin fibers such as cotton or synthetic input like polyester, that are produced in bulk and subsidized by globalized value chains. These raw materials remain systematically cheaper than recycled or bio-based alternatives used by circular brands, undermining the business case for sustainable inputs (Fletcher & Tham, 2019).

Moreover, circular production processes often require greater labor intensity: dismantling garments, adapting irregular surplus fabrics and handling innovative but less standardized materials, all demand skilled human intervention, which cannot be easily outsourced to low-cost contexts (Pal, 2017). By contrast, fast fashion brands face significantly lower labor costs, as they outsource production processes to developing countries such as China, Vietnam and India, where wages and operational expenses are substantially lower (Labour Behind the Label, 2020).

The interviews conducted with entrepreneurs from circular brands add empirical depth to these theoretical claims. Rifò, for instance, highlighted that producing a cotton t-shirt from recycled fibers in Italy costs on average 8 euros per unit (Rifò, 2025), nearly double or almost triple the cost of an equivalent fast fashion garment produced in Asia, where costs can drop between 3 and 5 US dollars (between about 2,73 and 4,55 euros per unit). To remain financially viable, Rifò prices its products

between 25 and 35 euros, a figure that sits in a precarious position: too high for mass consumers, conditioned by the low-price fast fashion brands' prices, yet without the symbolic aura that justifies premium brands. ID'EIGHT encounters another dimension of the cost barrier in its use of bio-based materials, such as apple leather or recycled PET. While innovative and environmentally preferable, these inputs cost up to 30 or 40% more than conventional leather or synthetic alternatives, deeply lowering profit margins and necessitating higher final prices that can deter mainstream consumers (ID'EIGHT, 2025). For this reason, interviewees repeatedly emphasized the *double penalty* they face: higher per-unit production costs combined with market conditions that undervalue sustainability, as consumers are simultaneously pulled toward the very low prices and the symbolic prestige of fast fashion brands. This captures the essence of the economic challenge: circularity often translates into authenticity and quality, but struggles to secure profitability in a marketplace dominated by cost-driven or status-driven consumption patterns.

The structural contrast with linear models is easily visible. Low-price fast fashion companies, such as Zara and H&M, have perfected supply chain strategies that minimize costs and maximize speed, making them able to produce up to 24 collections per year to continuously refresh consumer demand (Niinimäki et al., 2020). Emerging players like Shein have taken this to an extreme, because they use real-time algorithms to monitor social media trends and adapt designs in a matter of days, maximizing the production capacity and leveraging economies of scale to sell garments at prices that circular enterprises cannot approach (Shen, 2021). The financial and technological infrastructures supporting such models give them unparalleled agility and cost advantages.

At the opposite, premium-price fast fashion brands such as Armani, Loro Piana or Salvatore Ferragamo, are able to impose extraordinary markups on products whose production costs are not substantially higher than low-price equivalents, capturing surplus value through branding and cultural narratives (Kapferer & Michaut-Denizeau, 2017; Joy et al., 2012). Despite their higher margins and ostensibly greater capacity to absorb the costs of sustainable innovation, these premium brands largely perpetuate linear practices, relying heavily on virgin materials and global supply chains, with profitability secured more through symbolic branding and exclusivity than through material innovation. The *AGCM (Autorità Garante della Concorrenza e del Mercato)* investigation into Armani can be a right example to understand this structural logic: the investigation revealed that Armani, in its production processes, used machinery with safety devices removed in order to increase productivity, optimize the production and reduce costs (AGCM, 2021). These practices demonstrate that even high-end premium and famous Italian brands prioritize standardization, cost control, production maximization and operational efficiency over embedded sustainability and circularity. Together, the efficiency and the symbolic quality of fast fashion brands squeeze circular enterprises

into a competitive disadvantage, creating a structural asymmetry in which circular realities have higher costs, while being systematically undervalued by consumers, that appreciate either artificially cheap prices or premium and luxury products whose value is derived from cultural capital, rather than sustainability.

However, within this landscape, some opportunities still emerge. As scholars such as Bocken et al. and Niinimäki et al. argue, authenticity, transparency and traceability can be reframed as unique sources of legitimacy and differentiation for circular brands (Bocken et al., 2014; Niinimäki et al., 2020). Consumers increasingly aware of environmental issues may accept higher prices if these are convincingly linked to quality, durability, ethical practices and real environmental impact reduction (McKinsey & Company, 2022).

As a consequence, economic factors can not be defined as a complete barrier for the integration of circularity, although they are among the most significant obstacles. Circular integration could be possible for linear brands, but it is limited by the intrinsic characteristics of their business models: both low-price and premium fast fashion brands have the financial, logistical and technological resources to implement circular initiatives such as recycling programs, take-back schemes, eco-design or upcycling capsules. However, these strategies are often partial or marginal, not fully embedded across the entire business model, because the fundamental linear logic, characterized by high throughput, globalized outsourcing and efficiency-driven production remains dominant. High production costs, lack of scalable recycled inputs and labor-intensive circular processes constrain the scope and depth of circular strategies, especially for low-price fast fashion where low-price expectations dominate.

In particular, especially wealthier premium brands would be able to absorb these costs and integrate some circular practices, even lowering the huge profit margins that have at the moment.

From this paragraph, it is possible to understand that organizational and financial factors strongly mediate the effectiveness of circular strategies: even if the economic capacity exists, a linear brand might choose not to fully adopt circularity due to strategic priorities, marketing models or operational inertia. Linear brands can integrate some circular strategies, but typically not fundamental principles of their business models, because economic considerations, while they are not absolute barriers, make full circular integration costly and risky. Circular brands face structural economic disadvantages in both production and market valuation, whereas linear brands can partially absorb costs and experiment selectively, turning economic barriers into manageable constraints rather than insurmountable obstacles. In short, economic factors are an important, but also a partial or conditional barrier for linear brands, especially the premium ones, that are able to integrate circular strategies, even if selectively, especially when aligned with quality or brand prestige objectives.

In conclusion, economic barriers can be defined as one of the central factors shaping the competitive field between circular and linear models in the fashion industry and the possible integration of circular practices into fast fashion linear business models.

As it is evident from this paragraph 5.2, the misalignment between cost structures and market valuation creates a systemic disadvantage for circular enterprises, as fast fashion brands can exploit efficiency economies of scale to capture value, especially externalizing environmental and social costs. This asymmetry between circular and fast fashion business models, not only makes it improbable and marginal the integration of circular strategies for linear business models, but also perpetuates their dominance in the market. For linear brands, including circular strategies in their business model would require not only technological innovations in recycling and material science, but also systemic interventions in policy, supply chain governance and consumer education.

The persistence of the sustainability cost–value gap underscores that circularity cannot be achieved only through entrepreneurial initiative but requires incentive investments in machinery and new technologies, huge incentives and a change of the culture in the fashion ecosystem and across the consumers. These economic challenges, while formidable, are intertwined with organizational, technical, cultural and behavioral barriers, which will be addressed in the following sections, highlighting the multifaceted nature of the transition toward a circular fashion economy.

### **5.3 Structural, Technological and Regulatory Barriers to Circular Fashion**

Structural, technological and regulatory barriers, all together, interact in ways that make the integration of circular strategies into fast fashion business models very difficult. As it was previously said, structurally, fast fashion is designed for speed, cost minimization and globalized outsourcing, relying on highly fragmented and opaque supply chains that span multiple continents (Sandvik & Stubbs, 2019). This business model structure and characteristics are efficient for scaling up production rapidly and continuously, but they are fundamentally misaligned with circular practices that require modular design, traceability and controlled flows of materials (Sandvik & Stubbs, 2019). In this system, even initiatives such as collection schemes or pilot recycling projects are marginal, because the underlying business model is centered on volume growth and rapid turnover rather than long-term product stewardship (Energies, 2023). Despite this, some fast fashion brands, despite the enormous difficulties that are encountering, are trying to become more circular, and they are trying to redesign or, at least, improve their governance model and production system (ID'EIGHT, 2025; Save the Duck, 2025). From the interviews, it has been possible to underline that Save the Duck, for example, still outsources production to China even trying to manage a multi-level monitoring system, with a local office supervising factories on a daily basis, regular inspections from Italy and

independent social audits organized by global organizations (Save the Duck, 2025). This triple-control system, even if not sufficient, aims to a more transparent supply chain, highlighting a possible alternative to the opacity of mainstream fast fashion (Save the Duck, 2025). Additionally to this criticality, even if, in some Save the Duck business model's aspects, circularity is explicitly pursued, contradictions emerge. Save the Duck has recently introduced mono material garments, made entirely of nylon or polyester, with the idea that such products could be more easily disassembled or recycled at end of life (Save the Duck, 2025). While this design choice responds to the principle of recyclability, it relies on synthetic fibers whose recycling processes are environmentally problematic. Mechanical recycling of synthetic fibers typically lowers the quality of fibers, only making it possible to downgrade the product, and restricts reuse options, while chemical recycling requires high energy input and the use of solvents with negative environmental impacts (Sandin & Peters, 2018). As a result, these solutions shift rather than solving the problem, since mono materiality in synthetics facilitates theoretical recyclability, but does not guarantee genuine sustainability (Sandin & Peters, 2018). This reveals a structural paradox: circular design principles can be certainly adopted, but when the material that has to be recycled is fossil-based, the outcome still requires a strong dependency on non-renewable resources and potentially high ecological costs (Energies, 2023).

Technological limitations further increase this misalignment, because textile recycling is still limited by both material properties and industrial feasibility. Mechanical recycling, the most common method, involves shredding and re-spinning fibers, but shortening them, reducing their quality and restricting their use in products that have the same value of the previous ones (Sandin & Peters, 2018). As a consequence, fibers that are mechanically recycled, are typically downcycled into lower-value products and often require the use of virgin fibers to restore their performance, impeding the full implementation of closed-loop principles (Sandin & Peters, 2018). The second option, chemical recycling, often presented as more modern and effective, can theoretically recover fibers' value through processes such as polyester depolymerization, but its high energy consumption, solvent intensity, difficulty in removing additives and dyes and reliance on costly facilities make it economically and operationally impracticable for some circular brands, and consequently for most fast fashion enterprises (Sandvik & Stubbs, 2019). Thermal recycling, including incineration with energy recovery, makes it possible to conserve energy value, but it destroys material value, precluding fiber-to-fiber recycling and contradicting circular economy principles (Sandin & Peters, 2018). These obstacles are intensified in fast fashion, which uses mostly mixed fibers: cotton-polyester blends, elastane, nylon and synthetic fibers enhance performance and reduce costs, but are also extremely difficult to separate once interwoven or bonded (Sandin & Peters, 2018).

In conclusion, mechanical recycling can not maintain fibers value and characteristics, chemical solutions require precise and expensive separation technologies and thermal processes eliminate material potential altogether (Sandvik & Stubbs, 2019; Sandin & Peters, 2018).

As a consequence, it can be concluded that recycling is very difficult for circular brands, that invest huge amounts of money to obtain the necessary knowledge and technologies to do that. It would be even more difficult for most fast fashion brands, almost structurally impossible (Energies, 2023). In the fast fashion industry, both low and premium-priced brands, commercialize large share of garments that combines cotton with polyester, viscose with elastane or includes complex dyeing and finishing processes that make separation unfeasible (Energies, 2023). Even when brands launch take-back initiatives, these mainly result in downcycling, with clothes shredded into insulation or cleaning cloths rather than being transformed back into textiles (Sandin & Peters, 2018).

In addition to structural and technological barriers, regulatory inconsistencies represent another major obstacle to circularity in fashion. The European legal framework is still fragmented, with obligations and fibers certifications that vary from country to country and directives that remain incomplete or unevenly applied (European Commission, 2023). The most emblematic case is the Extended Producer Responsibility scheme. This policy, first introduced and now valid only in France, requires producers to assume financial and operational responsibility for the end-of-life management of the garments they place on the market (European Commission, 2023). In principle, EPR should promote eco-design, incentivize the development of recycling infrastructures and ensure that companies contribute directly to the costs of collection, sorting, and material recovery (European Commission, 2023). Substantially, with this regulation, producers are legally required to account for the volumes released into the market and to demonstrate responsibility for where garments end up and could theoretically reuse materials to produce new products within their own line, but this is not legally possible (European Commission, 2023). For fast fashion brands, which launch huge quantities of products every season, this represents not only an enormous financial burden but also a logistical challenge of unprecedented scale.

However, because EPR is currently mandatory only in France and not yet harmonized across the European Union, its effectiveness is severely limited. While France obliges brands to contribute to specialized organizations that manage collection and sorting, in most other EU countries this system doesn't even exist (European Commission, 2023).

More importantly, under current European waste legislation, once a garment has been sold, worn and discarded by a consumer, it is legally classified as *waste*. This classification means that only certified waste-management companies are authorized to handle, process or recycle it (European Commission, 2023). Fashion brands themselves are prohibited from directly taking back post-consumer garments,

dismantling them or reusing recovered fibers in their own production cycles, unless they collaborate with licensed intermediaries (European Commission, 2023). The rationale behind this rule lies in the need to prevent environmental and health risks linked to improper waste handling, but in practice, it blocks one of the central mechanisms of circular fashion: the possibility for brands to close the loop on their own products.

This regulatory gap generates a paradox. In France, where EPR is in force, producers must fund collection and recovery systems, yet they still cannot directly process the garments, as these remain in the hands of licensed waste operators (European Commission, 2023). In the rest of Europe, where EPR is not yet applied, brands are under no real obligation to manage end-of-life products at all, which perpetuates the linear *produce–consume–dispose* model (European Commission, 2023). As a result, only a very small share of unsold inventory or pre-consumer waste can be internally recycled, while the vast majority of post-consumer garments are diverted into external systems that are often underdeveloped, opaque and incapable of true fiber-to-fiber recycling (Energies, 2023).

Consequently, in this fragmented legislative environment, companies would need permits, specialized facilities and the capacity to manage waste streams. Currently, no certified recycling chains exist that can handle used textiles in a way that allows genuine fiber-to-fiber recycling, and for this reason, the majority of used garments are downcycled, disposed, exported to countries with limited waste infrastructures or incinerated, contradicting with the fundamental principles of circularity (Energies, 2023).

Empirical evidence from interviews supports these points. For example, interviewees, in particular with ID'EIGHT and Save the Duck, highlighted that even when brands have the technological capability to recycle or repurpose their products, the law prevents them from doing so in-house (ID'EIGHT, 2025; Save the Duck, 2025).

Consequently, circular brands face structural constraints, whereas fast fashion companies remain under no incentive to alter their linear, volume-driven model. Until the Europea Union establishes specialized recycling infrastructures and harmonizes regulations, EPR will remain a potentially effective but practically limited tool for enabling genuine circularity in the fashion industry (European Commission, 2023).

As a consequence, the coexistence of fragmented regulations, structural rigidity and technological limitations produces a multidimensional lock-in: while circular startups face disadvantages due to laws and infrastructures that are not yet in place, large fast fashion companies remain structurally and institutionally disincentivized from moving away from their linear and volume-driven model (Energies, 2023).

In conclusion, the integration of circularity into fast fashion is made very difficult by a combination of structural, technological and regulatory barriers. Fast fashion's main characteristics, such as high-volume, fragmented and opaque supply chains, evidently conflict with the traceability, modularity and controlled material flows required for circular practices (Sandvik & Stubbs, 2019). Moreover, technological barriers in circular practices implementation, like, for instance, the difficulties in recycling mixed fibers and the energy-intensive nature of processes, further hinder closed-loop systems and discourage both low- and premium-price fast fashion brands to include circular practices in their business models (Sandin & Peters, 2018; Sandvik & Stubbs, 2019).

#### **5.4 Consumer Behavior and Consumption Culture**

Consumer behavior and consumption culture represent an important barrier, but also a critical opportunity for the fashion industry's capacity to integrate circularity, and their influence deeply differs between fast fashion business models and purpose-built circular wear brands. In fast fashion, consumer behavior is strongly conditioned by a culture of disposability, immediacy and low-cost consumption, actively reinforced by especially low-price brands' business strategies, that prioritize extremely frequent collection cycles, low-priced garments and high-volume sales (Birtwistle & Moore, 2007; Joy et al., 2012). A key cultural barrier is represented by the current absence of a repair culture among consumers: as reported by ID'EIGHT, many people no longer know how or where to repair garments, especially because the perceived cost or effort of mending fast fashion items often exceeds the price of buying new ones. This gap is exacerbated by insufficient infrastructures resulting in widespread disposal of textiles into general waste streams (ID'EIGHT, 2025). As a consequence, those lack of knowledge and cultural familiarity with garment maintenance, prevents effective consumer education and limits engagement with circular practices. In this environment, convenience-driven behaviors have much more success than circular practices, that aim at extending apparel life, reinforcing linear consumption patterns and entrenching a systemic preference for novelty and disposability (ESG360, n.d.; Green Bocconi, n.d.). Furthermore, without clear regulatory requirements that force fashion brands to be more transparent about product origins, composition and environmental impact of their products, consumers cannot be fully informed, and this, obviously, prevents their ability to make sustainable choices.

In conclusion, addressing these cultural gaps is essential for reshaping habits toward repair, reuse and responsible consumption.

Moreover, in this complicated environment, economic incentives to participate in circular programs are frequently absent or inadequate; take-back initiatives, recycling points and donation schemes often provide no immediate benefit, making disposal the easiest and most rational choice. All together, these factors demonstrate that both low- and premium-price fast fashion business models,

not only exploits consumer behavior, but actively cultivate and normalize habits that hinder circularity, embedding structural, cultural, and behavioral barriers in a mutually reinforcing loop (Niinimäki et al., 2020; Bocken et al., 2014). As a result, circular strategies across the full 9R spectrum are extremely difficult to implement within fast fashion unless consumer behavior shifts significantly, highlighting the critical role of end-user collaboration.

By contrast, circular fashion brands such as Save the Duck, ID'EIGHT, Rifò, Progetto Quid, Filippa K and Redo Upcycling, illustrate how consumer behavior can be strategically mobilized to facilitate circularity: they have developed multi-point engagement strategies that recognize awareness, cultural sensitivity and incentives as central to the successful adoption of circular practices. For instance, Save the Duck have recently started to use the Certilogo QR codes, that contain detailed Digital Product Passports, including material composition, certifications, production processes and environmental impact, of each product it sells, exemplifying the integration of transparency, education and digital tools in the T&A sector. Not only, through the QR code, clients can also resale their used clothes on eBay and donate them thanks to partnerships with Humana Vintage; this ensures traceable and responsible circulation of garments, while offering tangible benefits to consumers without generating any profit for the brand (Save the Duck, 2025). Moreover, during the interviews, ID'EIGHT emphasized that consumer engagement is strongest when sustainability is combined with aesthetic (ID'EIGHT, 2025), while WRÅD put a deep emphasis on emotional value, illustrating that design, style and sentiment are integral to motivating circular behavior, particularly among younger demographics who are more receptive to resale, rental and second-hand consumption (WRÅD, 2025; Del Vacchio Leather, 2021). Crucially, these strategies demonstrate that circular initiatives can only be successfully operationalized when consumers actively collaborate and engage with the system, transforming theoretical practices into real-world outcomes (Bocken et al., 2014; Niinimäki et al., 2020).

Furthermore, as it was already said, empirical and theoretical evidence underscore that the geographic and cultural context significantly mediates consumer engagement: cities with higher environmental consciousness and civic participation, such as Verona and Trento, provide fertile ground for circular initiatives, as demonstrated by Progetto Quid, Rifò, and Redo Upcycling. Generational differences also shape consumers participation: Gen Z and Millennials are substantially more conscious than Baby Boomers or older consumers, and, consequently, more likely to embrace reuse, rental and second-hand purchases. This can be done with different motivations, including cost savings, access to premium brands, decluttering and contributing to environmental and social goals (Del Vacchio Leather, 2021).

This distinction between younger and older customers highlights that, circular brands, can tailor interventions to specific segments, aligning product design, functionality, emotional resonance and sustainability messaging to transform cultural awareness into actionable behaviors, while can work on creating more awareness on older people, making them more sensitive to environmental and social problems. Fast fashion, in contrast, remains blocked in a linear model, due to consumer expectations of speed, novelty and affordability. This obviously limits any opportunity to convert awareness or environmental concern into participation in circular practices.

In conclusion, consumer behavior dynamically interacts with the sector's structural and technological barriers, both reinforcing linearity or amplifying circular potential. In fast fashion, even with improved infrastructures and practices, the customers' habits, oriented toward convenience and immediacy, would probably limit adoption of recycling, repair, or resale programs, perpetuating a linear system. At the opposite, the interviewed circular brands demonstrated that engaged consumers can enhance the effectiveness of take-back schemes or design-for-recyclability initiatives, generating positive feedback loops that reinforce circular practices and create market differentiation (Niinimäki et al., 2020; Bocken et al., 2014).

Finally, as it was seen in this paragraph, the literature and empirical evidences converge in describing consumer behavior as a dual-edged determinant: it is not merely a passive constraint, but a very effective strategic tool: in fast fashion, it amplifies linearity and obstructs circular transition, whereas in circular brands, it can be used to drive adoption, system-level change and market differentiation. Critically, circular strategies across the 9R spectrum can only be effectively implemented when consumers actively participate. This means that, in order to promote circularity, position consumers as important co-creators rather than merely end users and creating awareness among them, allow circular practices to spread beyond niche markets into mainstream fashion systems, it is imperative that the socio-cultural aspect of consumption be effectively addressed (Niinimäki et al., 2020; ocken et al., 2014).

### **5.5 Structural Incompatibility of Fast Fashion with Circularity**

The integration of circularity into fast fashion models is fundamentally limited by structural incompatibilities embedded in their business paradigms, which prioritize rapid production cycles, high-volume consumption and planned obsolescence, directly contradicting principles of durability, repairability and material recovery central to circular fashion (Joy et al., 2012; Fletcher, 2010). Unlike technological or regulatory constraints, which can be addressed incrementally, structural incompatibility reflects a deep misalignment between fast fashion's core business logic and circular principles (Joy et al., 2012; Fletcher, 2010).

A central source of incompatibility lies in the emphasis on quantity and speed. Fast fashion relies on economies of scale, in order to reduce production and transport costs, offering in the market with large volumes of low-cost garments. Industry insiders note that this focus on volume and low costs is incompatible with any attempt to shift toward genuine circularity: slowing production, improving material quality or designing garments for repair would fundamentally alter the fast fashion model and raise final prices beyond what the market currently accepts (Joy et al., 2012; Fletcher, 2010). As a consequence, low prices and low-cost materials that degrade quickly, make the repair option economically inconvenient for the customers, while, at the exact opposite, circular brands operate on smaller and concentrated production volumes, emphasizing quality, local sourcing and production and durability (Fletcher, 2010).

Furthermore, fast fashion brands' marketing strategies exacerbate more the tragic situation. Aggressive communication and continuous new collections launch, in order to be up to date with all the trends, strongly incentivize disposability and short-term clothes ownership, discouraging repair, resale or long-term use (Joy et al., 2012). Consumer perception of value remains oriented to novelty and new trends, rather than durability, quality and even technically recyclable garments. It is clear that, in many fast fashion contexts, sustainability has become a marketing instrument rather than a core operational principle, effectively eliminating any authentic voice for systemic change. Initiatives such as resale platforms or take-back points, even if visible to the consumer, do not change the logic that is at the basis of production or supply chains, reinforcing linearity instead of promoting genuine circular practices (Joy et al., 2012).

Empirical evidence underscores this misalignment, demonstrating that even premium brands, often perceived as exemplars of quality and sustainability, remain entangled in practices that undermine circular objectives. For example, Loro Piana was subject to judicial administration after illegal subcontracted workshops exploited workers and Giorgio Armani was fined 3.5 million euros for making false sustainability claims due to violations in subcontracted facilities (The Good in Town, 2023; Economia Circolare, 2023). As a consequence, it is evident that, even for premium-price Italian brands, implementing circular practices effectively is sometimes hampered by fragmented global supply chains, reliance on subcontracting and pressure to maintain production numbers. These instances show that even high-end firms struggle to strike a balance between their operational commitments and their ethical and circular pledges.

In this context, brands often combine opacity, selective sustainability messaging and superficial reporting to convey an illusion of circularity, but without altering in any way the underlying linear model. The resulting marketing strategy from this process is called *greenwashing*: a very used marketing tool that highlights minor improvements in material composition, sponsor isolated

environmental projects or promote traceable small-scale initiatives, while the maintaining the business logic linear (Delmas & Burbano, 2011).

ID'EIGHT founder confirmed that certain well-known luxury labels, such Salvatore Ferragamo, only establish a small part of their value chain in Italy, while the biggest part of their value chain is externalized in other counters. Despite this, given that, for the Italian law, brands need to produce only the 1% of a product in Italy to declare it *Made in Italy*, such premium brands are considered an iconic symbol of quality, craftsmanship and sustainability (ID'EIGHT, 2025).

In a similar way, two famous brands' circular campaigns, such as Zara's *Join Life* and H&M's *Conscious Collection*, provide exhaustive examples of how greenwashing practices are embedded within fast fashion, highlighting the structural incompatibility of these models with genuine circularity. Zara claims that, over 50% of its collection met *Join Life* standards by 2022, leaving a substantial part of products outside these sustainability criteria and failing to effectively lower the negative environmental impact of the company's production practices (Eco-Stylist, 2022). Moreover, the materials used in the collection often lack independent third-party certification, and this limited consumer ability to verify sustainability claims and raising concerns about transparency. This lack of transparency is further complicated by the Zara's business model's main characteristics: short production cycles, continuous product turnover and cheap garments designed for quick replacement (Fletcher, 2010). Such practices are, by definition, directly against the values of durability, repair, and material recovery that define circular fashion (Joy et al., 2012). H&M has faced similar problems with its *Conscious Collection*. In 2022, the company was hit with a class-action, that accused the brand of misleading consumers through labels like *eco-friendly* and *sustainable*, which were argued to breach consumer protection laws (Business & Human Rights Resource Centre, 2023). Although the case was dismissed in 2023, it was only on a procedural point of view, leaving the ethical concerns unresolved (Business & Human Rights Resource Centre, 2023). Reports have since shown that some pieces in the collection were made entirely from polyester, a material notorious for its environmental impact, which casts doubt on the credibility of the brand, surrounding greenwashing accusations. H&M's clothing recycling scheme has also been criticized. Instead of being reused in new garments, a significant portion of returned items is downcycled into products like insulation or cleaning cloths, raising serious questions about the program's effectiveness, especially because there is a large gap between reality and company's declarations. Greenwashing, in these contexts, is a very used marketing strategy across both mass-market and luxury sectors, because it allows companies to create the perception of sustainability while maintaining fundamentally linear production processes, demonstrating that the operational model itself, rather than isolated product lines, remains the primary barrier to implementing systemic circular practices (Delmas & Burbano, 2011).

In conclusion, even when introducing recycled fibers or take-back schemes, the continued mass production of low-quality garments impedes meaningful circular impact. In sum, the structural incompatibility of fast fashion with circularity regards different touchpoint, such as design, supply chains, pricing, marketing, consumer culture and greenwashing (Fletcher, 2010; Joy et al., 2012). High-volume, low-cost and speed-driven production actively impedes repairability, longevity and material recovery. It is evident, from the interviews with circular brands, that meaningful integration of circularity requires a fundamental redesign of production logic, supply chain transparency, ethical investment and governance (Fletcher, 2010). In conclusion, circular brands demonstrate that differentiation is possible through smaller-scale production, durable and modular design, transparent supply chains and digital tools that are able to educate and engage consumers. Addressing these dimensions can provide a path for a meaningful circular transformation, moving beyond superficial sustainability narratives and marketing tools and toward sincere systemic changes in the fashion industry.

### **5.6 Answer to the RQ: Barriers and Opportunities for Circularity in Fast Fashion**

As demonstrated in this fifth chapter and, previously, from the interviews in chapter four, the integration of circularity into fast fashion models is obstructed by a combination of economic, structural, technological, regulatory and cultural barriers, that, all together, create systemic incompatibilities between the business logic of fast consumption and principles that are at the basis of circular economy. On the economic side, circular practices, such as design for durability, repairability or recyclability, inevitably imply higher costs in terms of materials, labor and infrastructure and that are fundamentally misaligned with fast fashion's low-price, high-volume model. Recycled and certified fibers remain significantly more expensive and less competitive compared to conventional alternatives, generating what Bocken et al. consistently described as a persistent *cost-value gap*. This fast fashion's cost advantage, as it has been already explained, is due to the fact that, structurally, the fast fashion system is based on fragmented, opaque and globalized supply chains optimized for speed, scale, and cost minimization. This reliance on subcontracting and delocalized production makes it extremely difficult to implement traceability, localized production or efficient take-back systems.

Technological barriers further aggravate these issues: as it has been demonstrated in the previous paragraphs, mechanical recycling shortens fibers, producing outputs that are downcycled into low-value products such as insulation or cleaning rags. In the same way, chemical recycling, while theoretically capable of producing near-virgin, quality fibers through depolymerization or solvolysis, remains energy-intensive, solvent-heavy, costly and largely limited to pilot plants. Lastly, thermal recycling preserves energy value but also eliminates material value, directly contradicting circular

economy basic principles. These limitations become even more severe with blended fibers, coatings, elastane and synthetic finishing agents that dominate fast fashion garments, which are nearly impossible to separate or recycle at scale.

Furthermore, on the regulatory side, the European framework remains fragmented and inconsistent: Extended Producer Responsibility, first of all, is currently mandatory only in France, where producers must trace their products and collection, recovering them at the end of their life and being responsible for all the products' lifecycle, while in most other EU countries no such obligation exists. In this way, under current EU waste legislation, once garments have been worn and discarded by consumers, they are legally classified as waste, meaning that only licensed waste operators are authorized to process them; consequently, this prevents the possibility for brands to directly reclaiming, dismantling and reusing post-consumer textiles, even when they have the technological capability, unless they collaborate with certified intermediaries. This legal framework, intended to prevent environmental and health risks linked to improper waste handling, paradoxically prevents companies from closing the loop on their own products and work as a disincentive for fast fashion brands to initiate or implement such circular practices.

Finally, cultural barriers also are very relevant. Consumers often lack basic knowledge about where and how to repair or recycle garments, perceive repair as more costly and inconvenient than repurchasing, and are influenced by marketing strategies that valorize novelty and disposability. The under development of the repair culture and convenience-driven behaviors have reinforced linear consumption patterns, entrenching disposability as the dominant cultural norm in fast fashion markets.

Despite these formidable barriers, significant opportunities also emerge, many of which are linked to the very same areas where the obstacles are strongest.

From an economic perspective, while costs are often cited as insurmountable, especially premium-price fast fashion brands already have the financial possibility and market positioning necessary to invest in circularity. Premium fast fashion companies operate with higher margins and can more easily absorb the costs of sustainable materials, localized production and circular infrastructures, lowering their huge profit margins, and producing at higher costs still offering their products at almost the same price. However, even low-price fast fashion groups, due to their scale, can mobilize substantial capital if circularity is strategically prioritized. Consequently, the *cost-value gap* is less a technical limitation than a strategic choice: if redirected, the enormous financial resources and global distribution systems of fast fashion groups could serve as a foundation and some help for building scalable circular infrastructures.

Moreover, although the fragmented regulatory framework currently represents a major obstacle, it also offers an important strategic opportunity for fashion brands willing to anticipate change. EPR Regulation and all the sustainability certifications are expected to be progressively harmonized at the EU level, making it possible for circular brands to recuperate their own discarded products and use them for their next collections, but also it will be an incentive for fast fashion brands, that will be forced to assume a more responsible attitude towards customers about the input used to produce their garments, about where they produced them and about their end-of-life management.

Additionally, although the structural, technological and regulatory barriers to circular fashion are numerous, there are also concrete opportunities that, if approached as systemic transformations, rather than marketing tool, could partially mitigate the contradictions of the fast fashion model and draw the way for more responsible paths. Among the most promising initiatives, there is the integration of second-hand and resale platforms, which respond to the rapidly growing consumer interest in pre-owned garments and the expansion of the recommerce economy; even some low-price fast fashion brands have already developed platforms such as *Zara Pre-Owned* or *H&M Rewear*, which allow customers to resell or donate items directly through the retailer's infrastructure. Another option can be the development of hybrid consignment or buy-back models, where the brand itself takes charge of used items, refurbishes them and resells them as *certified pre-owned*. In operational terms, the implementation of such systems requires a well-structured process: garments must be collected via in-store take-back or home pick-up, graded according to condition and quality, refurbished when necessary (with activities like cleaning, small repairs re-packaging) and then reintroduced into circulation via digital marketplaces integrated with e-commerce systems. If properly managed, resale strategies can extend garments' lifespan, generating new revenue streams and creating consumer touchpoints that go beyond the first sale. However, risks of rebound effects and greenwashing are high: resale can lead to increased overall consumption (consumers buying more *because they can resell later*) and may be used as a reputational shield while maintaining overproduction at the core. To avoid this eventual problems, resale initiatives must be tied to absolute reduction targets in primary production and their credibility should be measured through transparent KPIs, such as the capture rate (ratio of garments collected vs garments sold), the resale rate, the average life extension achieved and the amount of CO<sub>2</sub> emissions avoided per item.

As Zara and H&M, also premium-priced brands, such as Gucci or Stella McCartney, have already experimented with authenticated resale platforms, setting higher benchmarks in quality control and traceability, while brands like Save the Duck offer a particularly illustrative case in combining resale with digital product passports.

Another promising practice is the experimentation of the Product-as-a-Service models, including rental, subscription-based wardrobes and repair-as-service practices. While most current applications are in formalwear rental or luxury subscription models, there is potential for fast fashion brands to develop hybrid forms, such as, for instance, affordable short-term rental of capsule collections, event-based rentals or low-cost subscriptions to rotating wardrobes. Operationally, such models require high utilization rates (multiple wears per item per year), efficient logistics (collection, cleaning, redistribution), durable garment design (reinforced seams, replaceable zippers, fabrics suitable for professional cleaning) and customer trust through insurance systems for damages. If well managed, PaaS can reduce the environmental impact per garment that is produced and shift consumer culture towards access rather than ownership. However, the environmental benefits can be limited by transportation and cleaning impacts, which means that life cycle assessment is essential for each model. In the fast fashion context, where margins are tight, these models could function as complementary business lines rather than core activities, only partially solving the environmental and social damages that the sector creates, but they would nonetheless represent an opportunity to diversify revenue streams and experiment with circular consumption. Two elements linked to the PaaS, in the fast fashion context, could reduce these brands negative impact: first, the success of such models depends on localized logistics hubs to minimize transport impacts and on digital integration for efficient asset tracking and, second, low-price fast fashion brands would need to increase the quality of fabrics and construction in order to limit wear-and-tear damages, withstand repeated cleaning cycles and maximize the functional lifespan of each garment, which is a prerequisite for the economic and environmental viability of PaaS systems.

Finally, digital enablers and traceability mechanisms, such as Digital Product Passports and QR code and RFID tagging, are necessary for the credibility and effectiveness of all the mentioned strategies. By giving to garments their circular identities, brands can store and share data on material composition, repair history, origin of raw materials, production sites, certifications and post-consumer pathways. These tools not only enhance transparency but also facilitate resale, recycling and donation processes by providing essential information at every stage of the garment's lifecycle.

The crucial aspect here is that traceability makes more effective and data-driven the brands' governance model: over educating and informing customers, DPP and RFID permits to the brands to know in details how many garments are donated, resold, recycled or discarded, brands can monitor the real effectiveness of their circular initiatives and adjust them accordingly. While premium brands such as Ferragamo or Armani could leverage DPP to reinforce claims of craftsmanship and origin, fast fashion brands would need to adopt these tools to counter widespread accusations of opacity and greenwashing.

Complementary to the circular strategies described in this paragraph, significant strategies exist to take an advantage from these opportunities transforming consumers into active participants in circular systems, particularly through targeted education on repairability, garment quality and maintenance. For both low-price and premium fast fashion brands, education can be used as a strategic tool. Through multi-channel campaigns that integrate digital, physical and experiential touchpoints, brands can, for example, launch marketing campaigns that highlight durability and repairability concepts, while providing step-by-step instructions for basic repairs, such as mending seams, replacing buttons or reinforcing hems, or to maintain garments and extend their lifecycle.

Furthermore, low-price brands can base their strategy on social media short videos, TikTok challenges or Instagram tutorials to show customers how to extend the life of everyday garments, while premium brands might create curated, narrative-driven campaigns, for instance featuring designers or artisans, demonstrating repair techniques, to emphasize craftsmanship, Made in Italy and high-quality materials. In-store and community initiatives are equally important: for instance, premium-priced brands could organize and host workshops, offering Q&A meetings on garment care or repair days, where customers can bring items for free or discounted mending. A clear guidance on where consumers can go to repair their garments should also be guaranteed, including maps and information on websites or apps, showing certified repair locations, drop-off points for refurbishment or integration with take-back schemes. Moreover, digital tools such as QR codes or Digital Product Passports can help these initiatives, providing detailed information on fabric composition, production processes, certifications and maintenance tutorials linked to specific garments, ensuring consumers can care for their clothing properly, extending their useful life.

These strategies may also be ineffective for low-price fast fashion brands, that could, in this case, offer incentives to reinforce engagement: due to their products' very low price, consumers could not see repairing low-price brands clothes as convenient, preferring to buy a new product instead. For this reason, they might offer deposit-return schemes or discounts when garments are returned for repair, resale or donation. At the opposite, premium brands could provide exclusive rewards, early access to new collections or loyalty points linked to circular behaviors. Additionally, gamification, such as tracking the CO<sub>2</sub> saved, water conserved, or the number of repairs performed, makes participation tangible and can truly motivate customers. Relatively to this, it has been demonstrated that active participation in circular initiatives produces additional value: it fosters brand loyalty and encourages consumers to act as advocates within their networks, effectively multiplying the impact of circular business models. Without consumer collaboration, circular strategies can not scale, demonstrating that consumer engagement is not optional, but the critical enabler for operationalizing the full spectrum of circular practices.

However, the concepts of transparency, storytelling and educational campaigns must work synergistically with incentives, creating a comprehensive approach to consumer engagement.

In conclusion, while none of the proposed strategies can alone resolve the structural contradictions of the fast fashion model, they nonetheless constitute significant opportunities if implemented in an integrated and accountable manner. Among these strategies, especially for fast fashion brands and due to its limitations, recycling remains the less convenient, both on an environmental and technical point of view. By contrast, strategies such as reuse, resale, repair and refurbish appear considerably more feasible and impactful in the short to medium term: they do not depend on disruptive technological breakthroughs, but directly extend the functional lifespan of garments, and can be implemented through existing infrastructures with relatively lower investments.

### **5.7 Theoretical Contributions**

This research contributes to the theoretical work already conducted on circular economy and fashion, advancing the understanding of how fast fashion's structural logic conflicts with the principles of circularity, but also identifying more viable and short-term path for the change. Previously, literature has emphasized the technical, cultural and systemic challenges of integrating circularity into fashion (Niinimäki et al., 2020), while Sandin and Peters highlighted the technical limitations of textile recycling, particularly the downcycling due to the limitations of mechanical processes and the costs and energy demands provoked by chemical recycling (Sandin and Peters, 2018). In a similar way, Sandvik and Stubbs also argued that technological innovation, although promising, cannot by itself reconcile the contradictions embedded in the fast fashion model (Sandvik and Stubbs, 2019). The present study confirms these insights but extends them by showing that, within fast fashion, fiber-to-fiber recycling remains largely aspirational, constrained not only by technological immaturity but also by regulatory restrictions and the misalignment between circular infrastructures and a business model oriented to low cost and high volume (Sandin and Peters, 2018)

In line with Niinimäki et al., who contend that addressing sustainability in fashion requires systemic cultural and business model transformation (Niinimäki et al., 2020), the findings of this research highlight the relative feasibility of reuse-, resale-, repair- and refurbishment-oriented strategies, which directly extend garment lifespans and circumvent some of the technological and infrastructural barriers of recycling. This builds upon Koszewska, who pointed out the importance of consumer awareness and attitudes in the adoption of circular fashion, by providing a generationally differentiated analysis of consumer engagement (Koszewska, 2018). In particular, the research demonstrates that Gen Z and Millennials show higher receptivity to environmental and social concerns, but also to resale platforms, refurbishment programs, repair services and digital impact

tracking, while Millennials are primarily motivated by affordability and access to premium fashion through resale or rental, while Gen X and Baby Boomers are less sensitive to the topic (Koszewska, 2018). This generational framing offers a theoretical advance over prior literature by connecting consumer cultural dynamics with business model innovation in circular fashion.

In addition, the study extends these perspectives showing that even within fast fashion, experimental models such as resale platforms, repair services and product-as-a-service schemes can be operationalized, though only if supported by systemic investment, digital traceability and regulatory alignment (Norris, 2019; Pedersen et al., 2019). In the same way, Norris and Pedersen et al. stressed the risks of rebound effects and greenwashing in circular fashion initiatives, and this research confirms those risks while proposing governance mechanisms such as transparent KPIs as essential safeguards (Norris, 2019; Norris, 2019). Finally, the analysis supports and expands the arguments of Han et al., who demonstrated that consumer education and repair culture are crucial for sustainable fashion, by illustrating how multi-channel, generationally tailored educational strategies can transform consumers into active co-creators of circular value chains (Han et al., 2017). Overall, the study theoretically and empirically contributes analyzing the technological, structural, regulatory and cultural dimensions of circular economy and synthesizing them in its main opportunities and barriers. Moreover, it redefines circular fashion not as a set of isolated practices, but as an integrated transformation of business models, governance structures and consumer cultures (Niinimäki et al., 2020; Sandvik and Stubbs, 2019).

## **5.8 Limitations and Future Research**

Despite its interesting contributions, this study presents several limitations, first of all its methodological perspective, given that the research relies primarily on a qualitative design based on semi-structured interviews. While this approach has provided rich, insightful and in-depth information about the barriers and opportunities relative to the integration of circularity in fashion, it also limits the generalizability of the findings to the broader industry. The sample made of eight companies interviewed, although carefully selected, does not capture the full diversity of actors in the global fashion ecosystem, particularly those operating in the international market, especially outside Europe. From a geographical and institutional perspective, the research is largely situated within the European context and pays particular attention to the EU regulatory framework, especially in relation to Extended Producer Responsibility, Eco-Design, and waste legislation. While this focus is justified by the rapid policy evolution in Europe, it also constrains the applicability of findings to other global regions where institutional infrastructures, regulatory approaches and cultural practices differ significantly, such as, for instance, in North America, in which the regulatory landscape is less

harmonized. As a consequence, these contextual variations suggest that European-centric frameworks are not able to fully capture the complexity of global supply chains, raising questions about transferability and scalability of proposed solutions.

Furthermore, the absence of quantitative methodologies such as life cycle assessment (LCA), material flow analysis (MFA), or econometric modeling reduces the capacity to measure with precision the environmental and financial impacts of the strategies identified. In the same way, the study highlights promising strategies such as resale, repair, refurbishment and product-as-a-service, but does not explore in depth the long-term economic viability of these models under different market conditions. The analysis, first of all, focuses on identifying opportunities rather than quantifying trade-offs, such as the balance between increased logistics impacts and environmental benefits in rental or resale schemes. Similarly, the generational analysis of consumer engagement would benefit from further empirical validation through larger-scale surveys or behavioral experiments.

Future research should therefore move in several directions: first, comparative and cross-regional studies are crucial to understand how cultural, regulatory and infrastructural differences shape the feasibility of circular strategies and, secondly, a future research should deepen the investigation into consumer engagement, focusing especially on the evolving values and practices of Gen Z and Millennials, who are emerging as key drivers of change in fashion consumption. In this context, quantitative surveys could illuminate how education, incentives and digital tools, such as gamification and product passports, can be used by brands as strategic and marketing tools in order to influence long-term behavioral shifts.

In conclusion, while this study provides valuable insights into the systemic barriers and opportunities of circularity in fast fashion, future research should expand its methodological rigor, geographical scope, and theoretical depth to generate a more comprehensive and globally relevant understanding of how circular models can be scaled in the fashion industry.

## Conclusion

This thesis has treated and deeply examined the opportunities and barriers of embedding circular economy principles in the fashion industry, particularly focusing on the structural differences between linear, fast fashion and circular oriented fashion brands. Through qualitative interviews, analyzed with the Gioia Method, the research has identified the key barriers that limit or impede the circular practices integration in these business models and the opportunities that may serve as entry points for transformation.

The findings showed that the most critical barriers are structural in nature: fast fashion's dependence on speed, high volumes production and very high profit margins is incompatible with the principles of durability, repairability and material recovery. Technological solutions, such as fiber-to-fiber or chemical recycling, remain limited in scope and their potential is further constrained by cost structures, infrastructural immaturity and regulatory misalignment. Cultural dynamics further make it more difficult this integration: consumer value is still largely associated with novelty and trends, rather than with longevity or repair. Together, these factors confirm that the core business logic of fast fashion is fundamentally at odds with circularity.

Moreover, the research also pointed out that circular strategies, such as, reuse, resale, repair and refurbishment emerged as more feasible on a short-term period, retaining them as capable of extending product lifespans while bypassing recycling's technical limits. Additionally, digital traceability and impact-tracking tools were identified as mechanisms to increase transparency and consumer engagement.

On a consumer culture perspective, generational insights add further nuance: people still prefer buying products at lower prices, and they still continue choosing up-to-date very cheap or status driven products. Yet, Millennials and Gen Z are defined as more receptive to circular practices, probably motivated by both environmental and social concerns, while older people still remain less aware and sensitive to the topic.

Moreover, governance mechanisms, such as EPR and standardized KPIs and certifications, appear essential to prevent greenwashing, also ensuring that circularity initiatives are systemic rather than symbolic.

The comparative analysis with circular brands has been very useful do individuate these dynamics and fundamental differences between these two types of business models., highlighting the need for systemic interventions, like policy frameworks, infrastructure investments and consumer education, in order to create a level playing field.

In conclusion, the contribution of this study lies in its integrated individuation and mapping of barriers and opportunities. Unlike a high number of the existing literature emphasizes recycling technologies

and technical barriers, this research shows that the most significant obstacles are also structural, regulatory and cultural, while the most promising pathways lie in extending product lifespans and reshaping consumer practices. By articulating these dynamics, the thesis advances theoretical understanding of circular fashion, demonstrating that while fast fashion's current structure is largely incompatible with genuine circularity, change is not impossible and also offering practical insights for industry actors and policymakers.

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