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# SUSTAINABILITY IN THE FASHION INDUSTRY

**How Italian SMEs are translating  
the concept of sustainable fashion**

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## **ABSTRACT**

This thesis explores the current situation of the fashion industry regarding its impact from an environmental and social point of view. The first three chapter are a general review of three main concepts linked to the sustainability theme, while the fourth one presents a research performed on a sample of case studies.

In the first chapter, the concept of circular economy is addressed. The origins of this idea, that hopes in a system where the waste of a process can be kept in circulation as inputs for another or the same process, are presented together with the main elements needed for its implementation. The second part of the chapter is dedicated to the fashion industry by analysing why applying this regenerative theory is important for the fashion sector and the new business models that can be created on the basis of this idea.

Circular economy, however, requires a revolution in the whole industry. This means that the whole supply chain has to be changed and addressed to the goals of the circular economy theory. We thus dedicated the second chapter to explore the idea of a sustainable supply chain. After having defined what they are, we presented the typical supply chain in the fashion industry. It has been compared to the ideal steps in a sustainable value chain and then some examples of brands that are currently applying these ideas have been described.

The theoretical part is concluded with another concept linked to sustainability, that is the upgrading of suppliers within the chain. In fact, a sustainable supply chain should include also the possibility for the suppliers to grow, gain some power and be considered partners rather than just suppliers. Together with this kind of upgrading, that is an economical one, the ideas of a social upgrading and an environmental one are considered. They involve the implementation of better working conditions and the use of new technologies to limit the suppliers' impact on environment. This third chapter has been added because the theme is particularly important for fashion industry, where usually many steps of the supply chain takes place in less developed countries where the labour rights are not guaranteed, and where the environmental awareness is not developed.

To conclude the bibliographic review, we highlighted the fact that sustainability is a wide concept and that different interpretations are given to it, especially when it is put into practice. This consideration is valid also for the fashion industry, where the application of the idea of sustainable fashion can assume different forms.

In the last chapter, we present the research that we performed to understand which forms is assuming sustainable fashion in today Italian medium-hand fashion market. Analysing a sample of eleven sustainable brands, we were able to understand where they are focusing their attention. The results indicated that their main concern is the choice of raw materials. Other aspects of sustainability are underdeveloped, indicating that the path towards a sustainable fashion is still long. A limitation in their actions is given by the fact that the firms in our sample are generally small and with few resources. For this reason, we added a brief description of the sustainability programme of other two big Italian brands. Moreover, we dedicated a paragraph to the suppliers of raw materials, that are the ones that are providing the biggest innovations in this field.

The conclusions show how that, even if small industries are pushing the demand for innovative materials and big ones are more active in the R&D and communication of

sustainability to consumers, a real implementation of a circular economy in the fashion industry is still far away.

# CHAPTER 1: CIRCULAR ECONOMY IN THE FASHION INDUSTRY

## 1.1 CIRCULAR ECONOMY

We usually hear people talking about circular economy as a concept linked to industries such as the energy one, where the research aimed to find alternative energy sources has started years ago. Nowadays, this theory is entering other sectors, such as the food one or the fashion one, where the level of waste generated, and of energy spent in the production process is becoming unbearable.

The term “circular economy” exists in opposition to the one “linear economy”. Linear economy is the classic model of consumption that arose from the Industrial Revolution and that is commonly summarized as a “take-make-use-dispose” model. Resources are taken from the environment, used to make a product that will be utilized and then thrown away. Andersen (2007) reports the theory of Pearce and Turner (1990) about the four functions that environment has for humanity:

- *Amenity values*: the environment provides pleasures directly to humans.
- *Resource base for the economy*: environment provides the inputs for human activities.
- *Sink*: the environment is used as a waste bin for the residuals of economic activity.
- *Life-support system*: this function is linked to the environment biological character, that can be influenced by the human economic activity.

When the resource base function of the environment is overexploited, as well as the sink one, harm is caused to its other two functions and there is also a lost from the economic point of view, since resources that could be reutilized are lost forever. In summary, “economic activity can impact amenity values negatively, lead to excess resource extraction, cause harmful residual flows beyond the assimilative capacity of biological systems, and reduce the regenerative capacity of life support systems” (Andersen, 2007).

Linear economy is a model no longer sustainable by the environment and, as a consequence, by the economy itself. As the term suggests, circular economy tries to transform this line in a circle, where the resources used are no longer disposed of, but, on the contrary, they never leave the process. This concept is more and more present in academic studies and press, but its implementation is still far and confined to few industries and companies, even though the awareness about it is increasing. Moreover, given the raise in population and the change in lifestyles, even if a slow decrease in resources’ use is verifying, the request for them is growing, making it necessary to change things. It is true that many companies are showing concern through the creation of corporate social responsibility reports, but these documents remain often formal statements without a real action behind them. In the following paragraphs, we will summarize the academics findings about circular economy with respect to its definition, what its implementation requires and the obstacles that it faces. We will then relate these concepts to fashion industry, showing why a circular revolution in this field is needed.

### 1.1.2 Origins and definition

The idea that lies behind circular economy was not born in a day. It derives from different concepts, discussed over the years. Below we reported the ones that literature widely recognizes as the most related to circular economy, that are industrial ecology and cradle-to-cradle.

Before circular economy, academics defined the theory of industrial ecology. It dates back to the 70s and it is about modelling industries imitating the natural ecosystems, which are able to generate the resources they need, starting from their *by-products* (Preston, 2012). Later, at the end of the 80s, Walter Stahel, an architect and economist, introduced the concept of “closing the loop”, a situation achievable by making waste at the end of the process becoming a resource for the same or for another process (Andrews, 2015). Stahel did not use the term circular economy, but he introduced the as well famous term “cradle-to-cradle” to define this new concept, later employed also by McDonough and Braungart. It opposes to the classic model, labelled as “cradle-to-grave”. The cradle-to-cradle approach aims to create products that have an economic return, do not harm the environment and the society, and, moreover, that have a positive, regenerative impact on them (Preston, 2012); it is conceived as a “system that is restorative by intention” (Genovese et al., 2017). This means that it is intended to repair previous damage together with not to create further detriment. This is possible through the implementation of two types of material flows: biological nutrients, that will re-enter the biosphere safely, and technical nutrients, designed to not re-enter the biosphere but to keep circulating at their highest quality (Murray et al., 2017).

Circular economy is strictly linked to these concepts. Lieder (2016) provides a list of circular economy related ideas, that help us understanding how this model is a holistic one, that is, a model where the parts are inherently correlated. The linked theories, such as regenerative design and critical materials, industrial ecology, remanufacturing and closed-loop supply chains, resource conservative manufacturing (Lieder, 2016), refer often just to a step of the process; circular economy aims to be comprehensive. Other research studies affirm that its final goal is related to concepts such as balance between economic development and environmental and resource protection, industrial ecology, or sustainable development with its three pillars - economic, environmental and social (Murray et al., 2017). Circular economy attempts to respect the natural cycles, by slowing and reducing the removal of material from the environment and by avoiding the excessive release of by-products (Murray et al. 2017). With this objective in mind, circular economy embraces different aspects:

- *Recycling*: that is the reutilization of resources, what could be considered waste becomes an input.
- *Dematerialisation*: material inputs are reduced, and the processes are made more efficient.
- *Adoption of cleaner technologies*: they lead to lower consumption of energy, lower emission of pollutants, and higher efficiency.
- *Alternative business models* to extend the life of a product.

According to Murray et al. (2017), unlike other schools of sustainable thought that emerged from a group of academics, circular economy developed without a path and some countries started to apply it before the arise of an organized literature. For this reason, its origin is quite debated and the term itself is associated to different concepts and nuances. In fact,

there are numerous definitions of circular economy. Clearly, they have the same concept at their basis. Other papers have already realized literature reviews about the different definitions and it is not the aim of this thesis to present a new one. As our basis, we selected the definition proposed by Ellen MacArthur Foundation in 2013, an institution that is focused on providing evidence to reach the implementation of circular economy in all the sectors. Its definition gives a comprehensive summary of the principles of this theory: circular economy is “an industrial economy that is restorative and regenerative by intention and design” (Ellen MacArthur Foundation, 2013).

### **1.1.2 WHAT ITS IMPLEMENTATION REQUIRES**

Circular economy and its related concepts are becoming more and more present in literature and in press. However, their implementation is still far and limited to just some sectors. According to academics, there are some factors required to facilitate the adoption of circular economy principles. Each factor is fundamental and has some obstacles to be overcome in order to be effective. Below we briefly analyse the three main ones, reporting their importance and their actual weaknesses.

*a. Awareness and commitment.*

People have to be aware of the treat that current linear economy is posing to the environment and society. Information about alternative solutions and their importance is fundamental to create the demand for greener products and services, necessary to boost the investment in sustainable technologies and practices. In creating awareness, an important role is played by education institutions. Kids have to be educated about the importance of not to waste and of recycling as much as possible. Universities should include sustainability courses in their educational offer.

Even though consumers' awareness is already raising, a significant slice of people is still not interested or not faithful about green initiatives. In order to create commitment, companies have to make people trust them about the veracity of their sustainability statements. A common certification or labelling system may be needed to convince people about the real impact of this new generation of products (Preston, 2012) and to make them switch to greener companies.

*b. Knowledge sharing.*

Technology is the mean that allows the transition to circular economy. In the last years, new materials, new communication media, and new processes have been created and they have the potential to revolutionize the economy. Today, there are still many technological barriers that impede a wider implementation of the circular economy concept, and, where the technology would have an alternative solution, it can happen that from an economic point of view it is still more convenient to use virgin materials rather than recycled one. Moreover, criticisms about this model state that it is not possible to recycle in perpetuity (Andersen, 2007), because at a certain stage recycling will be too difficult and expensive.

Firms need to increase their investments in research, convincing themselves that an initial important investment will be repaid in the long-run. As well, they have to start to collaborate

with the different actors in each industry. Investments in innovation should be carried on in a synchronized way and the achievements in research should be shared to obtain new results and solutions. In this step, the leader company in each supply chain may be the one with enough power and resources to initiate the revolution. The creation of cross-sectoral hubs and networks is necessary to share the findings of research centres, in order to enrich them and put them in practice. Proximity can be a factor that eases this sharing. The concepts of industrial parks or districts is not new. They can be given a sustainable appeal and converted in industrial ecosystem such the one in Tianjin. Here the steel companies are linked to other local firms, creating a network where resources can be exploited in the most efficient manner (Preston, 2012).

c. *Institutional support.*

In order to revolutionize the current system, the involvement of public institutions is fundamental. They have the power to ease and speed the adoption of new technologies and processes and to reward those companies that really act in environment conservation. European Union and China are the ones that mostly have shown commitment to these issues.

In 2010, the European Commission defined a strategy about where it wants to be in 2020. It wants to grow, and this path is driven by three priorities: smart growth, sustainable growth, and inclusive growth. A sustainable growth is intended as using resources more efficiently and adopting a greener economy. Its main focus is on separating the economic growth from an increase in the use of resources, and on shifting towards a low carbon economy, where the use of renewable sources is increased, especially the ones that provide energy. In 2015, the EU Commission presented an action plan for Europe to implement circular economy (*Closing the loop – An EU action plan for the Circular Economy*). The document establishes how this plan interests all the phases of a product lifecycle and defines the priority areas of intervention: plastics, food waste, critical raw materials, construction and demolition, and biomass and bio-based products. In May 2018, EU proposed to ban some disposable plastics items and encouraged the research of alternative solutions, showing its commitment in changing things.

Since 2000, China started to impressively grow, economically and demographically. The willingness of applying circular economy allows the country to make this growth more sustainable. This engagement has been first formalized in 2009 with the “Circular economy promotion law” and it played an important role in the two subsequent 5-year plans. Eco-city and eco-parks have been created, strict standards have been applied. Being China considered the manufactory of the world, it has all the interests and the potential to be the leader in the transition towards circular economy. China prioritized ten industrial sectors where activating an industrial recycling policy is fundamental (Consulate General of the Kingdom of the Netherlands in Guangzhou, 2016).

Despite single countries' laws and regulations, the interest in sustainability is becoming wider. The number of conferences, studies and reports is increasing. Even the pope in 2015 wrote an encyclical addressing the pollution problems and the overexploitation of natural resources and he invited all the people to act. Real actions, however, are often difficult to implement, especially when institutions do not encounter the collaboration of the corporate world. According to Andersen (2007), it can be argued that there is a limited number of circular options that are rational for companies. In fact, “if companies are rational and profit-

seeking, the recycling and reuse options should already have been realised". However, as the author sustains, this is a narrow view, that does not take into account the environmental and social cost of the actual system. Decision-makers are responsible to provide evidence of the benefits of circular economy and to convince companies to change their way of doing business.

In the already cited Preston's paper, *A Global Redesign? Shaping the Circular Economy* (2012), a list of smart regulations is reported. They are actions that public institutions should implement to facilitate the transition toward circular economy. They are:

- *Fiscal measures*: they would provide incentives for minimal resource use, waste and pollution and for those who put materials back into circulation.
- *End-of-life regulations*: they would help in increasing the remanufacturing and reuse rates. Moreover, unnecessary regulatory obstacles for the use of waste should be removed.
- *Top-runner standards*: public institution should define standards and award the sustainability champions.
- *Public procurement*: it is about making the public sector greener, it should be the first one to demand more sustainable infrastructure, offices and equipment.
- *Public support for innovation*: public institution should encourage the private-sector investments in innovation.
- *Addressing legal frameworks*: a review of the legal aspect of company-to-company cooperation should be made.

Institutions have the power to make the change happens by setting standards and by supporting the companies. Their commitment, however, cannot change things overnight. A necessary condition is the cooperation between different countries because nowadays supply chains involves more than one country. Coherence between different countries' policies is necessary to create the right environment and infrastructures for circular economy establishment.

The path towards circular economy is still long and challenging and a lot of factors have to be taken into account. A main treat are the unintended related consequences, such as the pressure put on food production in poor countries because farmland is used in green energy production (Murray et al., 2017). Or the fact that products with a long-life may be difficult to breakdown at the end of their cycle with respect to simpler, but with a shorter life, ones. Circular economy requires a constant and careful technical innovation that has to be supported by the whole system. Despite the numerous challenges that it poses, it creates also new economic opportunities from both a product and process point of view. All the industries should revolutionize themselves to become more sustainable. We are used to talk about green energy, but other industries, even more present in our everyday life, are performing a highly negative action on our planet and they should change their basis too. The one that we will analyse in this study is the fashion industry, a complex sector that could play a fundamental role in environment protection and conservation.

## 1.2 THE FASHION INDUSTRY

Circular economy and its related themes interested traditionally the heavy industry, especially those segments dealing with metals (steel in particular) and minerals. They are finite resources, thus finding ways to recycle them is essential to allow these industries to survive (Preston, 2012). Other industries that are investing in making their processes more circular are the energy one and the chemical one (Genovese et al. 2017). Moreover, the last one has a fundamental role in the creation of new materials that can be produced in a more sustainable way and that are more easily recycled. In May 2018, in Italy the Foundation for Sustainable Development created the “Circular Economy Network”, an observatory body that helps in the implementation of circularity in the country. It is composed by companies active in heavy industries such as cement, recycling, household appliances, tyres, plastics (Greennews.info, 2018). This shows us as this topic is being developed especially by some defined sectors.

However, more recently, other industries started to reflect about their impact on the environment such as the food one (Genovese et al, 2017) and the fashion one, that is considered one of the most polluting. Its production processes require a huge amount of water and hazardous chemical materials' use. Moreover, fashion industry is one of the main actors responsible of air pollution and creation of waste (Ellen MacArthur Foundation, 2017). Its impact on the environment is one of the main reasons that are pushing this industry too towards the concept of circular economy. Even if it is still far away from being a green sector, its more and more documented polluting nature, the increasing awareness of consumers and stricter regulations about chemicals, are slowly changing it. Below we will analyse these three factors that are reshaping fashion and textile industry.

### **1.2.1 Factors that are pushing fashion industry towards more sustainable practices**

#### **IMPACTS ON THE ENVIRONMENT**

Fashion industry is part of our everyday life; it is one of the largest industries, able to generate €1.5 trillion of revenues in 2016 and to employ around 60 million people (Kerr & Landry, 2017). However, what we have to consider along these data is the fact that it is also the second most polluting industry after the oil one. It has enormous effects on soil, water, air, people and animal. We report some of the findings about the impact of fashion, divided according to three stakeholders: environment, people and animals.

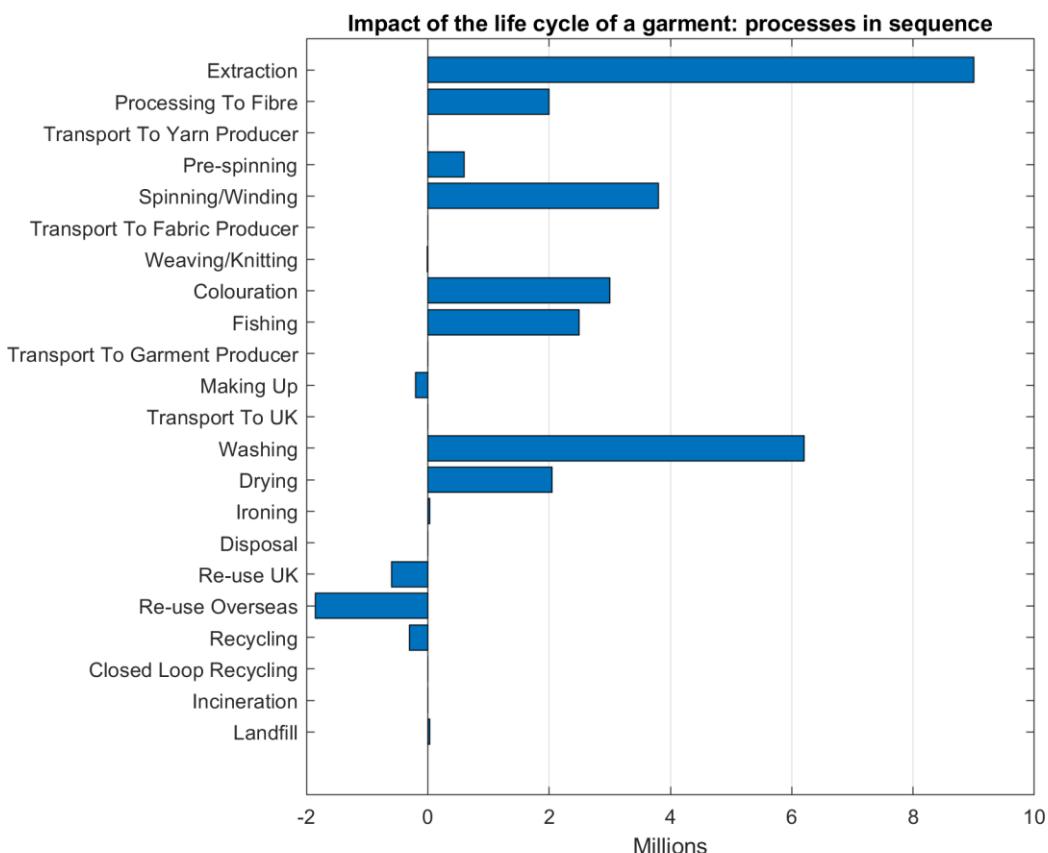
##### *a. Environment*

This is the biggest area of interest and the one that probably suffers mostly because of fashion industry. Moreover, harms caused to environment affect also the other two stakeholders. Fashion industry makes a massive use of resources, it utilizes hazardous substances in the production process, and a collecting system to avoid the dispersion of the products after their use is almost absent.

The Ellen MacArthur Foundation's report (2017) provides some data that allow us to understand the magnitude of the impact that this industry has.

- *Pressure on resources.* The industry uses 98 million tonnes per year of non-renewable resources. The production of plastic-based fibres burns almost 342 million barrels of oil every year.

- *Hazardous chemical substances.* Cotton production requires 200.000 tonnes of pesticides and 8 million tons of fertilisers each year. This is equivalent to approximately 23% of pesticides and insecticides sold globally as the BCG and GFA study *Pulse of fashion industry* (Kerr & Landry, 2017) and the factbook *Sustainability in fashion* (Karaosman, 2016) report. To keep up with fashion industry, cotton production has been pushed to its limits, by using genetically modified seeds that needs tons of fertilizers. Natural cycles are not respected, and millions of acres are treated in the same identical way. Dyes, colourants, detergents, water or stain repellents, performance enhancing coatings, fire retardants, are all chemicals that are often released into the water, producing terrible consequences for the ecosystem they infect. An estimation of NRDC (Natural Resources Defence Council, an American NGO) attributes to textile dying and treatment one-fifth of the industrial water pollution.
- *Plastic microfibres.* Each time we wash a cloth made from polyester, it loses plastic microfibres that end in the oceans. Data estimate the release of about half million tonnes of plastic fibres, making the textile industry the major contributor to the problem of plastic entering the oceans. The statement made by Greenpeace in the article *What are microfibres and why are our clothes polluting the oceans?* (Brodde, 2017) helps us understand the magnitude of this phenomenon: "Europe and central Asia alone dump the equivalent of 54 plastic bags worth of microplastic per person per week in the ocean".
- *Greenhouse gas emissions.* In 2015, the textile production released 1.2 billion tonnes of CO<sub>2</sub>; WWF report *Changing Fashion* written by Loetscher (2017) reports 1.7 billion tonnes, numbers that make fashion industry a great contributor to global warming. To these, we have to add 120 million tonnes of CO<sub>2</sub> generated during the use period, by washing and drying actions. Remy et al. (2016) estimate that to obtain 1 kilogram of fabrics, 23 kilograms of greenhouse gases are generated on average. All this information is alarming, considering the fact that the level of CO<sub>2</sub> in the atmosphere already exceeds the safe human level by 20% (Loetscher, 2017). Data in Figure 1.1 show the estimation of release of CO<sub>2</sub> in 2016 in UK alone for each phase of a cloth lifecycle.

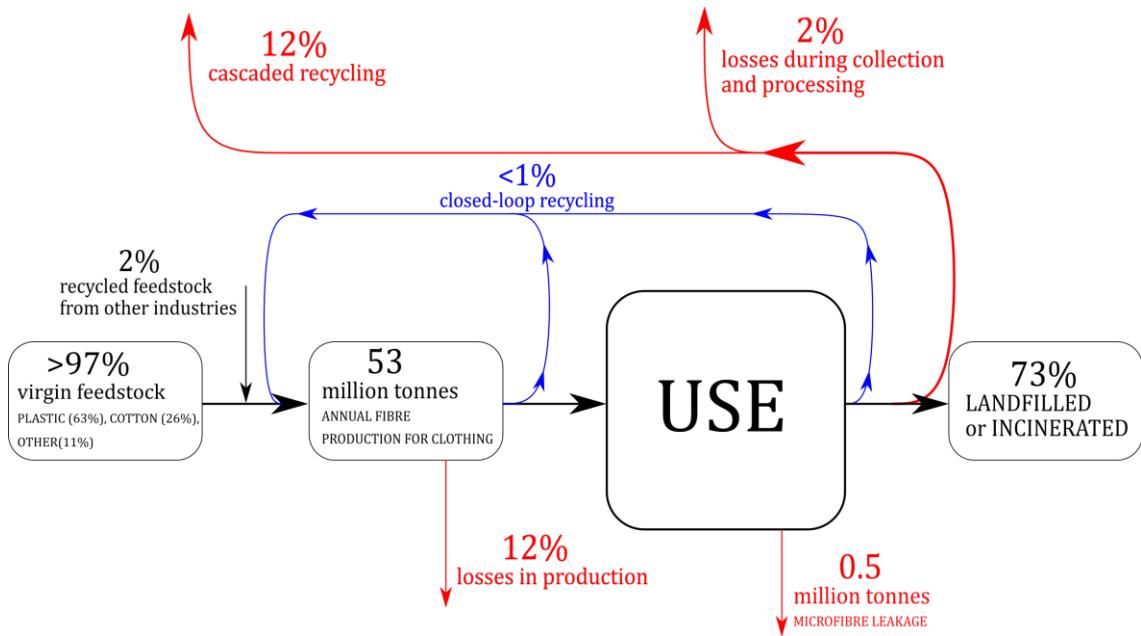


**Figure 1.1 - Carbon Footprint of clothing in the UK (tons of CO<sub>2</sub>) in 2016**

Source: WRAP, *Valuing our clothes: the cost of UK fashion* (2017)

- *Huge amount of water is used.* About 93 billion cubic metres of water annually are dedicated to textile industry. *Pulse of fashion industry* report lowers the number to 79 billion, which is still a worrying amount, comparable to "34 million Olympic-size swimming pool". Moreover, we have to consider that cotton farming (which uses up to 20.000 litres of water to grow one kilogram of cotton, a quantity that enables to produce just a man's shirt and a pair of jeans) and textile production take place almost exclusively in countries under water stress. Then, we should add to these data the water used to wash clothes in everyday life.
- *Land taken away from agriculture.* Cotton and wool production occupy almost 5% of arable land, and the request for land for food production is increasing making it near the shortage of these fibres. If the situation will remain unchanged, in the near future there will be a fight between food industry and the textile one over natural resources.
- *Waste.* The numbers provided by WWF (Loetscher, 2017) report that waste produced touches 2.1 billion tonnes of waste annually, and only 20% of them is recycled – findings from Ellen MacArthur Foundation (2017) present lower percentages. Waste production regard both the production phase (one third of raw materials is lost according to the *Sustainability in fashion* factbook by Karaosman, 2016) and the after-use phase. The main problem in the after-use moment is the fact that collection rates are very low. With the exception of Germany with the 75% of used clothing recycled, WWF shows that USA reach only a 15%, Japan 12% and China 10%. *The True Cost*

movie (Morgan, 2015) shows that the average American generated 82 pounds of textile waste each year. A related issue is represented by the fact that most of the materials used are unfit for a circular system, making landfills and incinerators the only feasible option for a lot of textile products after-use.



**Figure 1.2 - Global material flow for clothing in 2015**

Source: Ellen MacArthur Foundation, *A new textiles economy: Redesigning fashion's future*, 2017 (<http://www.ellenmacarthurfoundation.org/publications>)

The scheme in Figure 1.2, taken from *A new textiles economy* (Ellen MacArthur Foundation, 2017), shows some of the consequences that textile industry had on environment in 2015. It reports how the majority of the raw materials comes from virgin feedstock. Only 3% is recycled raw material and, among this percentage, the material coming from textile industry is just 1%. The 53 million tonnes of fibres produced for clothing end in one of the following ways: brought in landfills or incinerators (73%), lost in production, in the form of factory offcuts and overstock liquidations (12%), recycled into lower-value applications (12%), lost during collection and processing phase (2%), or recycled and given back to textile industry (1%).

## b. People

This stakeholder group comprehends workers, local communities and consumers. Workers are heavily affected by how the company decides to behave, being the ones that experience the adopted production process directly. The first workers that can be damaged in the textile supply chain are the farmers that grow cotton. As we saw, they are exposed to considerable amounts of pesticides and fertilisers. The movie *The true cost* (2015) shows how in some regions of Punjab, local communities of cotton farmers count a stunning number of deaths caused by cancer and a massive rate of children that are born with physical and mental handicaps. In addition to health problems, small farmers constantly have to sell their lands

to big companies that sell the modified cotton seed, the only one that allows to keep up with cotton demand. Other phases of the production process make workers enter in contact with hazardous substances as well, such as the dying step. If not regulated, these situations can have devastating effects on workers' health. The polluted water is often the one that workers and their families drink, causing them all kinds of illnesses.

The advent of fast fashion, almost fifteen years ago, led to the spread of realities where the working conditions faced by workers, especially in developing countries, are unsustainable. Long working hours and low wages (sometimes less than \$3 per day), that border modern slavery and that are often accompanied by child labour. Karaosman (2016), reports, among others, the following facts: "In august 2015, nearly 400 workers fainted in four factories across Cambodia. On July 2, 38 workers lost consciousness in a factory located in Phnom Penh. In 2014, more than 1.800 workers collapsed in 24 countries. [...] Mass fainting was linked to long hours and starvation". Only at the end of 2017 Uzbekistan ended the systematic use of child labour in cotton plantations and started to take measures to end forced labour (Partensky, 2017). Recorded injuries in workplace amount to 1.4 million per year (Kerr & Landry, 2017). Trade unions in most cases are not allowed, leaving workers with no voice and no protection. Still, they choose to work there because the alternatives are worse, even if the wage is anything but decent.

Over 50% of workers are not paid the minimum wage in countries like India and Philippines, and minimum wage in the industry are one half of what can be considered a living wage. This situation verifies not only in many Asian countries, but also in Eastern Europe and Turkey. Consider along this datum the ubiquitous gender gap, especially in an industry where the majority of workers are women (Kerr & Landry, 2017). It is reported that "the current minimum wage in Bangladesh only covers 60% of the cost of living in a slum" (Karaosman, 2016).

Local communities surely gain something by the job opportunities that a company can provide. Data about Bangladesh report that, in 2017, garments including knit wear and hosiery accounted for 80% of export revenues, and similar situation verify in other South Asian countries. However, when the processes are unsafe and unregulated (as in the majority of cases), the trade-off will be for sure negative. The communities will be left with an ill population and an ill environment, and incidents like the sadly famous one of Rana Plaza occurred on 2013 can frequently verify. Companies on average spend only 0.2% of sales on community spending against a UN proposed percentage of 0.7%. (Kerr & Landry, 2017) Brands should nurture their relationship with the communities, aiming to build a long-term, respectful collaboration.

Western companies go where their requests for incredibly cheap prices are met and workers in developing countries are the ones on which margins are squeezed. The price that final consumers pay does not reflect the impact that production has on environment and on people in the sourcing countries. Companies earn without bearing accountability for what is happening at the beginning of their supply chains. The unsuspecting customer himself can be exposed to danger, wearing clothes that can release the hazardous substances they have been treated with literally on his skin.

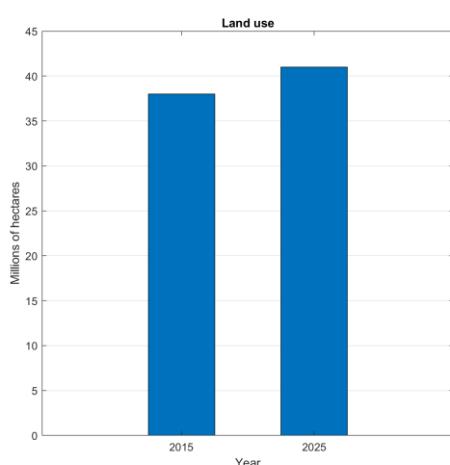
### c. *Animals*

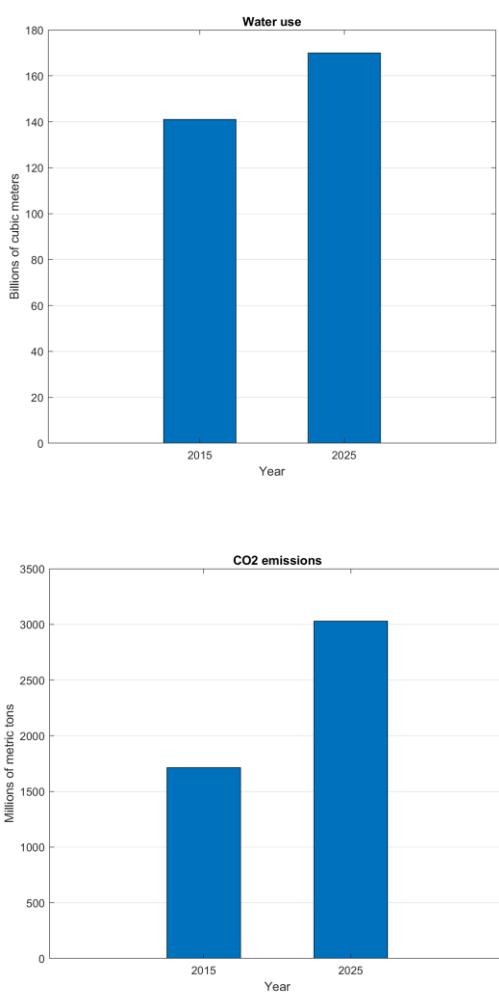
There are a lot of materials in textile industry that come from animals: leather, wool, fur, skin, down, and silk. The concerns about the use of these materials regard both the way animals are treated in the breeding farm and the pollution that these structures create. Often, the ways in which the animals are bred are cruel, making them live in very small cages (LAV reports that the measures of a cage of a mink are 35 x 70 x 45 centimetres), without the necessary space to enjoy a decent life. How the materials are obtained is often awful too, causing animals unnecessary pain. Down is sometimes taken from alive ducks, and some techniques to obtain wool make sheep suffer because also skin is taken away from the animal; LAV claims that 3 million of lamb and sheep die every year for the production of wool. To obtain silk, the cocoon is boiled with the pupae still inside, actually killing it. 95% of fur comes from fur factories farms, thus not from animals used in the food industry, but from animals breed to obtain their fur, usually in a cruel way. Karaosman's factbook (2016) reports that approximately 30 million minks, 2 million foxes and 100.000 raccoon dogs are killed for fur in European Union (where most of the farmed fur production takes place). 10.000 tonnes per year of angora rabbit fibre is produced and PETA demonstrated that a large part of this quantity is obtain by plucking the animal. In total, their data talk about 100 million fur-bearing animals killed for the fashion industry (rabbit excluded because the fur of 1 billion of them is used also in other industries).

The factory farms, moreover, are highly polluting. They create high concentrations of substances (for example the ones coming from the dung) that damage the local environments. Moreover, raw materials such leather, are treated with chemicals to make them usable for our purposes and to give them the appearance we know. Thus, these materials are often not biodegradable, and their production is generally inhuman and realized in countries with no laws for animal protection.

### *Future projections*

Industries, and the fashion one in particular, have to have in mind that being sustainable from an environmental perspective is fundamental for being sustainable from an economic perspective. In fact, the amount of resources that this industry uses its huge and it cannot keep use them without any concern as the actual main trend does. Maybe the brands in the fashion industry do not care about preserving the environment, about ensuring a decent life for their workers or maybe do not care about how animals are treated. But they should, if they want to preserve their revenues. The rhythm of fashion and textile industry is no more sustainable by Earth, in the sense that soon no more able to provide the amount of resources that we are using nowadays.





The analysis of Remy et al. (2016) gives an interesting insight about the future situation, taking into consideration the emerging countries. The graph in Figure 1.3 shows what would happen if 80% of developing countries achieved Western per capita consumption levels, while the rest of the world maintained the current levels of consumption.

The fashion industry is already producing way more waste and CO<sub>2</sub> emission and using more land than the planet boundaries allow. We have also to consider its chemical usage, that is difficult to substantiate. In less than fifteen years, if things do not change, the amount of resource used will increase because of the expected increase of global population, taking this already unsustainable situation to a catastrophic limit. Resources price will grow given their increased scarcity, as well as labour price, because the trend suggests that workers wage will be raised. Lot of value is already lost today, every time clothes end in landfills (Kerr & Landry, 2017).

Based on their projections, in the BCG and CFA report, Kerr and Landry forecast that continuing business as usual will create a loss

of 3% points in EBIT margins, roughly corresponding to €45 billion per year of profit reduction for the industry. This is just a prediction, consequences could be worst if prices will increase at a faster rate. Their projection in 2030 of some data is reported in Table 1.1. Industry will probably experience a negative result also because of a damage of its image. The WRAP report, *Valuing our clothes: The cost of UK fashion* (2017), shows that even if the SCAP (Sustainable Clothing Action Plan) signatories improved their performance and people keep more attention to their clothes, the emission of GHG gases in UK increased from 24 million tonnes CO<sub>2</sub> in 2012 to 26.2 million tonnes CO<sub>2</sub> in 2016, because the consumption of clothes increased due to the fact that their price decreased and the population increased.

	2015	2030	Percentage increase
Cloth consumption	62 million tonnes	102 million tonnes	+ 63%
Water consumption	79 billion cubic metres	118 billion cubic metres	+ 50%
Waste creation	92 million tonnes	148 million tonnes	+ 62%
CO <sub>2</sub> emission	1.715 million tons	2.791 million tonnes	+ 63%

**Table 1.1 - Projected environmental impact**

Source: Kerr J., Landry J. (2017) *Pulse of fashion Industry. Global Fashion Agenda & Boston Consulting Group.*

We should also take into account the need to have 35% more land used for cotton, a percentage that will slam against a 60% increase in the agricultural production requested to feed the increasing population. Another fashion related impact on environment is the one caused by the transportation phase. Items are shipped in developed countries from all around the world, adding this polluting step to their lifecycle.

All these data and facts give us an idea about the impact that fashion industry has on our environment and our lives. The situation calls for a change in the overall industry, from the moment in which the materials are created to the way in which customers use the product, to the methods to collect the garments after their use. This kind of exploitation of natural resources is becoming unbearable, not just from an environmental, but also from an economic point of view. Luckily, consumer awareness of the situation is increasing, a factor that can boost the revolution in this sector.

## CONSUMER AWARENESS

During the latest years, the public attention on the sustainability theme has increased, with people positively valuing brands that show commitment to environment. For example, the Fur Free Retailer sustains that 73% of citizens, polled in seventeen European countries, are against fur farming. The increasing concern of consumers is sustained by scandals like the one of Rana Plaza in 2013 or the reality showed by documentaries such as *The True Cost* (2015). Moreover, the initiatives carried by institutions, foundations and brands as well, are making people rethink how this industry is structured and how dangerous it can be. In 2017, we witnessed the first edition of the *Green Carpet Fashion Awards Italia* in Milan, during which the most virtuous examples of sustainability were awarded, and all the supply chain actors represented. It will be held again in September 2018. One of the main organizing partners, *Eco-Age*, among other initiatives, gave life in February 2018 to the *Commonwealth Fashion Exchange*, that took place in Buckingham Palace in London. Here, all the 53 countries of Commonwealth were represented by designers and artisans that work caring about environment and people.

Sustainable actions have been promoted also by single brands and companies. VF Corporation, that comprehends brands such as The North Face, Timberland, Napapijri, Wrangler, Lee and Vans, in May 2017 declared its decision to be fur free. The same path is present also in luxury fashion: in October 2017, Gucci announced its decision to stop the use of fur in its creations, a statement that surely will bring others to adopt this or similar paths (Farra, 2017). Brands are also creating new collections using recycled materials and they are supporting NGOs projects; the collaboration of Adidas with Parley for the Oceans for the creation of a pair of shoes made from plastic coming from oceans is just one of many examples. Other brands promoted innovative events, like the *Take Back Black Friday* by Ace&Jig. It is a swap movement, that raised autonomously from customers and that the brand decided to support.

Celebrities too are supporting this cause, showing a fashion that is sustainable does not give up creativity. The actress Emma Watson created the Instagram page *The Press Tour*, through

which she showed the dresses, rigorously sustainable, that she worn during the tour made to promote the film *Beauty and the Beast* (2017) where she starred as main character. Each photo was accompanied by a description of the dress and of how it was created. Similarly, already in 2010, Livia Firth launched the Green Carpet Challenge, inviting celebrities to wear ethical dresses during public events. Social media are helping to spread this issue; the movement Fashion Revolution launched the hashtag *Who made my clothes*, a way to invite brands to be transparent about their supply chain.

Lot of associations exists that provide tools and challenges to companies in order to really become more sustainable. There is the Sustainable Clothing Action Plan (SCAP), launched in 2013 by WRAP, an agreement to reduce the use of resources giving some targets to reach within 2020. Greenpeace is carrying on its *Detox my Fashion* campaign, launched in 2011, through which the signatories make the commitment to eliminate from their supply chain a list of hazardous chemicals that have strong impact on environments. Similar is the scope of ZDHC (Zero Discharge of Hazardous Chemicals) programme by the namesake foundation.

### *Obstacles posed by consumers*

Consumers are asking more and more transparency and sustainability when talking about clothes. Nowadays, an increasing number of brands reports some involvement in sustainability issues and more people check their level of commitment. But, at the same time, consumers behaviour can be an obstacle in the investment of a new kind of fashion.

First of all, there is still a certain level of scepticism about what brands declare. Thus, even if according to some studies (Nielsen, 2015), 60% of the respondents are willing to pay more for sustainable products, the fact that firms are not able to generate trust about their green statements halts consumers from buying.

A second challenge is to make consumers really aware of what there is behind a t-shirt that costs 3€ and of the fact that they can do something. People are used to be able to buy cheap clothes and to have a big amount of them. They value more the quantity and the replaceability of them than quality. Even if consumers are concerned about environmental situation, they typically do not associate fashion with this issue, they do not view the disposability of fast fashion as something that treats environment and as a contradiction to the sustainable way of life that they often are trying to pursue.

The third fact is linked to the second challenge. There is a gap between the values and the actual behaviour of consumers. Generally, consumers, especially young ones, value sustainability and the presence of an ethical nature in products of many sectors, among them also fashion, but only a niche of them buy constantly ethical clothes. This is because, even knowing that their purchase will help somebody, they do not want to be "hurt". Not only higher prices are considered a drawback, but also the fact that often ethical fashion does not reflect the way people would like to dress. Clothes are a way to express themselves, and people do not want to give it up. For this reason, only consumers that make of sustainability their lifestyle, are those that actually buy green clothes (called *ethical hardliners*) (Joy et al., 2012, Niinimaki, 2010). The common consumer would switch to eco-fashion only if it becomes stylish; for now, she associates it with plain clothes. Fashion domain should make the change by starting using sustainable materials and creating stylish items with them. Thus, cost resulted not to be the sole barrier to eco-fashion; it is accompanied by "lack of

awareness, negative perceptions, distrust, high prices, low availability" (Bonini and Oppenheim, 2008).

## REGULATIONS

As happens with other products, also with clothes there are some regulations that differ from country to country. This can create difficulties for firms that have to adapt their products in order to be able to export them. In a globalized industry as the fashion one, it can also represent a benefit for consumers of less developed markets, because firms are pushed to produce a cloth that respond to the more stringent regulation. On the other side, it is true that often the products reserved for a developed market are different from the ones intended for the less developed countries. Nevertheless, laws regarding the textile industry provide some protection to consumers and some obligations to companies, asking them some requirements about materials and a minimum level of transparency about their supply chain.

The requirements set by governments are basic and they regard mostly the labelling of garments, necessary to inform the consumers about what they are buying. In Europe this topic is regulated by regulation 1007/2011. The label has to report the fibres used and their weight in percentage and in order of importance. The regulation states that "the labelling shall be durable, easily legible, visible and accessible and securely attached to the cloth". The only abbreviation permitted to indicate the fibres is the mechanised processing code, otherwise they must be written in extended form. The "Made in" wording must be present, as well as the name of the producer or of the retailer. If the producer is outside the EU, the retailer is responsible to provide a label conforming to the EU law. Finally, the information reported in the label has to match what is written in the commercial documents.

Naturally, this regulation applies also in Italy, that adds some other aspects. The label has to be in Italian and none abbreviation is allowed (see Camera di Commercio Padova's website). Moreover, special provisions are intended for the use of words such as leather and fur. For example, for products coming from regenerated leather fibres or obtained with some mechanic or chemical processes, it is not allowed to use the term leather (see Federazione Moda Italia's website).

Other than the labelling regulation, other general laws apply to textile products. Clothes have to comply with the directive regarding the general safety of products (Directive 2001/95/CE). It defines products as safe when the risk associated with them and their utilization is minimum. Factors that have to be considered are the characteristics of the product, its package, its assembling, its effects on other products, its labelling and instruction for use, and whether it is dangerous for some categories of consumers.

More related to the textile industry is the REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals), a regulation created in June 2007. It was born to protect human health and environment from the risks related to chemical substances. It also proposed alternative ways to evaluate them, in order to limit the number of tests on animals. REACH asks firms to show that the substances that they use are safe, and if they are not able to do that, authorities can set some limitations. Europe, as many other countries, has its own Restricted Substance List (RSL) that regulates the use of some dangerous chemical elements. RSL is constantly uploaded, as research goes on. Other laws that interest the textile industry are the regulations about biocidal products (528/2012) and persistent organic pollutants (850/2004), chemical substances that difficulty deteriorate and that are toxic. In addition to

regulations, guidelines exist to improve the sustainability of the textile products such the ones provided in Italy by Camera Nazionale della Moda Italiana.

A requirement that in EU is not mandatory, but widely diffused since it is compulsory in countries such as USA and Japan, is the conservation and cleaning label, that inform the consumer about how to wash and treat the garment, in order to maintain it in its best shape. China has similar and often stricter standards. They include chemical requirements, that set accepted chemical levels, and restrictions on a number of chemicals, performance requirements, about for example colour fastness and odour, and labelling requirements. Differently from USA and EU, where irregularities are almost always reported by consumers, in China surveillance is more stringent. Authorities inspect products when they enter the country and randomly in the shops.

We have seen how different factors are requiring a change in the way fashion and textile industry is organized. Other than transforming them in a less polluting reality, a revolution in this sector can also translated itself in the creation of new business model whose innovation can be an opportunity for firms which can develop new competitive advantage. Some business model associated with the concept of circular economy are described in the following paragraph.

### 1.3 NEW BUSINESS MODELS

In the study of Bocken et al. (2016), we find some business models based on the concept of circular economy listed. They are divided in two broad categories according to the objective they want to achieve. The two aims considered are (1) slowing resource loops, where the product-life and its utilization period is extended and/or intensified in order to slow the consumption of resources, and (2) closing the loops, where the resources used are recycled.

The first group comprehends:

1. *Access and performance model*: with this model, the users' needs regarding the product or the service are satisfied without having the ownership of the physical product. Service and maintenance are provided by the manufacturer or by the retailer, while the user enjoys the access to the product or service and pays per unit of service.
2. *Extending product value*: It is about recovering products that do not function anymore and remanufacture or repair them, in order to exploit their residual value. In this case, it is necessary to establish take-back systems and collaborations to ensure a consistent rate of product returns.
3. *Classic long-life model encouraging efficiency*: products are designed for durability and repairability. They usually show a premium price that covers the fact that they will have a long-term use. This kind of items are considered "anti-consumerism" products because they allow users to keep them as long as possible.

The second category of models is composed by:

1. *Extending resource value*: the "otherwise wasted materials and resources" are used and transformed "into new forms of value". In this case too, take-back systems have to be implemented. The advantages of this model are the reduced cost of material,

and the fact that the product becomes more appealing for those consumers that have a green soul.

2. *Industrial symbiosis*: industries and firms collaborate to make the waste of one's processes into inputs for other's ones. A geographical proximity makes it easier the implementation of this model (view the already cited eco-parks).

We will now analyse how these models can be applied in fashion industry. To do so we will cite some real example of firms that have implemented similar models. This analysis is summarized in Table 1.2.

	CIRCULAR ECONOMY BUSINESS MODEL	FASHION INDUSTRY APPLICATION	EXAMPLES
Slowing resource loops	Access and performance model	Rental and loan services	Drexcode
	Extending product value	Resale Good care and repair services	Depop Clothes Doctor
	Classic long-life model	Timeless design	Levi's
Closing the loops	Extending resource value	Recyclability and reuse	Patagonia
	Industrial symbiosis	Recyclability and reuse	I:CO

**Table 1.2 - Circular economy business model and their application in fashion industry**

The access and performance model can be realized through *rental and loan services*. They offer novelty and variety to the customer, who is not obliged to buy the product to actually use it. When the customer wants to change style, he can simply return the items and choose among other ones. Organizations can create rental subscription models that with a monthly fee ensure the client a fixed number of garments, or they can provide a short-term rent for one-off occasions. Long-term rental agreements can be an optimal solution for clothes like workwear and uniforms. Today, in UK, 90% of them is sent to landfill (MacArthur Foundation, 2017). Rental are an easy channel to get materials back and use them for other projects.

Nowadays, this solution is implemented almost exclusively with luxury products, given their quality and the fact that usually they are used few times, making them the perfect items that people prefer to use rather than possess. Inspired by the American *Rent the Runway*, *Drexcode* is an Italian platform that offers the possibility to rent luxury dresses for events. Customer can rent a dress for four or eight days. It offers a series of services such as the possibility to order two sizes, in the case one is not sure about which will best fit. It is based in Milan, but clothes are sent in all the Italian territory. It collaborates with a famous shop in Milan, *La Rinascente*, by giving the opportunity to try some of the available items in the shop before rent them. For a single rental, prices range between 50€ to 680€, depending on the chosen product. Furthermore, there are two kind of subscriptions, one that gives the possibility of rent one cloth per month paying 49€ per month, and one that gives unlimited

rentals paying 139€ per month. The proposed wardrobe is selected for special events, like parties or gala. There are also sections with wedding dresses and elegant maternity dresses. At the end of the season, part of the wardrobe is sold at convenient prices.

In fashion industry, the extending product value model can be achieved through two models: *resale* and *good care and repair services*. Resale is the offer of second-hand clothes, sometimes refurbished or renewed. Digital technology can help the firms in establishing a platform or in collaborating with a third party. Resale offers the possibility to capture a new market, to increase the visibility of the brand, and to present it as a durability and quality leader. It is true that take-back schemes, for example, require an investment from retailers and a commitment to the brand by customers to be economically worthwhile.

Regarding good care and repair services, firms can provide instructions about the better way to treat and wash the items and about what to do in case of damages. In alternative or in addition, it can also provide the service itself along with a restyle one in case of necessity. WRAP reports that, in UK, the annual turnover of repair market is between £116 million to £312 million, showing that it represents a business opportunity. In fact, realities exist that base their entire business of resale or repair services. Regarding the resale option, it is becoming more and more famous an app, *Depop*. It was born in 2011 from an idea developed in H-FARM, a business incubator placed in Roncade (North-East Italy). It is a platform where privates can offer for sale used clothes and vintage home furnishing. Sellers can put four photos of their items, set a price and the delivery method. Its success pushes also shop of vintage clothes to create an account, avoiding in this way to create their own online channel. Moreover, it is going to open some physical shops in the main fashion cities in the world, London, New York, Milan and Los Angeles. These shops will focus on unique vintage pieces, hosting the products of the most successful local sellers and events (Pambianconews, 2018).

Talking instead about repairing services, in England, especially in London, the website *Clothes Doctor* is active. It is like an online tailoring, that offers repair, alterations and cleaning services. Customers select the type of intervention they need, provide the new measurements and information about what they want. A courier takes the items from customer house and bring them to the workshop. Both during the order phase and the reparation phase, seamstresses are available to discuss the alterations. In Italy this kind of service is usually provided by small shop in the neighbourhoods.

To implement the classic long-life model in the fashion industry, the first phase of the supply chain (about which we will talk about it more extensively in the second chapter) has to be revolutionized. The *design* of the clothes should be *timeless*. This means that clothes created following this principle do not go out of fashion and do not become obsolete. People will keep them in their closets for longer periods and maybe they will pass to the next generation. For this kind of durable items, a warranty may be provided. There are a lot of clothes that are considered iconic and that are appreciated for more than one season and, moreover, for more than one generation. There is the trench coat by Burberry or the Rayban sunglasses or the Converse Chuck Taylor All Stars sneakers. Another fundamental example of timeless design is provided by *Levi's* and its most famous model of blue jeans, the *501*. It was invented in 1823 as an innovative garment for cowboys and blue-collar workers, characterized by an incredible resistance. This model is still present in *Levi's* collections, slightly changed to better encounter the new tastes, but it maintains its essence. For sure the material used, the denim, helps since it does not go out of fashion, but the quality of the product and its design make it one of clothes that more often we find in second-hand shops, passing from one

people to another.

Putting in practice the second category of business model is more difficult in fashion industry. This difficulty is caused by the fact that the collection system of clothes is still weak and by the fact that the recyclability of garments is very low. The high number of different materials present in a textile item and the impossibility to separate them makes almost impossible to *reuse* them to create new clothes. For now, the extending resource value model is achieved when, at an artisanal level, old clothes or piece of them are used to produce accessories, such as bags. Moreover, we have an industrial symbiosis when old clothes are used to produce insulation material used in the construction industry. It is true, however that in this case the material ends in a lower-level application, wasting part of its value.

One of the most famous sustainable brands is *Patagonia*. In addition to an attention to its production processes that allow it to create high quality and durable products, it carries on a number of other initiatives to reduce the impact of fashion industry on the planet. In its website, a section is dedicated to show to costumers how to repair clothes and take care of them. A special event organized by this brand is the Worn Wear Tour, during which a Patagonia's van travel towards some cities of an area and offer a free repair service for products of all the brands. The last one, that interested UK and France from August to October 2018, was focused on the fixing of wetsuits. They have also established a collection system in their shops. People can leave old Patagonia items that are no more usable. The firm establishes whether they can be refurbished, transformed in something else or whether they have finished their life as clothes, but their fibres can be recovered and recycled. In their website they declare that since 2015 they have collected 82 tons of clothes to be recycled.

A wider and more organized collecting, sorting and recycling system in textile industry is the one organized by *I:CO*. I:CO is a firm that work in collaboration with some fashion brands. The latter ones use their shops as collection points of old clothes or shoes. I:CO then picks up the material and sorts it. The material can be then addressed to a reuse or a recycle phase. When materials are recycled they can re-enter the textile industry in order to close the loop, or they can be transformed in input materials for other industries.

Circular economy has the potential to be a disruptive innovation, that will change how entire sectors of the economy work. For sure it poses challenges and risks, but it also proposes new models that are more sustainable for the environment and the society. As we have already reported, it is a change that does not interest just some firms, but the entire supply chains. These new models call for a revolution of how the products are made and services are offered from the very beginning of their life, along their production and distribution processes, their use and their disposal. For this reason, in the following chapter we want to introduce another concept deeply linked to the one of circular economy: the sustainable and green value chain. We will analyse it and discuss how it can be implemented in the fashion industry and facing which obstacles.

## **CHAPTER 2: GREEN AND SUSTAINABLE SUPPLY CHAINS**

### **2.1 WHAT SUSTAINABLE SUPPLY CHAINS ARE**

A supply chain is the entire network of entities and the totality of the steps involved, directly or indirectly, in the satisfaction of the final consumer. Several actors are involved in this network and the collaboration between them is often difficult to obtain. For this reason, the management of a supply chain constitutes an important cost, and logistics occupies a large share of the product final cost. The Supply Chain Council defined supply chain management as “managing supply and demand, sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, and delivery to the customer” (2007). Thus, it represents the integration of all the activities and the information associated with the production of a product or a service (Seuring and Müller, 2008).

There are some strategic imperatives that have to be taken into account during the production process, such as customer focus, efficiency, quality and responsiveness. Recently, also environmental sustainability has started gaining more and more importance (Green et al., 2012). All of these imperatives, and sustainability in particular, are aspects that interest the whole supply chain, not just one of the organizations. Considering this, environmental protection within the steps of the supply chain has become subject of studies and it is referred to with the name of Green Supply Chain Management. Green Supply Chain Management (from this point indicated as GSCM) is about considering environment conservation in the decision-making process of a supply chain and improving its profitability. To make a supply chain green, all its steps have to be thought considering their impact on the environment. “All the steps” means that the design as well as the end-of-life phase have to be studied to be sustainable. Moreover, this kind of management considers both forward and reverse logistics.

As often happens, a term is associated with other concepts. For example, GSCM is often used interchangeably with “Sustainable Supply Chain Management”, for which we can find slightly different definitions in the literature. Sustainable Supply Chain Management (SSCM) is said to use the triple bottom line approach to operationalize sustainability. This method considers all three the dimension of sustainable development: environment, economy and society (Seuring and Müller, 2008); a green supply chain, instead, focuses just on the effects on environment. (Nikbakht, 2009). However, the difference between the terms is not widely recognized by authors. Genovese (2017), taken one, defines sustainable supply chain management as a tentative to “integrate environmental concerns into organizations by minimising materials flows or by reducing unintended negative consequences of production and consumption processes”, a concept equal to the one of GSCM. Since the focus of our research will be the fashion industry, a sector that, not only has a huge impact on environment, but also relies a lot on workers, we will consider the broader concept of SSCM, rather than the one of GSCM.

What has been said until now about SSCM makes clear that it is a concept developed in parallel to the one of circular economy. Circular economy embeds a broader idea, adding to the sustainable management of a supply chain some principles, such as the maximum

reutilization of resources, by never letting them leave the process. Circular economy can also be viewed as a common final objective for a supply chain, helping creating networks and collaborations between actors, that are connected by the same commitment (Genovese, 2017).

The theme of supply chain management is particularly important for the fashion industry because in this sector the supply chain has a high level of complexity. This complexity is given by its fragmentation both regarding the steps and regarding the countries where the steps take place. Below, we describe the main characteristics of a fashion supply chain.

## 2.2 THE SUPPLY CHAIN IN THE FASHION INDUSTRY

As the Ellen MacArthur Foundation Report (2017) shows, the way in which the textile sector works is almost linear, and it can be easily summarized in three phases: use of non-renewable resources to produce clothes, use of the clothes (usually for a short period of time), materials sent to incinerators or landfills. To be sustainable, fashion industry has to change way of work in each of the main three steps that compose its life by extending the central one (that is the use of the product) and connecting the initial one with the last one, becoming in this way a circular economy industry. Only in this way, resources can be exploited in the right way without impoverishing our environment.

This means that its whole supply chain has to be involved. However, fashion industry is characterized by having a complex supply chain and by acting in an environment where it is often difficult to be efficient. One fundamental characteristic of it is the fact that the demand for its products cannot be forecast in an accurate way. The ideal situation for all the industries is the one where the supply chain is organized in a way that allows to respond to a real-time demand. In addition, the fashion one has some characteristics that make it particularly exposed to chaos. The products are saleable in a short period (a season) and their demand is not stable; it is affected by unpredictable elements such as weather or stars' tastes, able to influence the public. Moreover, the purchasing decision is not always determined by some previous thoughts, but often stimulated in the moment in which people see the product (Christopher & al., 2004). The consequent situation given by this unpredictable demand is a considerable amount of inventory difficult to place or a shortage of items that people would be willing to buy. This risk is increased by the fact that sometimes brands arrive late in the market, when the demand has already started decreasing.

The traditional fashion supply chain requires long time. Brands start to work on a collection more than a year before its launch. They have to reflect about what the collection wants to communicate, the materials they will use, the colours and then the logistic organization begins. Often the time required to move from the idea to the realization of the product is considerable.

In recent years, the industry tried to change this situation by creating an agile supply chain, shorter and more demand-driven than the traditional one. It is based on information: data are constantly collected at the points-of-sale, allowing to adjust the design of products and to re-order what is needed also during the season itself. To quickly respond to customer demand, the arrangements between members of the supply chain are flexible. Some activities are retained by the focal firm, the others are outsourced, and collaborators are changed according to circumstances. There are not long-term agreements. All this is possible

if the suppliers are flexible and responsive enough. However, the real problem lies in the hidden costs that being so flexible brings with it: difficulty in constantly finding new suppliers, lower quality, delays related to the fact that the products arrive usually from other countries, human cost paid by workers to keep up with this pace. (Christopher & al., 2004).

Fast fashion has initiated this kind of revolution, eliminating the concept of collections and simply receiving products weekly. The time pressure put on suppliers often makes them rely on other sub-suppliers; brands, consequently, find themselves not knowing who did their products. Unclear situations like this are fertile ground for the spread of environmental and social issues, especially because brands outsource to less developed countries, where human rights and environmental awareness are often not yet established (Turker & Altuntas, 2014).

Even if things are changing, having a transparent supply chain is really difficult. Clothes are complex products, formed by many elements and materials. A simple shirt comprehends: who raises the plants from which the fibres are obtained, who creates the fibres, who produces the textile from the fibres, who eventually dyes it, who sews it to produce the shirt, who mails it to the final shop. The same procedure applies to all the components of the garment, such as the buttons. The complexity increases as the number of fibres and decorative elements increases. In the next paragraphs we will try to understand how the supply chain can become more sustainable despite its complexity.

## 2.3 THE STEPS OF A SUSTAINABLE SUPPLY CHAIN

Focal companies are the central actors in the supply chain. Seuring & Müller (2008) defined them as companies that “(1) rule or govern the supply chain, (2) provide the direct contact to the consumer, and (3) design the product or the service offered”. So, they generally are the companies that own the brand of the product and that are directly associated to it. Stakeholders will exercise pressure on them, thus they have all the interests in improving their performance. They are the ones that can revolutionize their supply chain, passing the consumers' pressure to their suppliers.

Focal companies can build an SSC by cooperating with their suppliers in order to identify and implement improvements aimed at sustainability. An alternative for the focal firm is selecting its suppliers among those who are certified or that have a sustainability plan or equivalent documents. Many decisions have to be taken: who to partner with, what type of technology use, which organizational practice to adopt.

The organizational practices that can be considered in designing a sustainable supply chain are *reduction* of materials used, of waste and pollution; *reuse*, that is keeping the original structure of a product and use it again; *remanufacturing*, a practice translated in replacement of parts; *recycling*, when materials that constitute a product can be physically and/or chemically changed to be the components of a new product (Sarkis, 2003).

Two main environmental approaches are used to check the level of sustainability of a supply chain (Nikbakht, 2009):

1. *Life-cycle assessment*. It is an objective process used to evaluate the environmental burdens of a product, looking at the whole life of a product, from raw materials to its disposal. It is a holistic approach that gives us an indication of which resources are

used and how, allowing the identification of inefficiencies. It comprehends different methods, with different levels of attention towards sustainability. The first of these levels is the *cradle-to-grave* one, in which just the materials used are analysed, in order to understand how it is possible to dispose of them. The *wheel-to-wheel* level analyses the transportation system. In the *cradle-to-gate* level, efficiency is measured until the product is delivered to the customers. What happens to the product after the buying step is not considered a company's problem. Finally, we have the *cradle-to-cradle* level, that aims at making the grave of a product the cradle of another one, by reusing or recycling it.

2. *Environmental conscious design.* It tries to highlight the environmental issues that appear during the product and process design. It aims at obtaining more quality at lower costs, cleaner plants, reduced disposal costs, reduced environmental and health risk, better public image, and higher productivity.

In the following paragraphs, we will see how the steps of the value chain have to be changed in order to make them sustainable. Particular attention is devoted to the first step, the design one, because of its influence on the subsequent stages.

### 2.3.3 Design

A responsible design is fundamental to mitigate environmental impacts and to ensure environmental health and safety over the product lifecycle. In their study, Bocken et al. (2016) present a correspondence between sustainable design strategies and the business models that we saw for the circular economy. In their opinion, design can have two main objectives:

1. *Design for slowing resource loops.* Companies should create long-life products and extend the product's life. This is translated in giving birth to products for which customer experiences attachment and trust and that are reliable and durable from a physical point of view. Maintenance and repair services should be provided in order not to replace the product when it breaks. Another foresight to put in place this strategy is about ensuring that the product works also with other products ("standardization and compatibility") and that its parts are available over time. Finally, product's parts should be easily separated and reassembled both to be repaired and to be transformed.
2. *Design for closing the loops.* In this group we find products that can enter a cycle, which can be technical or biological. A technical cycle is one in which materials can be continuously recycled; in a biological cycle, materials used become "food for natural systems" (they are biodegradable or compostable). In this group too, a strategy is designing products in a way that allows them to be easily disassembled and reassembled. Eco-design is also necessary to implement reverse logistics practices, that are the ones that allow the recovery of materials.

In the design phase, the choice of the raw material enters too. They should not have a negative impact on the environment. Moreover, they should be regenerative. Sarkis (2003) calls these initial steps "procurement or purchasing decisions". The type of materials used in the processes (reusable, recyclable or already recycled) and the vendors they arrive from

will affect the whole supply chain. This attention to what is bought and from whom is also defined as “green purchasing” (Zhu et al, 2008). Unfortunately, sustainability is not yet a fundamental criterion for designer and it is not among the education guidelines. It should be added in educational programs in order to facilitate the work for future generations (Andrews, 2015).

### **2.3.4 Operations**

We define operations as the steps that go from the production of a product to its final disposal. They can be bundled in the following five groups.

*a. Manufacturing and remanufacturing.*

During manufacturing processes, the impacts on environment should be reduced by using proper materials and technologies. Companies should also implement remanufacturing actions, through which restoring worn-out products to like-new condition. In general, the production process has to be designed to be able to use the materials selected in the procurement phase and to reduce to the minimum the production of waste and pollution.

*b. Packaging.*

Packaging has an impact not only on environment, but also on the following step, that is distribution. Considering sustainability issues in the packaging phase “can reduce materials usage, increase space utilization in the warehouse and in the trailer, and reduce the amount of handling required” (Sarkis, 2003). The environment is directly affected by packaging, since wrappings are often disposed in the wrong way.

*c. Distribution and transportation.*

They include outlet locations, mode of transportation, control systems, just-in-time policies (Sarkis, 2003). These aspects can be rethought considering the travel that materials and products undertake to reach the plant or the shops, how much each travel is exploited, and how the inventory is organized.

*d. Reverse logistics and network design.*

Through reverse logistics (or reverse supply chain management) materials flow back from the final customer back to retailers or manufacturers or ad hoc collection points. According to whom recovers the material, the “loops” can be open, when they are recovered by parties other than the original producers, or closed, when it is the manufacturer itself that takes back the product from the consumer (Genovese et al., 2017). The purpose of this operation is recapturing the value of materials – and for this reason is also called investment recovery (Zhu et al., 2008) - or properly disposing of them. Its implementation requires different intra-organizational action, such as commitment to environment protection, ethical standards, and support from policy makers. Some sectors are formally regulated by legislation (such as household appliances in Europe); in other cases, manufacturers engage in recovery actions “to reduce production costs, enhance brand image, meet changing customer expectations, protect aftermarkets, and pre-empt pending legislation or regulations” (Zhu et al, 2008).

*e. Waste management.*

Waste management is an operation present in more than one steps of the supply chain. In fact, it is both about waste minimization during production operations and at the end of product's life, when the item is considered no more usable and it has to be disposed of.

## 2.4 CURRENT BEST PRACTICES IN FASHION INDUSTRY

It is true that fashion industry and customers are becoming more aware of the negative impact of this system, but implemented changes are focusing especially on making the current linear system more sustainable. The real revolution would be changing the system into a circular one, by increasing the clothing utilization and the recycling. This would keep clothes, fabric and fibres at their highest level for longer and they would re-enter the economy after use. More people would have access to high-quality clothing without disrupt natural resources. To reach these objectives, investments and changes must be done and they have to occur in all the steps that characterized the life of a product, from the choice of raw materials to the after-use disposal.

Below we show how the steps of a fashion supply chain can be made greener and more sustainable. We enrich this description by reporting current real case studies that are revolutionizing at least parts of their supply chain. A scheme of the supply chain steps and their virtuous adjustments and examples is given by table 2.1.

### 2.4.1 Design

Designers should be aware of the impact of garments on environment and society and avoid the common tendency to design to cost. In order to slow the resource loop, clothes should be designed having as a focal point *quality and durability*. A higher quality allows the garment to last longer. The value for the customer increases as well as for the brand, that gains in customer fidelity. Furthermore, quality and durability are necessary to implement models like rental and resale, discussed in the first chapter. A brand that has these values as core points is *Tom Cridland*. The designer proposes menswear realized with high-quality material and he offers a thirty-years warranty, since durability is the characterizing elements of his products.

If the final objective is implementing circular economy in the fashion industry, clothes should be designed also in a way that the loop can be closed, that is having their *recyclability* in mind. To be really recyclable clothes should be born like this and attention to all the materials used must be paid. All parts have to be taken into consideration: often elements like buttons, zips or labels prevent the recycling process. Designers are responsible for the increase of recycled materials demand that would enhance investments in research in this area. Nowadays, almost the totality of recycled materials comes from other industries, such as PET bottles. The MacArthur study (2017) affirms that there is the "risk that in the long run this prevents higher-value recycling in those industries and suppresses clothing-to-clothing recycling". A recycled material that more than one brand is using is *Econyl*, a material produced by the Italian firm *Aquafil* and that is obtained from used fishing nets. It is utilized, for example, by the American *Outerknown* to realize shorts and jackets.

Another strategy that some fashion brands can and are already utilizing is the creation of

*individualised clothing.* A garment can be adapted to customer needs, made-to-measure or personalized with some special features. The participation in design of the item increases the value that the customer attributes to it, enhancing its emotional durability. Lately, it has been a service offered in the footwear area. Different firms, such as *Converse* or *Nike*, give the possibility to customize shoes by choosing new colours and by adding some decorative elements, like writings.

Thanks to technology improvements and creativity, we can nowadays realize also items characterized by a *smart design*. Clothes can be made modifiable and suitable to be used in different occasions or different weather conditions, like modular jackets. The Canadian *Encircled*, for example, in addition to be a sustainable brand in its production processes, has a line called “multiway clothing” that proposes items wearable in different ways, in order to change style without changing the product.

The design phase comprehends also the choice of raw materials. This is a critical moment, since they affect all the subsequent steps and the quality and aspect of the final product. Raw materials should take into consideration the following characteristics.

- *Safety and health.* Input materials should be safe and healthy to avoid negative impacts during production, use and after-use. These characteristics are obtained by eliminating substances of concern from the beginning of the chain. Restricted substance lists exist; they are provided both by public and private institutions or established by companies themselves. This positive effort should be improved by creating a common standard to make it easier the compliance along the whole supply chain. Firms will gain economic advantages through an enhanced image and by the cost saving: the management of these substances is demanding and highly regulated – an eventual remediation fee is massive. *A new textiles economy: Redesigning fashion's future* (MacArthur, 2017) reports a loss of 200.000 tonnes of dyes into effluents, corresponding to 1 billion of dollars every year because of inefficiencies. Moreover, first movers gain technical knowledge that provide a competitive advantage.
- *Circularity.* Materials should fit a circular model: they should be recyclable or organic, in the sense that they can decompose and give back to soil nutritive substances. Today technology does not allow the recycling of all materials and often the decomposition of organic textile does not enrich the soil enough. Investments in R&D should be made, and innovation shared.
- *Renewable resources.* When virgin material is irreplaceable it should come from renewable resources, such as renewable feedstock for plastic-based fibres. Moreover, the methods to obtain them should be regenerative and restorative, in order to maintain or better improve the quality of the ecosystem exploited. The Ellen MacArthur Foundation report (2017) makes the example of regenerative agriculture systems, where no toxic substances are used, cost saving in pesticides is experienced and soil health is enhanced.
- *Innovative materials.* Research to discover new materials that require less resources to be processed and that have a small impact on environment is critical. Attention, however, should be put in order to avoid “regrettable substitutions” that can bring other negative impacts. For example, recycled polyester is sustainable because it is

obtained from the waste of other industries, but it poses also the problem of the release of microplastics during washing.

A virtuous example in sustainability, and in raw material procurement in particular, is the luxury brand *Stella McCartney*. It chooses organic cotton, wool coming from certified farms, vegetarian leather, viscose obtained from managed forests. It also uses recycled synthetic materials and regenerated cashmere. Finally, it is investing in research and collaborations to improve the way in which metals it needs are extracted and to find alternative methods to obtain the silk.

## 2.4.2 Steps of the production process

In the *manufacturing and remanufacturing* step, a series of adjustment should be considered. First of all, the plants should be run using *renewable resources* and making an *efficient use of them*. With this objective, companies would be able to reduce their GHG emission and to save costs. Moreover, they will significantly decrease the risks of their supply shortage and their consequent increased price. *Alternative Apparel* uses low-impact dyes, biodegradable fabric softeners, and reclaimed water.

Another trick that companies should take in consideration is the *reduction of offcuts*. Production should be organized in a way that prevents the creation of this kind of waste. The current level of wasted offcuts is estimated to be between 10% and 20% (Ellen MacArthur Foundation, 2017). Inevitable offcuts can be reused in the production process, by, for example, transforming them in internal or external details of the garment, or, in alternative, they can be recycled. *Tradlands*, based in California, declares to use 98% of the fibres they make and recycle the offcuts in order to reduce waste to the minimum.

Fundamental to the subsequent recycling of the product is including a detailed *label*, indicating all the materials. Finally, companies should *share* their achievements in sustainability. Improvements in production should be made visible, to spread awareness and knowledge and to make possible to others to operate a change. Brands and manufacturers could collaborate and establish partnerships to face the investments needed to adopt and research innovative solutions. In this way, creating and buying a sustainable product would be no more a prerogative of few people.

The impact of *packaging* is often not taken into account, especially by the final customer. Logistics should consider the solution that employ less material and space, in order to reduce the consumption of resources, the waste, and the number of travels needed to move the products from the production to the distribution centres. *Vetta*, for example, sends its sustainable clothes in boxes that are made from 90% recycled materials and 10% FSC certified materials.

Fashion is by now a global phenomenon, both because it relies on suppliers located in countries different from the one of the retailers, and because the same product can fit different markets. For this reason, *distribution and transportation* can have a big role in the impact of a company on the environment, particularly regarding the emission on CO<sub>2</sub> (Turker & Altuntas, 2014). The mileage needed increased, both for the long distances and for the more frequent travels, given the huge number of collections that fast fashion creates each year. Brands that decide to produce and sell locally are the ones that can better respond to

this problem.

With *reverse logistics* and *network design* the after-use phase starts. Garments should enter this phase only when they are no more usable as clothes. Otherwise, different actors in the industry lose some economic value. Customers lose 460 billion of dollars by throwing away good items, the economy loses an input of fibres that could represent the 87% of the material needed in production, municipalities bear the cost of disposing the textile fibres in landfills and incinerators (MacArthur, 2017). However, the steps that this phase comprehends are still underdeveloped, both from a technological and a logistic point of view. The after-use phase starts with the *collection* of textile waste. Nowadays, municipalities do not provide a separate collection of it, making it be sent to landfills and incinerators.

Some private initiatives exist that try to catch the value brought by used clothes, while some brands have their own platforms. For example, the high-hand fashion brand *Cuyana* carries on the initiative “Lean Closet”, aimed at collecting unwanted clothes and giving them new life. When costumers buy an item, they can request to be sent a bag to fill up with old clothes. They then mail the bag to *Cuyana*, that donates these clothes partnering with an NGO. Customers that participate in this initiative are also provided with a 10% discount on the following purchase. Once the old garments are collected, they have to be *sorted*. Unluckily, sorting technologies need to be improved to make them more efficient and effectively used. This is necessary to provide a well-defined feedstock. WRAP affirms that optical sorting technologies are critical in this sense, but their current accuracy and speed limit their application.

As we have already said, *waste management* interests more than one point of the supply chain. During the production process, efficiency can be gained with an optimized use of renewable resources and the reduction of by-products, such as off-cuts. When a garment reaches its end of life, in a sustainable supply chain the material at disposal is divided, and then it can be recycled. *Recycling* allows the capture of the value of the materials in those garments that can no longer be used as clothes. It is a huge opportunity for the industry (the materials actually lost are considered being USD 100 billion worthwhile – MacArthur, 2017), but the design and the production process has to support it.

As a circle, firms should make clear commitments to use more recycled input in order to increase the willingness to pursue this path by the supply side. *Salewa* is an Italian brand that produces technical equipment for mountain-related outdoor activities and it is investing in sustainability projects. Recycled materials count for 25% of the components of their products, in particular recycled wool. They have also a program thanks to which they recycle the down filling from old sleeping bag. They collect them in their stores and, with the materials they are able to recover, they produce an eco-line of sleeping bags. Moreover, thanks to an upcycling project, they create gloves from the inevitable offcuts of production. Their collaboration with the design university of Bolzano (Italy) and with *AKRAT*, a social cooperative, has been initiated to create new products starting from offcuts and other materials used in the shops.

When dealing with organic material, we can talk about *composting*. Today recycling is better than composting because through it more value is captured and the nutrient value that textile actually gives back to soil is low. However, composting is better than landfill, and the research in this field should be increased. Some brands have already launched their compostable line of garments. One of them is *Freitag*, the Swiss company famous for their bags created starting from trucks' tarp. This brand invested in R&D to create clothes that are

durable and that at the end of their life can be entirely used as compost. A help from public institutions is fundamental to communicate how to recycle clothes, to stimulate market demand and favour the use of recycled materials, by removing some regulatory barriers.

STEPS OF A SUPPLY CHAIN	ADJUSTMENTS IN FASHION INDUSTRY	EXAMPLES
Design	Quality and durability Recyclability Individualised clothing Smart design Raw materials choice	Tom Cridland Outerknown Converse, Nike Encircled Stella McCartney
Manufacturing and remanufacturing	Renewable resources and efficient use of them Reduction of offcuts Labelling Sharing	Alternative Apparel Tradlands
Packaging	Efficient use of space Sustainable materials	Vetta
Distribution and transportation	Closer suppliers Lower number of travels	
Reverse logistics and network design	Collection and sorting of used clothes and textile materials in order to dispose of them in the best way. The primary aim should be the reuse of them.	Cuyana
Waste management	Reduce the amount of material that will end in landfill by Recycling Upcycling Composting	Salewa Freitag

**Table 2.1 – Sustainability adjustments of supply chain steps in fashion industry**

## 2.5 WHY SSCM

The application of environmental concern in the design of the supply chain “is expected to result in improved environmental performance, as measured by reductions in air emissions, effluent waste, solid waste, and the consumption of toxic material” (Green et al., 2012). However, implementing a sustainable supply chain has to bring a commercial benefit; without it, managers are not motivated to initiate sustainability patterns. The two main economic benefit recognized to SSC are the risk and delays reduction and the improvement of brand image. Seuring and Müller (2008) support this statement by reporting two strategies that can induce companies to create a Sustainable Supply Chain:

1. *Supplier management for risks and performance.* Especially in some sectors, such as the chemical one, a high level of risk accompanies the production process. In order to minimize it, companies try to surround themselves with partners able to work in the safest possible way, attention that is often translated also in limiting one's own impact on environment. When the main motivation to enter an SSC is this one, formal certifications assume a lead role. Choosing this kind of suppliers helps the focal firms to reduce the environmental risks that suppliers' activities bring with them.

2. *Supply chain management for sustainable products.* Sustainable products are those that improve the environmental and social quality. To test their impact on the environment they are often subject to a life-cycle assessment. To develop a sustainable product, a cooperation with suppliers, at all levels, is necessary. In fact, the product has to be born as sustainable starting from the design and raw material selection. Moreover, this kind of products assumes a sustainable process behind it, thus it is a 360-degree concept.

We can also add the fact that a green organization of the supply chain can translate itself also in financial and operational advantages such as cost reduction by eliminating waste, saving resources, improving productivity. Moreover, this objective is a stimulus in keeping the company innovative and competitive. Commercial reasons may not be the only ones. The implementation of a sustainable supply chain can be driven also by ethical reasons. Managers can be particularly sensible to environment protection and as a consequence they may decide to do their business in a certain way. Commitment of management is fundamental, since sustainability has to become part of the mission statement. Ability to communicate this objective throughout all the level of the organization is required as well. The senior and mid-level management commitment and support towards sustainability is considered an internal driver (Zhu et al, 2008).

Opposed to this internal driver, we find three main external drivers, that trace the factors that are slowly pushing economy toward a circular nature: government, customers and other stakeholders. They exert pressure that can take different forms such as: legal demands and regulation, customer demands response to stakeholders, competitive advantage, environmental and social pressure groups, and reputation loss (Seuring & Müller, 2008). The pressure of these groups of stakeholders can be normative, coercive or mimetic (Testa and Iraldo, 2010). The pressure is normative when it pushes companies to change their behaviour to be considered more legitimate; the main normative pressure is the one exercised by customer requirements. Regulation bodies press companies in a coercive way, since they can impose penalties and fines for non-compliance or require the disclosure of information about the impact of the company on the environment. The mimetic pressure is about adopting green practices because other companies have initiated this path and are being rewarded.

Having these pressures in mind, Testa and Iraldo (2010) recognized the existence of four strategies that favour the adoption of SSCM:

1. *Reputation-led.* The product and the process are made “greener” and the customers are made aware of that. Thus, the corporate image is enhanced, not only at the eyes of customers but also within the network of business partners, increasing the probability of collaborations.
2. *Efficiency-led.* The material input is reduced. Costs are decreased, and the product can be offered with a more competitive price. This is recognized as a quite weak strategy by the authors, especially because the initial investment required can be very high, and the payoff is supposed to arrive only in the long-run. The focal company involvement is fundamental to initiate and support the change.
3. *Innovation-led.* Products and processes present innovative sustainable practices that allow the companies to differentiate themselves from competitors and be leader in a new market. Usually to develop this kind of strategy a strong network is required.

4. *Imitation-led.* This strategy is adopted by those who decided to implement a sustainable supply chain later than first-movers and that are now trying to regain the competitive advantage by collaborating with suppliers, after having the proof that innovative sustainable practices are effective.

Zhu et al. (2008) too pinpoint three theories that can explain what is at the base of a company's choice of being sustainable.

1. *Contingency resource base theory.* The uncertainty of the availability of some resources can induce companies to implement sustainable actions and be more proactive towards environment.
2. *Institutional theory.* Some administrative innovations, as SSCM can be, are institutional process that can verify because coercive, normative or mimetic pressure.
3. *Stakeholder theory.* Managers have to consider stakeholder groups in their decision-making process. Each industry has a different typical supply chain, with a different level of verticalization. The influence that stakeholders can have is different and it determines a specific level of sustainability in supply chain.

As we can see, also in this list we find, in the second and third theory, the three external pressures, commonly recognized as the most important drivers towards a SSCM. The fear that gives life to the first theory is supported by the data about environmental pollution showed in the first chapter. The positive way to look at the problem is thinking about what can be gained, especially economically, from a change in our way to conduct business. The data are given to us by the already cited report of Kerr and Landry (2017), published by BCG and CFA. It affirms that if all the actors in the fashion industry applied the available best practices, in 2030 there would be an upside of about €160 billion for the world economy. Table 2.2 shows the sources of these money.

<b>Value at stake</b>	<b>Until 2030</b>
Reduced water consumption	€ 32 billion
Reduced energy emissions	€ 67 billion
Reduced occupational illness	€ 7 billion
Reduced amount of waste	€ 4 billion
Workers earning 120% of the minimum wage (ILO suggestion)	€ 5 billion
Reduced number of recorded injuries	€ 32 billion
Increased community spending	€ 14 billion
<b>Total</b>	<b>€ 161 billion</b>

**Table 2.2 - Value opportunity of Sustainable Fashion**

Source: Kerr J., Landry J. (2017) *Pulse of fashion Industry. Global Fashion Agenda & Boston Consulting Group.*

However, currently available solutions are still not enough to face the future resource scarcity challenge. Firms have to invest in R&D to find new solutions aimed at reaching the lowest possible level of use of resources and pollution of environment. Moreover, textile industry could gain another €60 billion in addition to the 160 million discussed at the beginning of the chapter (Kerr & Landry, 2017). This will be possible only if a collective push to reach some ambitious, yet realistic, objectives is implemented. The authors suggest that these goals should be aimed to reduce conventional cotton use, increase renewable energy

use, realize industry best practice safety levels, increase efficiency in processing steps, establish minimum wage page, offer in-store end-of-use collection schemes and increase transparency on chemicals usage.

The gains of having an SSC are substantial, but so are also the difficulties in creating it. Some of them have already been cited, such as the technological barriers than can be overcome only if investment in R&D are made. Together with them, often investments in training are required because workers and managers are not yet competent in this field. In addition, particularly challenging is having a truly green supply chain, since often transparency is difficult to achieve. For this reason, certifications are becoming more and more important for suppliers in order to be chosen and trusted by the focal company. When they are not yet available, often the focal company asks its collaborators to present a self-evaluation, where they state how they behave towards environment and people. A new way of thinking is necessary to meet this challenge, and this is perhaps the greater barrier to overcome. But “the value at stake from sustainability-related issues – from rising raw-materials prices to new regulations - is substantial” (Bonini et al., 2014), and investing in it can be winning strategy for more than one actor in the market.

The next chapter presents a concept related to the implementation of a sustainable supply chain, that is the upgrading one. It is about empowering the suppliers from an economic point of view and about improving the conditions of their workers, aspects that should be part of a sustainability effort performed by brands.

# **CHAPTER 3: ENVIRONMENTAL AND SOCIAL UPGRADING**

## **3.1 DEFINING UPGRADING**

In creating a sustainable supply chain, a thought should be dedicated to the future prospects of its actors, in terms of an improvement of their social, environmental and economic conditions. Focal firms have the fundamental role to foster environmental and social upgrading among their suppliers. Suppliers should not be just an arm that serves the central firm, but a network of firms collaborating and sharing knowledge and technical findings. Firms can be dependent reciprocally, without one exploiting the others. The concept of upgrading concerns precisely the exploitation of new opportunities by suppliers and their advancement in the social, environmental and economic areas.

Upgrading focuses on the links that tie the different actors of a supply chain, in particular the focal firm and its suppliers. From an economic point of view, a firm experiences an upgrading when it enters in a supply chain with a higher value production or when it reposes itself within the value chain performing activities that have a higher value added (Barrientos et al., 2011). With this new role, the firm can improve technology, knowledge and skills, and increasing its position and, consequently, its benefits within the supply chain. The economic upgrading can assume four forms:

- *Process upgrading*: it is achieved by changing the production process in order to make it more efficient, usually substituting capital for labour.
- *Product upgrading*: it involves the introduction of more advanced products that makes it necessary to have more skilled employees.
- *Functional upgrading*: through it, firms perform new activities with higher valued added.
- *Chain upgrading*: it brings the firm to shift to a more technologically advanced production chain, entering in new industries and markets.

The possibility to grow in a value chain can be considered a nuance of sustainability, because it is a way through which workers can have access to a better work. However, to be truly a sustainable practice, economic upgrading should be tied to social and environmental upgrading. Environmental upgrading is the “process by which economic actors move towards a production system that avoids or reduces the environmental damage from their products, processes or managerial systems”. Social upgrading is “the process of improvement in the rights and entitlements of workers as social actors, which enhances the quality of their employment” (Barrientos et al., 2011).

The improvement of workers condition involves the presence of freedom, equity, security, human dignity, protection of rights, adequate remuneration, social coverage. Even if economic and social upgrading seem two concepts that develop together, in reality the first one, does not ensure the second one. Barrientos et al. (2011) report some examples in which the economic upgrading of a firm leads to the creation of an unsafe and exploitative working environment. Two factors that obstacle the development of a complete upgrading are

reported in the following paragraph.

## **3.2 DIFFICULTIES IN THE IMPLEMENTATION OF UPGRADING**

Reviewing the literature, we find two main factors that make the realization of a social upgrade complex to achieve. One is the type of governance the supply chain is subject to, the other is the different type of working that we can find in a supply chain.

### **3.2.1 Supply chain governance**

Governance is the way in which focal firms organize their supply chain, which is more and more often a global one. The role of governance in the implementation of an upgrading is fundamental since it defines how the profits and the risks are distributed in the supply chain (Kogg & Mont, 2012). This role has been studied by Gereffi & Lee (2016). They show how the literature presents different typologies of value chain governance, according to the role that the focal firm decides to play. For example, they report the theory of Ponte & Sturgeon (2014), that highlights three aspects of governance. Governance can drive the supply chain by controlling much of the production through ownership, retailers and agents. In alternative, the focal firm can coordinate the suppliers by establishing a network that allows it to obtain the final product, without being directly involved in the production. Finally, it can normalize the chain by making it compliant with a standard or a norm. Driving, coordinating and normalizing show three different level of involvement that a focal firm can decide to have regarding its supply chain.

However, in reality, the private governance, enacted by the focal firms, is complemented by the public governance, exercised by public actors and the social one, driven by civil society (Gereffi & Lee, 2016). Thus, the situation is more complex: different actors can exercise pressure and propose their way to organize and manage the supply chain, showing that there is not a common strategy, and that the approaches that can be used are not mutually exclusive. After having provided a review of literature about governance, that we have in part reported, Gereffi and Lee listed six trajectories through which social upgrading can be implemented. The distinction among them is based on the different actors that can exert pressure and the mechanism and action they can implement to obtain an upgrade. Table 3.1 reports these six paths.

These paths show different kind of pressures that may bring focal firms to help their suppliers in realizing a social upgrading. In market driven path, customers ask for products produced with high social standards. When are the global buyers that ask for an explicit commitment towards Corporate Social Responsibility, we recognize the presence of a CSR-driven path. In a multi-stakeholder one, the pressure comes from different actors and it has the aim to help firms in the value chain to address autonomously labour issues. Then, there are situations in which workers can exercise enough power to speak for themselves and try to obtain some improvements; in this case, the path is labour-centred. A cluster-centred path is possible when a group of firms of the same value chain are localized. Thanks to the relationships among them they can collaborate to improve their working conditions. Finally, the public governance path can be followed by the government, probably the most powerful actors. All the actors presented have different capabilities and limitations; for this reason, it

is often necessary that more than one of them is involved in the road towards social upgrading.

PATHS	KEY DRIVERS	MAIN MECHANISMS	MAJOR ACTORS
Market-driven	- Market competitiveness	- Market supply and demand	- Buyers - Consumers - Suppliers
CSR-driven	- Global buyer's reputation and purchasing power	- Compliance to buyers' codes - Social audits	- Global buyers
Multi-stakeholder	- Coalition for standard-setting - Monitoring - Capability-building and sanctions	- Multiple and standardized social standards - Capability-building and cooperation	- International NGOs - Global buyers - Local actors
Labour-centred	- Workers' grievances - Bargaining power	- Collective bargaining - Strikes - Sabotages	- Workers - Labour unions
Cluster-centred	- External CSR pressure - Collective efficiency	- Collective standards setting - Implementation Support	- Cluster firms - Industrial associations - Cooperatives
Public governance	- Public pressure	- Strong labour law - Law enforcement	- National - Regional - Local governments

**Table 3.1 - Possible paths towards social upgrading**

Source: Gereffi G., Lee J. *Economic and Social Upgrading in Global Value Chains and Industrial Clusters: Why governance matters*, Springer Science (2016)

### 3.2.2 Typologies of work

Another obstacle in the realization of social upgrading is the fact that not only in the same supply chain, but in the same firm, we can find different typologies of employment relationships. Barrientos et al. (2011) recognizes five different types of work in the industries of agro-food, apparel, IT and business services:

1. Small-scale household and home-based work
2. Low-skilled, labour intensive work
3. Medium-skilled, mixed production technologies work
4. High-skilled, technology-intensive work
5. Knowledge-intensive work

The differences among these groups create the conditions for which, even if the firm decides to invest in a social upgrading, probably only one group of workers will benefit from it. Moreover, in labour intensive industries, such as apparel, to be able to respond to focal firm requests, suppliers often use irregular workers who are not protected by any formal contract or social standards. Using the case study of Moroccan garment industry, the authors explain

that the local firms find themselves in the situation of having to respond to request of low cost, short lead times, flexibility for last-minute changes in order and high quality. Firms, at this point, involve in the production both their permanent workers and irregular low-skilled workers with few or no rights. Thus, even if the regular workers are somewhat protected, an important part of the supply chain remain excluded from an upgrading path.

Having the opportunity to operate an economic and a social upgrading is fundamental for SMEs in developing countries. They would not only improve the conditions of their workers but also the positioning of the whole firm. They would be more competitive and could have the opportunity to serve other buyers and other markets, including the local one. It is also true that, to respond to commercial pressures, firms often take a mixed approach between upgrading and downgrading. Both in fact have negative outcomes: social downgrading results in losing out quality, a practice unsustainable in the long run; with social upgrading the firms risk losing price competitiveness. For this reason, a studied strategy is needed.

Standards can play an important role in the upgrading of a supply chain. A firm can decide to apply its own standards that, as a consequence, are voluntary and untrustworthy. Product differentiation and public pressure are making more requested the presence of private standards. However, also this measure can have a drawback effects since the costs associated with it can prevent the smaller suppliers and producer to enter the market, even if their practices could be considered sustainable.

A collaboration with the focal firm is the main element for a successful upgrading strategy, an interaction more useful than one with firms in the same position (Marchi et al., 2013). Marchi et al. analysed four case studies of Italian home-furnishing firms and in three over four cases, larger buyers – the focal firms – played a fundamental role in making these firms realizing a change and improving their position in the value chain, both by becoming a strategic partner and by improving their products. In the fashion industry too, the big worldwide brands could exert their power to improve their suppliers' situation and also to increase their quality level, operating in a sector where the risk of workers' exploitation is high, as we are going to explain.

### **3.3 WHY UPGRADING IS IMPORTANT FOR FASHION INDUSTRY**

Fashion industry generates jobs that often are characterized by precariousness. Its dependence on cheap labour and cheap material has become substantial in the last decades, making different social issues such as child labour, unfair salary, corruption, forced labour, and unhealthy working conditions, a serious and widespread situation. Most of the labour force used is composed by young and poorly educated people, women and children, because this kind of work does not usually require high skills. Moreover, textile manufacturing has shifted to less developed countries, where human rights are in general at risk and environmental awareness is low.

The flexibility required to the supply chain is very high, putting a part of the actors within it in an uncertain condition. In fact, the focal firm communicates with short notice the quantities needed and the changes in the order (orders are put close to the season to avoid inventory stock, due to the unpredictable demand), pretending the preservation of low costs but also the respect of certain quality standards. These requests are contradictory and the

pressure to meet them exercised on suppliers is passed on to the workforce (Plank et al., 2012). The consequent impact on working time and intensity makes suppliers asking a lot to their workers (with cases of compulsory overtime) and starting to rely on non-regular workforce such as temporary and migrant labour, usually poorly protected. Usually, the regular workers are skilled, able to guarantee high quality; the irregular ones are young and unskilled, and they cover the last segments of production, absorbing all the delays accumulated in the previous steps.

This heterogenous group makes it impossible to apply a linear social upgrading. Even when lead firm asks for compliance with a corporate social responsibility document, the fact that the production requests are so pressing make suppliers create two set of working time records, the official one respecting the national law, and the actual one (Plank et al., 2012), that allows the factory to survive. Another way to “pass” eventual audits is by outsourcing to smaller workshops, where the labour conditions are likely to be bad.

Some companies are starting to establish long-term relationships because, with arsing consumer awareness, the financial risk linked to a bad image is becoming considerable. One of the main attentions that contractors should pay is a better alignment between their requests and their CSR initiatives. Even if they choose better materials or eliminate hazardous substances, if they keep asking for the current amount at the current rate, the social problems in the supply chain will not change. Focal firm should think more about the consequences of their unilateral requests regarding cost and lead time. It is true that apparel industry has been one of the sectors that enabled less developed countries to enter the global market, but if the local companies’ role remains limited to level such as assembling, they will not reach a real economic and social upgrading. A situation in which the supply chain is composed by partners and not regulated only by a supply-demand relationship would be the ideal one.

From their side, suppliers should be more proactive. Moreover, the support of the public institutions is fundamental. For example, in Romania they were fundamental in securing labour rights. In Morocco, the textile association has created a label awarding those factories able to pass a social audit. Measurable standards have been increased, but regarding rights the path is still long (Plank et al., 2012).

A successful example is Sri Lanka, where the action of the government together with the entrepreneurial spirit of local firms have created an environment in which firms can upgrade economically and socially. This country specialized in producing sophisticated garments, attention that allowed it and its textile industry to remain competitive. The major companies have been able to backward integrate their supply chain. By controlling their suppliers, they can provide a total high-quality solution for the industry. Being able to cover also the design part gives to these companies the opportunity to be more competitive and more powerful. The role of the apparel association and of the government was fundamental to help companies initiating this path. The upgrade is based on “having expert professionals who can provide creative, commercial, technical, and leadership skills in the project” (Gopura et al., 2016). Sri Lanka does not compete purely on cost, but it has created a unique position for itself: it is able to provide a full package service for mid to upper market retailer that have an interest in sustainable issues. This competence gives it new power that enables the companies to negotiate some conditions with the powerful brands.

It is thus important for all these three actors – local companies, brands and government – to invest in a supply chain upgrading. The local companies would increase their power and

improve their working conditions, while the brands would enhance their image since they are held responsible by consumers about what happens in the production process and they would also have access to better products. With more powerful firms, finally, the economy of the country itself would be strengthen.

The upgrading of the suppliers in the supply chain is one of the aspects linked to the concept of sustainability. The nuances of this ideas are many; speaking about the fashion industry we selected circular economy, sustainable supply chain and upgrading as the most comprehensive and important theories that can lead to a transformation of the sector. As we have seen, they are wide areas of study and they application to the fashion industry is relatively recent. This is translated in a definition of sustainable fashion still not completely settled and characterized by a degree of subjectivity. For this reason, we wanted to conclude the bibliographic research of our thesis with an attempt to define the meaning of the concept of sustainable fashion.

### **3.4 DEFINITION OF SUSTAINABLE FASHION**

Circular economy, sustainable supply chains and upgrading are ideas that are part of the family of sustainability-related concept. They are all aspects of what can be called sustainable fashion. Being composed by so many points of view, it is not easy to define it, a condition necessary to be then be able to act to offer sustainable garments.

The term “sustainability” itself has a huge number of definitions. If we look for it in the Cambridge Dictionary, the general meaning of sustainability is reported as “the ability to continue at a particular level for a period of time”. When we search for the narrower definition concerning the environment field, we find that the concept of sustainability refers to “the idea that goods and services should be produced in ways that do not use resources that cannot be replaced and that do not damage the environment”. This is not far from what we find written in other dictionaries: “Avoidance of the depletion of natural resources in order to maintain an ecological balance” (Oxford Dictionary), “development condition able to ensure the need satisfaction of present generation, without compromising future generations’ possibility of fulfilling their own needs” (Enciclopedia Treccani), an explanation shared by the United Nations Brundtland report *Our common Future* (1987), or “the maintenance of the factors and practices that contribute to the quality of environment on a long-term basis” (Business Dictionary). In conclusion, being sustainable from an environmental point of view means having the smallest impact possible on the environment and its resources, which may also include people and animals.

We believe that this broad definition of sustainability can apply to fashion industry’s attempts to be “green”. Fashion and textile companies should define in which particular aspects they want to reduce their impact and improve their performance, since the term sustainability can embrace different realities. In the article *What is sustainable fashion?* (Henninger et al., 2016), authors recognize that “sustainable fashion” is still a subjective term, because of the different facets that people attribute to it. They propose a matrix to help companies to define what is its meaning according to their own experience, through the rating of all the aspects that sustainable fashion can include. Table 3.2 reproduces this matrix. Here, we find listed the concepts that are commonly associated to a sustainable product; however, being effective in all of them is quite complex. Companies usually have to

make choices and decide where to devote their energies, defining in which areas they have the power and the willingness to operate a change. We see that sustainability can mean both being innovative and preserving a particular heritage; it can include both a local production and the promotion of a fair trade with distant countries. Since there can be different way of being sustainable, there can be also different definition of sustainable fashion.

	<b>Basic</b>	<b>Low priority</b>	<b>Medium priority</b>	<b>High priority</b>	<b>Organizational evidence</b>	<b>Third party evidence</b>
Forward thinking						
Innovation						
Ethical/ sustainable design						
Ethically sourced						
Meaningful, interesting						
Local production						
Production techniques						
Versatile						
Promoting fair trade, fair wages						
Transparency/ traceability						
Checks for harmful substances						
Long-term focus						
Environmental standards						
Human rights/ working conditions						
Community support/integration						
Financially viable						
Environmental- friendly materials						
Renewable resources						
Limited transportation						
Fashion with conscience						
Heritage						

**Table 3.2 - The sustainable fashion matrix**

Source: Claudia E. Henninger, Panayiota J. Alevizou, Caroline J. Oates, *What is sustainable fashion? Journal of Fashion Marketing and Management: An international Journal, Vol.20 Issue: 4, pp. 400-416 (2016)*

A summary definition, that we find satisfactorily comprehensive, is provided by Green Strategy, a consultant agency in the field of green fashion, which in its website writes: "From an environmental perspective, the aim should be to minimize any undesirable environmental effect of the product's life cycle by: (a) ensuring efficient and careful use of natural resources (water, energy, land, soil, animals, plants, biodiversity, ecosystems, etc); (b) selecting renewable energy sources (wind, solar, etc) at every stage, and (c) maximizing repair, remake, reuse, and recycling of the product and its components. From a socio-economic perspective, all stakeholders should work to improve present working conditions for workers on the field, in the factories, transportation chain, and stores, by aligning with good ethics, best practice and international codes of conduct. In addition, fashion companies

should contribute to encourage more sustainable consumption patterns, caring and washing practices, and overall attitudes to fashion."

The big fashion groups are the ones more blamed for the current level of pollution reached by fashion industry. This is due mainly to their massive volume of production, performed at a considerable speed rate. After years of immoderate behaviour, nowadays almost all groups are trying to change some aspect of their business behaviour, especially to better meet the arising demands of a more aware costumer. In Italy we have only two groups that appear in the international coalition SAC, among whose members we find also the worldwide known brands and groups such as *H&M*, *Inditex group*, *Adidas* and many others. The Sustainable Apparel Coalition (SAC) is an international alliance aimed at developing tools to measure and improve environmental and social inefficiencies across the fashion industry supply chain. The most famous of these tools is the Higg Index, an indicator that helps companies in the evaluation of environmental and social impacts of their actions. From the Higg Index, the BCG and GFA developed the Good Citizens Principles that we used in our research study presented in Chapter four.

The first one of these two groups is. *OVS*, born in 1972 as a brand of the Italian group *Coin*. In 2005 it became *OVS S.p.A.* and in the following years it bought other Italian brands. Nowadays the group counts three brands, *OVS*, *UPIM* and *Blu Kids*. Being a big company, it created a structured path towards sustainability. In particular it has defined four action areas, each with some objective that the company plans to reach in 2020. The four areas are: (1) design strategy to allow the recyclability of garments, (2) increase the volume of used clothes collected, (3) increase of the volume of used clothes sold, and (4) increase the volume of garments produced with recycled fibres. A more detailed presentation of their sustainable actions is presented in Box 1.

The other company is *Benetton Group*, founded in 1965. In ten years, its export level reached 60% of its production, and nowadays is present in 120 countries. Two of its main sustainability efforts are reaching a good level of transparency in its supply chain and increasing awareness about some social issues through its advertising campaigns. Box 2 reports its more important green actions.

It is not common among firms being able to respond to all these requirements. Investments have to be made and new relationships established. We asked ourselves to which aspects firms that are considered sustainable give the priority and how. For this reason, we performed a research study where a sample of sustainable Italian brands have been analysed and the main aspects of their sustainability strategy highlighted. Thanks to research we found some common paths and some shared limitations, together with action that are proper of some organizations. The study is presented in Chapter 4 and it retraces the path of the theory presented until now in order to see which concepts are effectively put in practice nowadays.

## BOX 1 - How the “big ones” are becoming sustainable: OVS GROUP

DESIGN	MANUFACTURING	RETAIL AND USE	WASTE MANAGEMENT
<p><b>MATERIALS:</b> Their biggest focus is on cotton, because it constitutes 72% of the materials they use. Being member of BCI, they are increasing the number of items produced with cotton and other fibres coming from organic agriculture and they have the objective to use only organic and recycled cotton by 2020. They are able to use recycled materials at large scale in the production of denim products and they are studying how to be able to use recycled cotton for an industrial scale production. Their restricted substances list is stricter than the one proposed by the EU regulation. Only 1% of their material is coming from animal; among this there is down, that is certified by Downpass, a protocol that trace and control from where the down arrives.</p> <p><b>DESIGN:</b> They rely on the NGO The Natural Step to create a sustainable design. In particular they created a strategy to increase the volume of sustainable fibres used (those that allow the reduction of water consumption, CO<sub>2</sub> and waste production).</p>	<p><b>PROJECTS PARTECIPATION:</b></p> <ul style="list-style-type: none"> <li>- BCI</li> <li>- SAC</li> <li>- European Clothing Action Plan (an EU project aimed at defining a new sustainable model for the fashion industry)</li> <li>- The only Italian brand present at the Copenhagen Fashion Summit in 2017, where circular economy in fashion industry was discussed.</li> </ul> <p><b>SUPPLIERS:</b> They have a code of conduct and a program to improve the transparency and the collaboration along the supply chain. In this are helped by SAC and ACCORD, a legal agreement between brands, Bangladeshi manufacturers and Bangladeshi major trade unions to improve safety and health conditions in plants.</p>	<p><b>PACKAGING:</b> they give back boxes to be re-utilized to their suppliers, pallet to be repaired if broken and not thrown away. They also recycle old hangers.</p> <p><b>SHOPS:</b> Since 2017, they have renovated 80% of their shops, in order to reduce their environmental impact. This intervention translated itself also on an increase in returns, since the costs have been decreased.</p> <p><b>OFFICES:</b> offices renovated, and employees are sensitized about changing everyday little things that can change the world (e.g. reusable bottles, car-pooling).</p> <p><b>SOCIAL PROJECTS:</b> They launched different social projects addressed especially to children. These initiatives spaced from art's promotion, to environmental awareness to anti-bulling themes.</p>	<p><b>DURING PRODUCTION:</b> Collaboration with an Italian start-up, Officina +39, to develop the Recycrom technology, thanks to which textile off-cuts are transformed into dying.</p> <p><b>END-OF-LIFE:</b> Project called “OVS ricicla i tuoi abiti usati” in collaboration with I:CO. OVS shops are used as collection points of used garments that then are given to I:CO that sorts and prepare them for reusing or recycling.</p>

Table 3.4 - Sustainable actions of OVS S.p.A. divided in four of the steps of the supply chain

## BOX 2 - How the “big ones” are becoming sustainable: BENETTON GROUP

DESIGN	MANUFACTURING	RETAIL AND USE	WASTE MANAGEMENT
<p>MATERIALS: Its R&amp;D department is working to obtain a wool immune from fulling and felting. They have their own RSL and all their garments have the Eco Safe Mark, indicating a high level of chemical and mechanical safety standards. They are part of the BIC coalition. They do not use fur, and their wool and downs are certified, while the leather comes from food industry. Denim is not treated with sand-blasting.</p> <p>ENVIRONMENTAL FOOTPRINT: A study was performed in collaboration with Ca' Foscari University to determine the amount of water used in the various facilities around the world connected to Benetton.</p>	<p>PROJECTS PARTICIPATION:</p> <ul style="list-style-type: none"> <li>- ZDHC</li> <li>- UN Global compact, an initiative whose goal is engaging businesses on a platform of ten principles regarding human rights, labour, environment and anti-corruption.</li> <li>- SAC</li> <li>- Greenpeace Detox Campaign, that asks to eliminate all the hazardous chemicals by 2020. In 2016, Benetton was among the top brands in the avant-grade category, the highest. The result of the hazardous chemical testings are accessible in the company website.</li> <li>- BIC</li> </ul> <p>SUPPLIERS: They traced all their first- and second-tier suppliers, excluding the occasional ones. Benetton created a Group Code of Conduct and implemented an audit program that include third-party unannounced assessment to suppliers. They are committed in improving the situation of suppliers in Bangladesh. They are part of the ACCORD on fire and building safety (see Table 4.3), they started to collaborate with BRAC after the Rana Plaza tragedy and contribute to the Ran Plaza trust fund, established by the ILO.</p>	<p>PACKAGING: Reduction of the volume of the packaging material. Certified paper for catalogues and shopping bags.</p> <p>CARE SERVICES: In a section of their website there are some suggestions about the best way to wash clothes and the instructions to perform some small reparations.</p> <p>SOCIAL PROJECTS: They sponsored and organized a lot of social campaigns, sensitizing people about different issues, such as the microcredit in Africa, women safety, youth unemployment, sustainability.</p>	No information provided.

Table 3.5 - Sustainable actions of Benetton Group divided in four of the steps of the supply chain

# **CHAPTER 4: HOW SUSTAINABILITY IS TRANSLATED BY SMALL AND MEDIUM SIZE ITALIAN FASHION BRANDS**

## **4.1 RESEARCH INTRODUCTION**

As discussed in the previous chapters, sustainability is a wide concept that embraces different aspects. From circularity to ethical issues, it can be specified in different ways. According to the already cited Henninger's article (Henninger et al., 2016), even in a smaller environment such as the fashion industry, this term can be interpreted giving greater importance to some aspects over other. We wanted to know whether today there is a common interpretation of sustainability in the Italian fashion industry and which is. Our question was about which of the ideas linked to sustainability was the most important for Italian brands, how they practically translated in their work the idea of being sustainable.

With this purpose in mind we conducted a research among some Italian fashion brands producing apparel or footwear. We decided to focus on SMEs, a reality closer to our everyday life with respect to the one of luxury brands, although their importance for the Italian market. The brands that we analysed were selected according to the methodology explained in the first paragraph, together with its limitations. This process has brought us to have a sample of eleven brands.

To analyse them, we decided to deepen four of the supply chain's steps analysed in Chapter 2. They are the main ones and they encompass many of the concepts discussed in the previous chapters. They are design, manufacturing, retail and use, waste management, and they carry with them the ideas of environmental footprint of materials and processes, transparency of the supply chain, upgrading of suppliers, research and innovation, sharing of knowledge, change of habits, and circular economy. Starting from these steps we created a framework, described in the second paragraph, that allowed us to compare the selected firms.

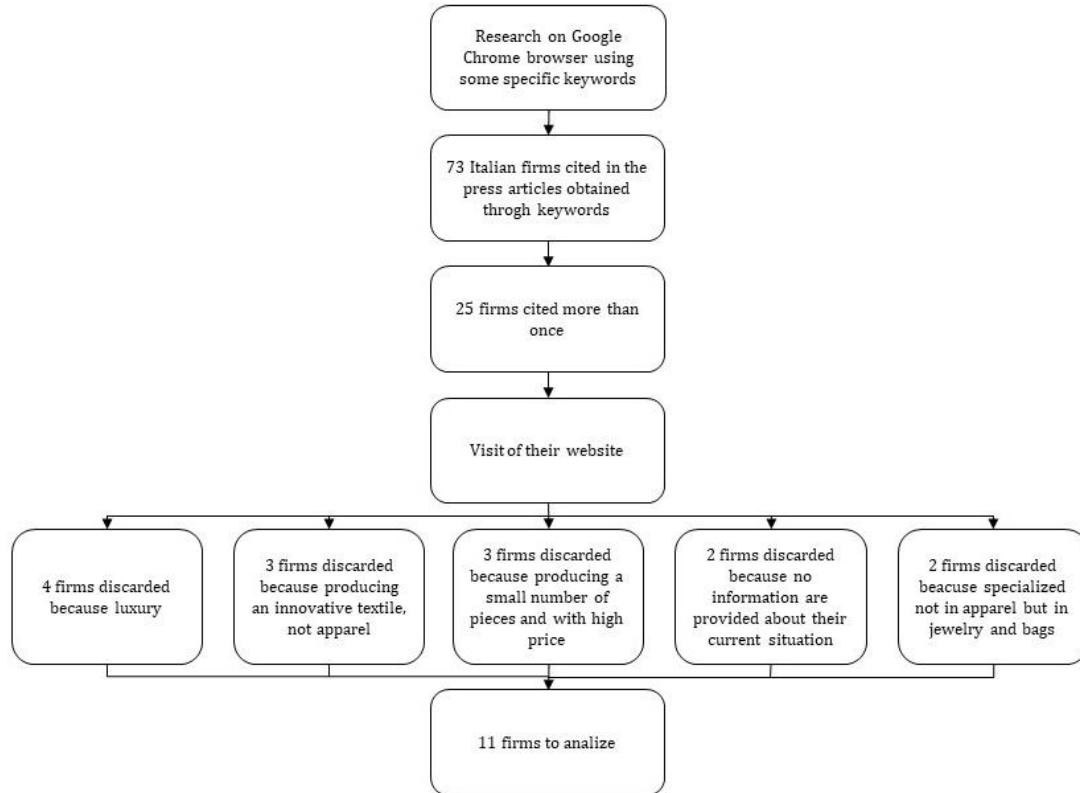
The considerations that arose from this comparison, summarized in the fourth paragraph, following the report of the results in the third one, highlighted the necessity to enlarge our research basis and to dedicate some space to raw materials producers, who seem to be more active and important actors in the promotion and advance of sustainability issues. Results have been also compared with the actions undertaken by the two big groups previously described in Box 1 and in Box 2. This allowed us to see how firms with different resources are facing these issues.

## **4.2 RESEARCH METHODOLOGY**

To select the case studies later analysed, we used a systematic approach, that allowed us to include in our research those Italian brands that have been recognized

by the press as investing on sustainability. The research can be considered inductive, since its scheme has been modified as we obtained information during the review process. The process that we followed to identify the brands to analyse is schematized in Figure 4.1.

**Figure 4.1 – Methodology**



The first step was the determination of which keywords will be used. They have been selected following the purpose of our study, aimed at understanding whether and how Italian fashion brands are investing on sustainability. Since the research was focused on Italy, we used Italian words, limiting the use of English words to those that are commonly used also in Italy (such as “brand”, “fashion”, “eco-friendly”, etc.). With the same intent, the words “Italia” or “Italian” were used in all the research attempts. The other words used were linked to the concept of sustainability; for this reason, we also included keywords such as “ethical”, “cruelty free” and “recycled” in addition to “sustainable”. To make our research more complete, we repeated it using synonyms. The complete list of keywords used is presented in Figure 4.2.

The research was conducted using the browser Google Chrome and checking the first four pages of results for each combination of keywords, since after that point the results started to become less in line with our scope.

KEY WORDS
- Aziende moda italiane sostenibili
- Brand moda sostenibili
- Moda sostenibile marchi italiani
- Brand fashion sostenibili Italia
- Marchi abbigliamento sostenibile Italia
- Italian sustainable fashion brands
- Moda eco-friendly Italia
- Marchi moda green Italia
- Moda cruelty-free Italia
- Abbigliamento animal-free Italia
- Abbigliamento materiali riciclati
- Moda etica Italia

**Figure 4.2 - Keywords used in the research phase**

Thanks to this research we obtained a series of press articles that talked about Italian fashion brands openly interested in sustainability issues. We created a list of them, discarding in advance those brands that posed themselves in the luxury sector. We did this choice because it was our intent to study firms that can be part of everyday life of a wider part of the society. The list obtained in this way was composed by 73 firms. Among these, we decided to keep those firms that were cited by more than one article, making them a more recognized reality. The list shortened to 25 firms.

At this point we checked the websites of these 25 companies and we furtherly reduced the list. Four brands were discarded because resulted to be part of the luxury segment. Three brands were discarded because they produce a very small number of products and they sell them at high price, making them high-hand firms, even if not clearly declared luxurious. Three were removed because they produce innovative textiles (coming from oranges, wood and wine), but they do not produce clothes themselves. We were not able to find updated information about two firms, so we did not consider them a reliable example. Finally, we eliminated two companies because one, even producing some clothes, is specialized in jewellery, and the other produces only bags, while we decided to focus on clothes and shoes. This selection left us with eleven firms that we analysed in a more detailed way.

#### 4.2.1 Limitations

Our research presents two kinds of limitation, one in the creation of the sample and one in the sample itself. The creation of the sample cannot be considered completely subjective. In fact, the articles obtained through the use of the keywords gave us a list of firms sustainable according to the articles' writers. This can be a limitation since there is not an objective base as a data base can be, and since the costumer can have a narrow concept of sustainability. However, it gives us a preliminary idea of what being sustainable means for costumers, to which aspects of it they put more emphasis, and, as a consequence, which brands they decide to support.

The second limitation regards the fact that the sample is very small, eleven firms in total, thus it does not give us a completely satisfactory image of the current situation of the Italian market of this area. From the analysis of these eleven case studies, another obstacle has been detected; the brands that compose these sample are small

realities, with the exception of Save the Duck, whose turnover is definitely higher than the others and which is a more industrial company. The other firms live in an almost artisanal situation, characterized by low volumes of production. This means that we have a limited image of the current landscape in medium-hand fashion market. The considerations linked to this discovery are further discussed later. We now proceed with the description of the analysis framework that we used.

### 4.3 ANALYSIS FRAMEWORK

The analysis of the case studies was conducted creating a framework based on the theory presented in the previous chapters. Of the six steps of a sustainable value chain discussed in Chapter 2, we decided not to consider the packaging and the distribution and transportation steps, because the general smaller relevance given to them in fashion industry compared to other phases – although their undoubted impact on environment. To simplify the analysis, we also put together the reverse logistics and the waste management phase under the name “Waste Management”. The choice was dictated by the necessity to create the simpler framework possible and, since the reverse logistics phase serves the waste management one, we concluded that they could be analysed together.

For the creation of our framework, we also took inspiration from the *Good Citizens Principles* provided by Kerr and Landry (2017). It is a detailed list of the steps of a fashion supply chain, enriched by the indication of minimum requirements for each phase. The complete list of principles is reported in Appendix A. From this scheme we added to our framework a phase that we named “Retail and Use”, two moments that the authors analyse separately but that, for the sake of our study, can be merged. In fact, we considered this phase as the one comprehending the services offered to costumers, both at the moment of purchase and after the sale.

SUPPLY CHAIN PHASE	ASPECTS ANALYSED
Design	<ul style="list-style-type: none"> <li>- Planning of durability</li> <li>- Planning of recyclability</li> <li>- Environmental footprint of raw material chosen</li> <li>- Raw materials' supplier transparency, traceability, and social labour conditions</li> <li>- Avoidance of short notice orders</li> </ul>
Manufacturing	<ul style="list-style-type: none"> <li>- Suppliers transparency, traceability, and social labour conditions</li> <li>- Environmental footprint of production processes</li> </ul>
Retail and Use	<ul style="list-style-type: none"> <li>- Communication of sustainability to costumers</li> <li>- Care and repair services</li> </ul>
Waste Management	<ul style="list-style-type: none"> <li>- Presence of reverse logistics to collect materials</li> <li>- Recycling/Upcycling/Composting/Other solution to use waste</li> </ul>

**Table 4.1 - Analysis Framework**

The final framework is consequently composed by four main steps: Design, Manufacturing, Retail and Use, and Waste Management. In Table 4.1 we indicate the main aspects analysed for each phase. These aspects were taken and adapted from the Good Citizens Principles framework, according to what was studied from the literature reported in Chapter 2.

## 4.4 CASE STUDIES

The case studies are presented giving a general brief overview of the firm and its scope. A deeper analysis was conducted regarding the information necessary to fulfil the framework scheme we previously defined. The information gathered is presented in an extended form in the following sections and then summarized in Table 4.2. A note has to be made regarding the fact that all the firms presented have some environmental certifications. The main ones in the textile industry are reported in Appendix B and, for this reason, they are not discussed in detail in the following paragraphs, which described the selected case studies.

The case studies in the sample were studied first of all by looking at the information accessible through their website and through press articles. Then we tried to contact the brands by email, asking for a phone call to have more details at our disposal, especially about themes not treated in the website. Six firms (*Quagga*, *Esemplare*, *Camminaleggero*, *Fera Libens*, *NVK Daydoll*, and *Progetto Quid*) responded to our request and we were able to talk with them by phone. The information about Save the Duck has been obtained during an internship period in the firm in April and May 2018. The other five realities have been analysed only through the information publicly accessible in their website and in press articles; for this reason, their analysis is limited.

We divided these eleven firms in five clusters according to similar characteristics. The first cluster is composed by three firms that creates outerwear avoiding the traditional materials, downs in particular. The second one includes two vegan footwear brands. In the third cluster we present two firms that focus in particular on just one material. The forth group comprehends three brands that have a particular attention for natural materials. Finally, *Progetto Quid* is left alone in the last cluster because of its social nature and upcycling willingness.

### No need for downs: the new recycled nature of jackets

#### SAVE THE DUCK

Save the Duck was born in 2012 as a brand of the Italian company Forest S.R.L., established in 1914 by the grandfather of the actual CEO. From the start, the company has produced jackets, growing from a small workshop to become a company that exports in twenty-nine countries. In June 2018, given its success (in 2017 it had a return of €31.5 million), with the entrance of an investment fund, Forest S.R.L. became Save the Duck S.p.A. The company counts twenty-four

employees divided in five departments: product and design, marketing and communication, sales (with different responsible for Italian and foreign market), administration, and logistics. They are all dedicated to Save the Duck, with the exception of two employees that work for the other brand of the company, Ganesh. They have another product office in China that deals with suppliers and quality control. In fact, the production takes place in China. This is a representative office, thus people that work there are not Forest's employees; the company provides to this office what can be called a reimbursement of expenses.

Save the Duck produces outerwear in the complete respect for animals, by not using materials coming from animals: no down, no wool, no silk and no materials from shells are present. The values of the brands are few and clearly stated:

1. *Respect* for animals, environment, and internal and external stakeholders.
2. *Responsibility*, that is translated in continuous improvements to have the smallest possible impact on environment and in giving support to those who fight for our planet. Each collection tells a specific story: each year they try to face a problem by making people aware of it and by showing the improvements that they have made to address it.
3. *Irony*, showed through the colours and through the willingness to look at the positive and bright side of life. the logo is the emblem of the light spirit of the organization: a duck that whistles and wipes drop of sweat because its downs are now safe. The whistle also signifies that the brand is in tune with the universe, because of its respect of environment and animals.

*Design.* Save the Duck's jackets are designed to be used for more seasons and, more importantly, for more years. Their style tries to be such that it does not go out of fashion, offering products that are original but durable from a physical and stylist point of view. None of the materials used contain elements coming from animals. Save the Duck received LAV certification in 2015 with the highest rating (VVV+), since the brand is 100% vegan. Thanks to this attention, it received also awards, such as the Vegan Fashion Award by PETA and the MARIO UNNIA award for sustainability, dedicated to those firms that invest in products or services that reduce the environmental impact or promote a more efficient use of resources.

Feathers are substituted by a patented material called PLUMTECH, that is able to provide the warm temperature of a classic jacket and to add other features such as lightness, breathability and ability to dry off quickly. From the Spring/Summer 2018 they introduced a new material called RECY that is completely obtained by post-consumer recycled polyester. In order to create a jacket, almost twenty plastic bottles are used. The Spring/Summer collection of 2019 will include a new line produced with ECONYL, a Nylon yarn obtained from recycled fishing nets. The company's intention is to increase the percentage of lines realized with these innovative and recycled materials, and it aims to add other sustainable fabrics in the next years, such as organic ones.

Another attention of this brand is addressed to hazardous chemicals. The firm has its own Restricted Substances List, that enumerates all the not-accepted chemicals.

It comprehends all the substances reported in the REACH, the European regulation about chemicals, and others. This environmental-friendly decision allows the firm to enter in a wider number of markets. Some of their raw materials that are certified by Bluesign and OEKO-TEX.

*Manufacturing.* Save the Duck has not yet a formal social and environmental impact assessment, but it is working to institutionalize its effort and to define which will be the next steps. Regarding the social sphere of sustainability, Save the Duck is positioned positively. In the initial phase of its life, it acted in a passive way, by simply asking to its Chinese suppliers to show ratings done by third parties. Joining the non-profit organization Amfori, it forced its manufacturer suppliers to be assessed through audit done by third-parties and being then be rated by Amfori in accordance with its code of conduct (BSCI, Business Social Compliance Initiative), based on the UN 2020 Development goals. Moreover, the organization asks to their signatories to push suppliers to improve and to certify these improvements.

The BSCI has been subscribed by all the manufacturers in the company supply chain, while textile suppliers are still reluctant. They are willing to be subjected to private audit conducted by brands and some of them have their own code of conducts, but they do not want to invest in a third-party certification. Thanks to a long-term collaboration with suppliers (the brand started to collaborate with China in 1994), Save the Duck can be reasonably sure about what happen in its supply chain. The fact that they have a related office in China enables the brand to have information about manufacturers and suppliers and the constant communication between them and the Italian office allows the brand to maintain a "made in Italy" quality level.

In the field of environmental impact, they have many objectives and good intentions, such as the participation in the ZDHC project (Zero Discharge of Hazardous Chemicals) and the achievement of Manufacturing RSL. Both have to objective to completely eliminate the presence of the most dangerous substances not only from the product itself, but from the entire production process. Save the Duck is confident that these measures will be positively accepted by Chinese partners, because the country is becoming more and more demanding about environmental issues, given the unsustainable level of pollution that it has reached. Nowadays, Save the Duck relies on self-assessments made by its suppliers and it is mobilizing to implement the guidelines given by Amfori through BEPI (Business Environmental Performance Initiative).

*Retail and Use.* This company advertises its sustainability nature, being aware that it is a great competitive advantage. Through an analysis of their follower base on Facebook, the brand determined the interests of their fans, finding out that most of them are people somehow aware of sustainability issues. In fact, 65% of its followers are people interested in theme such as cruelty-free and ethical lifestyle, and they like Save the Duck because it provides a green alternative to the classic jackets' producers, allowing them to be coherent with their values. The other 35% of Save the Duck fans are people interested in premium brands of different areas (e.g. automotive, fashion), showing us as Save the Duck conveys not only a message of sustainability, but it can also leverage on its being fashionable and stylish.

The stylish features of its products make Save the Duck a brand that can attract also

not sustainability-interested customers and make them aware of the current situation. In fact, this company uses its advertisement to sensitize people about the dangers that animals and environment have to face.

Moreover, it has a lot of collaboration with different NGOs, both local and international. In most cases, it gives donations to these associations both in the form of money and in the form of jackets, that then the organizations will sell. Today, it donates regularly to more than fifteen associations, committed to different causes. It also created some collections collaborating with WWF and with sustainable designers, such as Christopher Raeburn and Christopher Bevans.

Regarding the care and repairs services provided to customers, the company provides a two-year warranty for their products and a minimal repair service. All the products have a label that indicates the best way to preserve and wash them, in order to maintain them in good condition as long as possible.

*Waste management.* The company does not have a collect system for old jackets or a network to keep them into the market. As we said, part of the materials used are recycled, but they do not come from fashion industry. A goal expressed by the CEO is to be able to create a completely recyclable product. For now, they just provide a detailed list of materials used in each product.

## QUAGGA

Quagga was born in 2010 and it is a brand of the company Vestetica S.R.L. It has its headquarters in Turin, in North Italy. From the beginning it proposed itself in the market as a sustainable brand, producing winter jackets, designed to be comfortable, stylish and capable of providing high technical performances. Particular attention is put in the selection of materials, which are 100% recycled and not coming from animals. The name itself embodies the concern for environment: the quagga is an animal similar to a zebra that was wiped off in the middle of the 19<sup>th</sup> century and then reintroduced thanks to the work of some scientists. The brand chose this example of biodiversity to represent itself.

The decision to create a sustainable brand arose from the sensibility of the founder Stefano Bonaventura. In the 90s, working in the fashion field, he was interested in the beauty of the creation but also in the related ethical issues. The main problems he recognized were the delocalization of production and the fact that people started to consider clothes as more and more disposable items. He started to study the ecological impact of fashion and in 2010 he founded the company together with his partner. It was a small but innovative project, because people were used to associate ethical fashion with the style of the hippy revolution in the 70s. Quagga, instead, was proposing something green *and* fashionable. The brand is slowly growing and nowadays it produces among one-thousand pieces for season. It is still a small reality without big resources to invest, but with good ideas.

*Design.* Quagga uses only materials obtained by recycled polyester fibres and it avoids substances that are dangerous for the customer and for workers. The same attention is paid to the production of the accessories such as zips and buttons. They

created jackets completely made by recycled polyester and that are recyclable at the end of their useful life. This choice was dictated by the willingness to find a solution alternative to downs.

They first thought about vegetal fibres; however, the necessary ones grew only outside Europe and the CO<sub>2</sub> released during the transportation would have undermined their sustainable production. Thus, they selected as main material post-consumer recycled polyester; in this way they are able to give new value to this material, to produce at a low impact for the environment, since it is a material found and treated in North Italy, and, finally, to be sure not to face shortage of it. At that time, it was not easy to find somebody willing to weave this kind of fibre, being this sector still very young. At the end, they started to collaborate with a firm of Como, 150km from Turin, the only one ready to invest.

By using recycled PET, they do not necessitate of materials coming from animals; they obtained the highest rating of the LAV certification, VVV+. A difficulty in this aspect was to convince people that the substitutes for animals' downs or fur are equally valid. All the suppliers own environmental certifications, such as the Bluesign one and the OEKO TEX Standard 100.

The quality of the materials and the attention to the details make these jackets durable and functional. The brand also avoids the insertion of parts whose only function is a decorative one. Often the materials used for them are polluting as well as their production. Adding nothing useful to their products, if not elements that may become old and out of fashion, the brand does not use them, focusing instead on a clean and timeless design. They also propose innovative and smart solutions, such as an accessory called "tool"; it is a strip that can be added to two models of jackets for women, allowing to enlarge the jacket in case of pregnancy and, rotating it, to be able to bring and protect from cold an infant.

*Manufacturing.* The supply chain is certified by Bluesign and it takes place in Italy, especially in city near the company's headquarters. On the label of each product all the actors of the supply chain are reported. Together with them, it is also stated how the price that costumers pay is distributed in the supply chain: 35% is used for the purchase of raw materials and the production of the jacket, 50% goes to the retailer, and 15% is used to cover administrative costs.

*Retail and Use.* Regarding the communication of sustainability, the website of the company is rich of information about the choices made by the company, in particular about the materials used. A section of the website is dedicated to press news not only regarding directly Quagga, but we find also articles about sustainable and ethical fashion in general. The company code of conduct is accessible from the website too. The label on each product is rich of information about its production and the fair wage principle that is beyond it. They offer a free repair service also for items purchased more than two year before.

*Waste Management.* On the label of the jacket is reported that, after a long life, the jacket can be disposed of in the plastic bin. Moreover, those jackets still in good condition can be given back to Quagga, receiving a 20% discount on the future purchase; in alternative, the firm is willing to pay back 5% of the price paid for the

item. The collected garments are washed, reconditioned and donated to NGOs operating in the field of solidarity.

## **ESEMPLARE**

Esemplare is a brand of the Italian company Pattern S.R.L., a reality that has the concept of sustainability at its basis. This small-medium company is certified with the standard SA8000 Social Accountability and it presents a sustainability statement that follows the international standard of the Global Reporting Initiative. Pattern bought Esemplare in 2014 and started the production of high quality and high technology waterproof outerwear. The innovative materials used, the functionality of these garments and the careful design make them a durable product on which people can invest their money. Besides its brand, Pattern work also as a supplier for fashion firms. Their concept of sustainability passes through people, by ensuring that their employees and the ones of their suppliers are treated in a fair way, and through technology, that is exploited to find new efficient ways to “close the loop”.

*Design.* Innovative materials are used, and research about the latest technologies is constant. They want to provide quality, durability and high performances. They do not use leather, fur or downs. They use both synthetic and natural materials. Part of the synthetic material is recycled from PET bottles. This phase takes place in Italy.

*Manufacturing.* The production is located in Europe. The certification that this brand owns ensure a sustainable supply chain, both from an environmental and a social point of view. They tend to look for already certified suppliers. However, some actors, such as the garment makers, are helped to reach some sustainability standards.

*Retail and Use.* Indications about how to take care of the products is provided. Moreover, they are easily washed also through dry-cleaning.

*Waste Management.* This step of the supply chain has not yet been developed.

## **Vegan shoes: microfibres that resemble leather**

### **FERA LIBENS**

Fera Libens, born in 2015, produces footwear characterized by being vegan and made in Italy. The name of the brand highlights these two aspects, by recalling its Italian origin through the use of the Latin and its cruelty-free nature, since the translation of the name is “happy animal”. Being vegan is for them a starting point, that makes them be associated with the concept of sustainability. However, they recognize that the path towards sustainability is still long and challenging, especially for a small company as Fera Libens is.

*Design.* Being vegan ensures Fera Libens the highest LAV rating. To replace leather,

they use innovative materials such as the Alcantara - patented and certified as a carbon neutral material, that is the producing company takes actions to balance the CO<sub>2</sub> released in the production processes. This and the firms that provide Fera Libens the other microfibers are Italian. They choose this kind of materials to provide a different product with respect to the traditional leather shoe, a product with a lower impact on the environment.

The sole of their shoes is produced by another Italian brand, Vibram, famous for the quality of its products and that is investing more and more in the research towards sustainability. The laces are in cotton and produce in Italy. The design tries to be classic, in order not to bore after short-time, but also original. They are studying whether they can use other innovative materials, such as faux leather coming from apple skin, wine or mushroom.

*Manufacturing.* Shoes are designed in Milan and produced with the collaboration of craftsmen located in the Italian regions of Piemonte, Lombardia and Marche. The suppliers are not necessarily certified; the brand relies on the fact that they are Italian artisanal realities, where is difficult to find unethical situations.

*Retail and use.* In the FAQ section of the website we find some suggestions about how to take care of the shoes, in particular how to clean them, putting attention toward the needs of the different materials that make up a product. The firm does not provide assistant services.

*Waste Management.* This step of supply chain is not developed.

## CAMMINALEGGERO

Camminaleggero produces footwear without the use of material coming from animals. Its legal headquarter is in Pavia, North Italy. They believe in the use of alternative materials with respect to the ones coming from animals, in the necessity to consume and produce less and in the limitation of the impacts that our actions have on the planet. It is a small firm, born from the willingness of its founder, Carolina Pini, to create a shoe as she wanted it, not finding it in the market. In addition to being sustainable from an economic point of view, this small firm wants to be sustainable for the people who collaborate within it. A sustainable timetable and the awareness of being doing something good is valued a lot by its founder.

*Design.* They substitute the traditional leather with a microfibre, a choice dictated by the reflection about the lower impact that this artificial material has with respect to the treatments that leather has to be subjected to. The vegan orientation allows them to obtain the rating VVV+ by LAV and the PETA certification. The used microfibre does not present hazardous substances and provides the same effect as leather. To obtain this material, they collaborated with Future Microfiber, a firm located in Vigevano, a city near Pavia and where also the production of Camminaleggero shoes takes place. This microfiber was used in healthcare sector, since it is free of substances that can create allergies. Performing various tests, the two firms create a microfiber suitable to be used to replace leather. In fact, it is

resistant, breathable and elastic.

Part of the production is realized with textile material that comes from Fair Trade certified reality in India. They also collect old jeans and use them for one of their collection. The sole is supplied by Vibram, a certified Italian firm. Some models present a sole obtained by recycled tyres. They focus on quality and on providing a durable product.

*Manufacturing.* The production quantity is limited. They do not have inventory, but produce according to the request, continuously restocking. At the beginning the production part was located in Vigevano too; this area was rich in shoe factories, but with time they have lost the competences that Camminaleggero wanted, that is a specific way to assemble the shoe, called “ideal”. They found this ability, today spread in other countries such as Portugal or Spain, in a firm that produces at an artisanal level in the province of Novara, not far from the other suppliers and firm's location.

*Retail and Use.* Indication about how to take care and wash the shoes are provided in the website. Even if not advertised, customers can ask for repair services contacting the firm directly. The shoes are made to last, and the way in which they are assembled make it easy to change the sole, that is the part that most suffer the use, by contacting a local cobbler.

*Waste management.* The microfiber does not contain hazardous substances, thus it has a limited impact on the environment. For now, the energetic cost necessary to recycle the material is still too high to be sustainable from an environmental and an economic point of view.

## **One good material is better: sustainable denim and beechwood fibres**

### **NVK DAYDOLL**

The designer Natasha Calandrino Van Kleef created this brand that proposes clothes for different occasions and it is particularly focused on women. The sustainable particularity of its collections is the material used, the Modal. It is obtained by beechwood, it is patented and certified and it is produced by the Austrian company Lenzing. The atelier is located in Milan.

*Design.* The main material, Modal, it is a sustainable one, both during the production and use phase. From the designer point of view, it is one of the most sustainable material that can be found nowadays: beechwood is “raised” for this purpose and it does not need to much resourced to grow. Moreover, it is a tree that lives in the areas close to where this brand's production takes place, limiting in this way the transportation costs. To keep the impact of the creations low, the designer decided to eliminate as many passages as possible because each one adds complexity and pollution. The solution to this willingness has been the use of just this material; no buttons or zips are used, just a double layer of Modal where more protection is

needed. The brand reports the Peta-Approved Vegan mark and the Fur Free logo. All the clothes follow the requirements of the Kyoto Protocol. This certification looks at the impact of the all production process and at the balance between the necessary inputs and outputs. Thanks to the use of Modal, the brands received also a safety certification from the Italian Ministry of Health.

*Manufacturing.* The production takes place in North Italy and it is not in series. Particular attention is posed to the dyeing phase, that is the most polluting one. They use a technique called stain dyeing that allows to use one tenth of water with respect to the traditional way to dye cotton for example and also to save from 40% to 60% of energy.

*Retail and use.* In the website it is specified that this kind of fibre is washable at low temperatures and that it does not necessitate ironing.

*Waste management.* This step of the supply chain is not developed.

## **PAR.CO DENIM**

Par.co denim was born in 2012 and it is located near Bergamo. It's the brand of the company Par.co Fashion S.R.L. and it produces denim clothes, especially jeans, using organic and certified cotton.

*Design.* The firm uses only certified organic cotton, whose production has a lower impact on the environment, on the farmers and on final consumers with respect to the traditional one. They also use textiles that are obtained by mixing the organic cotton to other natural fibres, such as hemp and linen. They do not use materials coming from animals, thus they are certified VVV+ by LAV.

*Manufacturing.* The initial steps of the supply chain (spinning, weaving, warping and dyeing) are performed both in Japan and in Italy, by suppliers certified through GOTS, OEKO-TEX, SA8100 or that adhere at the Greenpeace Fashion Detox Campaign. These standards should ensure environment and workers protection. The cutting and the sewing phases are realized by craftsmen of the area where the firm is located. The washing and other treatments are made by Italian firms that employ innovative and sustainable techniques. The metallic parts of the products are produced near the firm and are nickel-free.

*Retail and Use.* They communicate on the website the problems caused by the use of traditional cotton. They opened a shop in Bergamo, where, together with their products, they sell also items of other sustainable and ethical brands.

*Waste Management.* No information about this step of the supply chain are provided.

## **Aware choices of raw materials: balancing the impact of their production**

### **RE-BELLO**

Headquarters placed near Bolzano, Re-Bello is a brand born in 2013. Great attention is put in the choice of raw materials, being aware of the impact of each material. They try to identify the best combination between a fibre and the purpose it has to satisfy. The name reflects the goal of this brands, that is launching a revolution (Re-) that is beautiful (Bello). The idea, in fact, arose in the mind of one of the founders, reflecting about the fact that the sustainable clothes available are usually not stylish, making people unwilling to buy them.

*Design.* Sustainable raw materials are one of the major concerns for this firm. They use beechwood coming from Austria, not far from where the firm is located and rich in this wood. The certified supplier of this material (the already cited Lenzing), moreover, is able to find other uses for the material not necessary for the production of fibres.

Another firm from the same region of Re-Bello provides the nylon fibres, obtained by regenerating used fishing nets and carpets. They used also recycled polyester, collected and transformed in fibre with a process entirely performed in North Italy.

Bamboo fibres are present; aware that while the cultivation of this plant is one of the most sustainable, the fibre extraction phase requires chemical processes, the firm mixes it with certified organic cotton (OEKO-TEX and GOTS certifications). Similar advantages and disadvantages are given by eucalypt, whose qualities as a fibre are multiple, such as the fact of being biodegradable. To contrast the impact of fibre extraction phase, Re-Bello relies on the innovative and sustainable processes of its trusted supplier that is the same that provides the beechwood material. Re-

Bello utilizes leather coming from food industry and which is treated in an innovative way. They collaborate with a supplier that processes the leather with an extract of olive tree that does not pollute as the traditional tanning and makes the leather biodegradable. Attention is posed also to wool: the used one is recycled and mixed with a small percentage of cashmere. Merino and Tyrolean wool is not recycled but it comes from certified suppliers. They find an alternative use for Tyrolean wool, often throw away because not easily used in textile industry.

*Manufacturing.* The main suppliers of materials are cited in the website and links to their websites is provided. They are all certified and a considerable part of the supply chain is located in Europe (in countries such as Italy, Greece and Austria); the proximity and the local legislations made these countries trustworthy place regarding a sustainable production from an environment and a social point of view. The simpler steps are performed in Turkey, the medium ones in Greece and the most complex parts take place in Veneto, a North Italian region not far from the headquarters and where also the design office is located. Suppliers are presented more as partners and solutions to problems are studied together, trying always to innovate and find new ways about how to use a material and to adapt it to different needs.

*Retail and Use.* In the website a clear list and description of material used is given, together with the specification of the certifications they possess. Moreover, entering the product code of one of their garments in the dedicated page on the website, customers can know how and where it was created. This is a way to provide transparency and traceability about their supply chain.

*Waste management.* No information about this step of the supply chain are provided.

## **FILOTIMO**

Filotimo is a brand that has its concept store and its headquarters based in Verona. Its peculiar characteristic is the use of natural and sustainable fibres to produce clothes for men and women.

*Design.* As raw materials, they use only natural fibres. Aware that the production of some of them is not completely sustainable, they select the ones which have the smallest impact possible on the environment. They use hemp, that does not require pesticides or a considerable amount of land. The same nature is presented by nettle, infesting by nature. Wool is exploited both for summer and winter production, as well as silk. They use silk obtained by cocoon boiled when the animal has left it. Linen is very appreciated for its similarities with cotton; it is more durable but also less elastic and costlier. The design is minimal, in order not to link an item to the fashion of one single season.

*Manufacturing.* Raw materials and accessories come from Italy, where also the production takes place. The clothes are designed and produced in Verona. The production is supported by the workers of a social cooperative, which goal is the social reintegration of people coming from difficult situations.

*Retail and Use.* Suggestions about how and when wash the clothes are provided on the website, together with other attentions to take care of the natural fibres. Each product is then accompanied by a label with indications about how to wash it.

*Waste management.* They try to reduce at the minimum level the offcuts. When it is not possible, they try to find alternative solutions. For example, the offcuts of hemp are given to a workshop that produces recycled paper using both paper and natural textiles.

## **CORA HAPPYWEAR**

Cora Happywear produces apparel for children and women, characterized by the use of natural materials. Born in 2014, it is a brand that indicates responsibility and social commitment as fundamental values. Part of their margins is used to participate in social projects in less developed countries.

*Design.* It uses natural fibres such as bamboo, eucalypt, organic cotton, beechwood

and Italian regenerated wool. Cotton is certified by GOTS and comes from Greece. As other companies do, they mix bamboo and cotton to limit the impact that the fibres' extraction phase has on the environment. The used bamboo is certified by Fair Wear Foundation and tested for harmful substances by OEKO-TEX. Eucalypt fibre is produced by the Austrian company Lenzing with an almost close cycle. This raw material comes from Greece and its certified by OEKO-TEX and OCS. Lenzing supplies the beechwood fibres too.

*Manufacturing.* The production is declared having a low impact on environment. They do not use chemical treatment to embellish their product and the colours are water-based. The dying phase is performed by companies certified by GOTS. The creation of the clothes takes place in EU countries and in Turkey. The suppliers located in Turkey are certified by the Fair Wear Foundation, while the European ones are protected by the community regulations. The choice to produce only in the Mediterranean area allows Cora to reduce the impact of the transportation phase.

*Retail and Use.* 2% of the margin coming from the sale of each product is used to finance a project of children adoption in Senegal. The website of the firm is rich with information about the sustainable aspects of their products and other suggestions for a more natural lifestyle. Indications about how to wash the products according to their composition is provided.

*Waste Management.* No information about this step of the supply chain are provided.

## Upcycling waste, upgrading workers

### PROGETTO QUID

Progetto Quid is a brand of the social cooperative Quid; it was born in 2013 and it is located in Verona. Its aim is helping women coming from difficult situation in finding, through work, a place in the society. The fashion sector has been chosen as the central one both because it needed a sustainable breakthrough and because it gives the possibility to these women to express themselves, creating something beautiful and with a value in the market. They are a social cooperative of type B; this means that at least 30% of their workers come from a protected category and the cooperative receives a tax relief for workers' limited productivity. In addition to them, another 20% of Quid's employees are women coming from disadvantaged situations.

Along its social mission, the cooperative gives space to sustainability in the selection of raw materials and by relying on a local network of partners. A lot of Italian textile companies donate part of their production to this project, allowing it to keep going.

*Design.* The raw materials come from Italian companies that produce high quality textiles. Sometimes fabrics are donated, sometimes they are bought at a stock price. They are usually the surplus from textile manufacturers that produced too much or that are too few metres to be utilized, otherwise they come from fashion firms that bought too much fabrics or that do not want to use them anymore. Thus, it is

something that has become useless to partner companies and that the cooperative can instead employ in a creative way. A complete list of the suppliers – all Italian - is accessible in its website.

*Manufacturing.* The production is made in Italy and the workers involved are mainly women coming from difficult situations that are given the possibility to find a place in the society.

*Retail and Use.* Products are sold through different means. They have their e-commerce, six shops, two outlets and some retailers. They have activated different collaborations (eight at the moment) also with big brands such as Intimissimi, Calzedonia. The products realized in these projects of co-branding are sold in the partners' shops. In the two outlets, also fabric remnants and unsold garments are sold. In alternative, they are recently become part of the platform Very Important Choice. It is a sharing platform where people can rent garments of sustainable brands. Regarding repair services, there is nothing formally organized, but they are able to provide assistance if asked to.

*Waste management.* They developed the art of upcycling by using materials that are offcuts and “waste” for other companies. They use also small pieces of textile as decorative details as a way not to throw them away. Take-back initiatives are not developed. The waste is better managed during the production: when they find themselves with too few metres of a fabric, they are given to their workers to realize clothes for themselves or donated to schools and social workshops.

**Table 4.2 - Sustainable strategies of the case studies**

FIRM	DESIGN	MANUFACTURING	RETAIL AND USE	WASTE MANAGEMENT
Save the Duck	<p><b>DURABILITY:</b> High quality materials planned to last. Their resistance is tested in an informal way. Timeless design.</p> <p><b>SMART DESIGN:</b> Transeasonal and modular products</p> <p><b>MATERIALS:</b> Recyclable, recycled and vegan materials. Presence of a company RSL, wider than EU REACH. Careful research about new materials and good knowledge of the ones already in use. Some of them are certified.</p> <p><b>TIMING:</b> Backwards planning of time schedule according to the date in which the collection will be presented.</p> <p><b>SUPPLIERS:</b> known 1<sup>st</sup> tier suppliers, located in China (yearly visit to control and support) but difficulties with the so-called converters. Suppliers rarely invest in third-party certifications but available for audits and some have their own code of conduct.</p>	<p><b>PRODUCTION AMOUNT:</b> production according to sold amount, not based on projected sales.</p> <p><b>ENVIRONMENTAL FOOTPRINT:</b> self-assessment by manufacturers, often difficult because there is not a dedicated figure. However, they show interest and willingness to improve. Questions about materials posed by the brand, who searches also from suppliers' ideas for improvement.</p> <p><b>SUPPLIERS:</b> known and long-run collaboration. Yearly audit by third party and then rated by WRAP or BSCI. The brand itself asks for improvements.</p>	<p><b>COMMUNICATION:</b> emphasis on materials used. Campaign for animal protection and recycling. Collaborations with NGOs. Charity initiatives.</p> <p><b>CARE AND REPAIR SERVICES:</b> minimum repair services. Two-year warranty. Optimal washing methods reported on the label.</p>	<p><b>REVERSE LOGISTICS:</b> not present.</p> <p><b>RECYCLING:</b> use of recycled materials but coming from other industries (PET bottles, fishing nets)</p>
Quagga	<p><b>DURABILITY:</b> materials of high quality and attention to details. Timeless design through the avoidance of useless decorative parts, that can bore customers.</p> <p><b>SMART DESIGN:</b> tool to allow women to wear their jacket also when they are pregnant.</p> <p><b>RECICLABILITY:</b> 100% polyester garment, recyclable as plastic.</p> <p><b>MATERIALS:</b> recycled polyester, vegan (VVV+). No hazardous substances.</p> <p><b>SUPPLIERS:</b> certified (Bluesign, OEKO-</p>	<p><b>SUPPLIERS:</b> transparent supply chain, reported on product label. Bluesign certification.</p> <p><b>SHORT SC:</b> production is made in Italy.</p>	<p><b>COMMUNICATION:</b> sustainable choices reported in the website, as well as news about sustainable and ethical fashion and the company code of conduct. Label with information about their fair price values.</p> <p><b>CARE AND REPAIR SERVICES:</b> free repair services.</p>	<p><b>REVERSE LOGISTICS:</b> people can give back their old jacket and Quagga checks and repairs it and donates it to charity associations. The customer has a discount on the future purchase.</p> <p><b>RECYCLING:</b> use of recycled materials but coming from other industries (PET bottles).</p> <p><b>RECICLABILITY:</b> products can be disposed of in the</p>

	TEX), located in North Italy as the brand itself.			plastic bin as the label reports.
Esemplare	DURABILITY: high quality, timeless design  MATERIALS: innovative, both natural and synthetic, part recycled. Vegan products.  SUPPLIERS: Italian	SUPPLIERS: they try to select certified suppliers. They are helping their garment makers to reach higher levels of sustainability.  SHORT SC: suppliers are located in Europe.	CARE SERVICES: easily washable products, also through dry-cleaning. Suggestions provided.	REVERSE LOGISTICS: not developed.  RECYCLING: use of recycled materials but coming from other industries
Fera Libens	DURABILITY: high-quality materials, classic and timeless design.  MATERIALS: vegan, innovative carbon-neutral material (Alcantara) or microfibre. Research to add new materials resembling leather but vegetal.  SUPPLIERS: located in Italy, such as the design office	SUPPLIERS: craftsmen located in Italian regions (Piemonte, Lombardia, Marche)	CARE AND REPAIR SERVICES: suggestions about how to take care of the shoes in the website. No repair services.	REVERSE LOGISTICS: not developed.
Camminaleggero	DURABILITY: simple design that does not go out of fashion. Their design makes them easily repairable also by local cobblers.  MATERIALS: vegan (VVV+ rating), no hazardous substances, old jeans, certified textile material, recycled tyres.  SUPPLIERS: Italian, and from a certified reality in India. Collaboration with the microfiber suppliers to adapt the material to the purpose of Camminaleggero.	SUPPLIERS: collaborations with craftsmen located in North Italy.	CARE AND REPAIR SERVICES: indications about how to wash the shoes. Customers can directly contact the firm to ask for repairs.	REVERSE LOGISTICS: not developed.
NVK Daydoll	SIMPLIFIED DESIGN: designed studied to be free from bottoms and zip, in order not to add superfluous steps that increase the complexity and the impact of the garment.  MATERIALS: Modal (obtained from	SUPPLIERS: the production takes place in Italy and at an artisanal level.  ENVIRONMENTAL FOOTPRINT: stain dyeing, a process with a lower impact	CARE SERVICES: suggestions about how to wash the products. They do not necessitate ironing.	REVERSE LOGISTICS: not developed.

	beechwood and easily washable), vegan, respecting Kyoto Protocol. SUPPLIERS: only one and certified.	on the environment.		
Par.Co Denim	MATERIALS: certified organic cotton. Other natural fibres (hemp, linen). Certified VVV+.	SUPPLIERS: certified with GOTS, OEKO-TEX, SA8100, adhering Greenpeace Fashion Detox Campaign. SHORT SC: apart from some initial steps performed in Japan, all the other steps take place in Italy, especially in the region near the firm.	COMMUNICATION: communication about the impact of traditional techniques. RETAIL: shop in Bergamo where other sustainable brands are sold.	No information provided.
Re-Bello	MATERIALS: beechwood, regenerated nylon and polyester, bamboo, organic cotton, eucalypt, leather treated with vegetal substances, recycled and not wool. All the materials are certified.	SUPPLIERS: main suppliers are cited and links to their website provided. Usually considered as partners. LOCATION: Italy (where the most important steps takes place), Greece, Turkey and Austria.	COMMUNICATION: description of materials, list of certifications. Possibility to trace back the supply chain of each product entering its code in the website.	No information provided.
Filotimo	DURABILIY: minimalist design in order not to go out of fashion. SUPPLIERS: Italian MATERIALS: natural fibres, attention and awareness about the impact of their production.	SUPPLIERS: Italian. Workers that manufacture the products are employees of a social cooperative.	CARE SERVICES: suggestions about how and when to wash the clothes, both on the website and on the labels.	WASTE: offcuts of hemp are given to a workshop that produces recycled paper.
Cora Happywear	MATERIALS: natural fibres, all certified. SUPPLIERS: located in EU.	ENVIRONMENTAL FOOTPRINT: low impact, water-based colours. SUPPLIERS: the suppliers performing the dying are certified by GOTS. The manufacturing takes place in EU countries and in Turkey; EU regulations protect the EU workers, while the Turkish suppliers are	SOCIAL COMMITMENT: 2% of the margin coming from the sale of each product is used to finance a project about children adoption in Senegal. COMMUNICATION: rich information about materials and other sustainability issues. CARE SERVICES: indications	No information provided.

		certified by Fair Wear Foundation.	about how to better wash the products.	
Progetto Quid	MATERIALS: high quality textiles donated by or bought from Italian producers or fashion brands. Often, they are surpluses and off-cuts, materials that the other firms are not able to use.	SUPPLIERS: the suppliers are the workers of the cooperative, especially women coming from difficult situation.	RETAIL: among the places where people can find their products there is also the Very Important Choice platform, where sustainable garments can be rented. In their two outlets, together with current and previous collections products, they also sell fabrics remnants.	UPCICLYING: they use offcuts and what is waste for other firms. DURING PROCESS: fabric that cannot be utilized for production is given to the workers to make clothes for themselves or donated to schools and social workshops.

## 4.5 RESULTS

Table 4.2 summarizes the actions of these firms regarding the selected steps of supply chain. We can notice that there are two points particularly developed by our sample of firms. Great importance is given to the choice of raw materials: three firms prefer recycled fibres, especially polyester, two use innovative microfibers, five focus on the use of natural fibres and one exploits the waste of other textile firms. An aware choice of raw material is the most highlighted sustainable action of these firms, that dedicate part of their website to describe the fibres they selected and why they opted for them.

Another common attention is the one dedicated to reassuring about the nature of the suppliers. Three firms clearly cite them in their website or on the label of their products. Four firms place great importance on the certification their suppliers possess, especially the ones regarding the impact of production on environment and on workers. The others rely on the fact that their suppliers are artisanal realities or that they are located in Italy or in European Union to be sure, and to assure the consumer, that they work in a way conforming the law, with a particular interest on the respect of labour law.

The Retail and Use phase is developed at the minimum level; it is true that all the firms provide suggestions about the best way to take care of their items, but the repair service is not well developed: in some cases it is minimal, in other absent. Regarding the communication, instead, the situation is better. Most of the firms communicate the impact of the fashion industry on the society and on environment, justifying in this way their choice to provide a durable product made with a certain type of material.

The less cared part of the supply chain is the Waste Management phase. Only one firm, Quagga, clearly states that its item can be recycled, and it is the only one that commits itself to take back the old items, repair them, and donate them to charity associations. This, in our opinion, is a big flaw for this segment, since it is one of the few things in which the brand can play a more active role, being the connection between costumers and producers.

We can affirm that, at this moment, their main contribution to the sustainability cause is the fact that they are increasing the demand for sustainable raw materials. They look for recycled materials, for fibres whose production has a low impact on the environment and for innovative solutions to substitute polluting traditional elements. Since raw materials' choice seems to be the major focus of these firms, it can be affirmed that, while the brands have the role to boost the demand for them, the more practical revolution is being made by the producers of these raw materials. They are the ones that are researching to find alternative fibres or alternative ways to obtain the traditional ones. The consideration that they are playing a more active role is supported by the fact that a more substantial number of them, with respect to the number of brands, is present in coalitions, projects or challenges regarding sustainability. We decided to dedicate the next paragraph to show how the presence of raw materials providers is more developed in organized groups and coalitions and recognized by international awards with respect to the one of brands.

A second consideration that the analysis of our sample leads us to make is the fact that it is characterized by the almost exclusively presence of small size firms. The only exception is Save the Duck, which is bigger especially from a financial return point of view. It is the only one with a more industrial nature, while the others' model is closer to an artisanal reality. It also differs from the other since its production is delocalized in China, making it closer to the

sustainability problems that we explained in the first chapters. It is not the most sustainable firm among our sample, but it is the most successful one, having been able to leverage in marketing their attention to environment and their fashionable nature. Thanks to its bigger resources, it compensates some shortfalls, such as some difficulties in the complete traceability of its supply chain, with initiatives that the other smaller realities cannot carry on. Some of these sustainability tools are their advertisement campaigns that focus attention on endangered species or their charity action towards or collaborations with NGOs.

The situation of Save the Duck shows one of the main limits of our sample, that is the fact that its representative only of the world of small businesses, whose presence covers only a very little slice of the market. To complete our presentation of the medium-hand Italian fashion industry, we decided to briefly compare our sample with the two big Italian brands described in the boxes of Chapter 3. They are the ones whose actions have a greater impact on the environment and that should invest more in changing the current polluting nature of this fashion industry.

The final conclusions presented in paragraph 4.6 comprehend the considerations made in the light of the information provided in the next paragraph and in the *OVS* and *Benetton* boxes. Paragraph 4.5.1 highlights the importance of the raw material suppliers, able to respond to the demand for innovative materials coming from brands and costumers. We will show how the importance of material suppliers is recognized by international awards and how their presence is developed in coalition regarding sustainability. The information contained in the boxes supplies the absence in our sample, and consequently in our analysis, of bigger firms.

#### **4.5.1 The role of suppliers in shaping green value chains**

To have other basis for checking whether, at least in Italy, it is true that textile producers are performing a more important role in enhancing sustainability in fashion industry, we looked at the lists of partners of national and international coalitions or awards dedicated to the sustainability theme. We analysed the lists of partners or participants of four green fashion initiatives that we encountered during our study with the aim to understand what kind of companies are participating in them. These projects are the ZDCH Roadmap to Zero Programme, the “100 Italian Circular Economy Stories” research, the Global Change award, and the Green Carpet Fashion Awards.

The ZDHC (Zero Discharge Hazardous Chemicals) Roadmap to Zero Programme is an international initiative born in 2012. The goal of ZDHC is the elimination of priority hazardous chemicals from the whole supply chain. It presents, among its members, brands, producers and associations. The presence of Italian organizations is almost limited to associations and producers, being the Italian brands represented just by Benetton Group. On the other side, we count almost thirteen among research centres, associations and services firms that provide solution or that are actors in the first steps of the supply chain. For example, at least three of these members are leather suppliers that are interested in making their processes greener.

Thus, also in this case, a more important Italian presence is made up by raw material suppliers. It is true, however, that the ZDHC initiative can interest a group of organization

more than another because of its focused scope; in order to have another, more inclusive, project, we took in consideration also the 2018 project born from the collaboration of Enel and Symbola.

Enel, the main energy provider in Italy, and Symbola, a foundation that promotes the excellences of Italy, created a volume in 2018 that presents one-hundred stories of Italian realities that are developing the concept of circular economy. The stories come from different sectors and different realities, such as companies, research centres and NGOS. The fashion sector is connected to nineteen of these realities and ten of them are innovative textile material providers. Another listed firm produce machinery for clothes finishing characterized by innovative and sustainable features, and another story is about the creation of a platform to exchange used children clothes. The other eight organizations are brands. Five of them are characterized by the fact that they produce upcycling post-consumer or other firms' waste; one of them is the social cooperative Quid, present also in our sample. Another one is the luxury brand Ferragamo, present thanks to its transparency and its decision to support Orange Fiber, a firm that produces an innovative textile starting from citrus juice production's by-products. The last brand cited is the OVS group, active in the waste management of clothes thanks to its collaboration with I:CO and its improving way of doing business. Here we see that brands are cited only if they proposed a product different from the others, such can be a product created starting from waste, or if they are heavily investing in transforming their businesses, action limited to big firms.

The other two of these initiatives are awards: one is the H&M Global Change Award the other the Green Carpet Fashion Award. The first one is a project initiated in 2015 by H&M Foundation with the aim "to speed up the process of finding, supporting and scaling up disruptive innovations that can make the entire fashion industry circular" (from the Global Change Award website). It is an accelerator for change, that gives the opportunity to innovators to spread their ideas and to winners to make them happen. The Green Carpet Fashion Award celebrates the best creations in sustainable fashion. In 2018 it took place in Italy, during the Milan Fashion week. The award does not only celebrate luxury brands committed to the sustainability cause, but also some innovators and champions in this field.

Among the winners of these two projects, we find also Italian realities. In 2016, Orange Fiber was awarded in the Global Change Award thanks to the creation of a new textile obtained by the by-products of citrus juice production. Orange Fiber material was used in 2017 by the luxury brand Salvatore Ferragamo in one of its collections. Vegea won in 2017 thanks to its vegetal leather obtained from winemaking leftovers; their innovation was awarded also by the Horizon 2020, a prestigious research and innovation program financed by EU.

Regarding the 2018 Green Carpet Fashion Award, the Italian WRAD was cited for its help in reviving an ancient technique, typical of South Italy since the Roman era, that uses graphite to dye textiles. The Handprint Award was actually won by the municipality of Monterosso Calabro, that innovated this traditional technique. WRAD, a small sustainable apparel brand, dyes its products thanks to this process, using graphite powder that is a by-product of a tech company located in Italy. Its collaboration in reviving and making circular this technique was fundamental. Another award won by an Italian, was the Sustainable Producer Award assigned to the textile producer firm Bonotto. They have been recognized for their ability to invest simultaneously in craftsmanship and industrial production, creating high quality fabrics through a slow production, that respects the time needed to create something beautiful and durable, but that is able to meet a more industrial demand.

From these two events, we can see how great attention is dedicated to the first steps of the supply chain, that regards the production of raw materials, recognizing that they are proposing big innovations.

In all these four examples we can see the importance conferred to the producers of raw materials, that are the ones that come up with innovative ideas. Despite their fundamental role, we think that the role played by brands, that choose to invest in this kind of materials rather than in traditional ones, is valuable as well. It is true, however, that the analysed brands that actually make this choice, are very small realities, whose impact in the industry and in the market is almost undetectable. For this reason, after having presented some of the sustainable raw material producers recognized by established realities, we want to summarize the sustainable actions performed by two of the biggest Italian realities in Italian fashion industry, Benetton Group and OVS Group.

#### **4.5.2 A comparison with the big ones**

The information reported in the tables of Box 1 and 2 allows us to make some considerations about how the sustainability is being translated in practical actions by these two firms. First of all, their considerable financial resources allow the two companies to be more active in the R&D phase by directly financing research projects and by participating in research and discussion initiatives. However, with respect to the firms of our sample which focus on innovative or natural materials, these two firms seem more interested in improving the production processes of traditional raw materials, cotton in particular.

Regarding the relationship with their suppliers, they have for sure more power over them with respect to small firms. They have also more resources to help manufacturers to ensure better condition to their workers. However, the fact that they have a more dispersed supply chain makes it difficult to trace and control it, aspect that for a small firm producing in Italy is easier. To cope with control problems of supplier located in distant countries they are collaborating with local associations.

The services linked to the use phase are not developed, fact probably linked to the industrial nature of these two firms, whose volume production are so big that the activation of a repair system would be too complex. Moreover, in the OVS case the price range is low, making sometime the repair costlier than the purchase of a new item.

On the contrary, the retail part of these two giants is more evolved. In fact, the firms in the sample distribute their products through e-commerce and small external retailers. OVS and Benetton have their own shops and a more complex logistic in their distribution system. As a consequence, they have to consider also these aspects in their path towards sustainability. Another action that they can perform thanks to their size and visibility and which is precluded to small firms, is the organization of awareness campaigns, the funding of social projects and the exploitation of their notoriety to convey social messages in their advertising campaigns.

Finally, the waste management phase is also in these cases at the beginning of its development. The point is not discussed by Benetton, while OVS has implemented a take-back system by collaborating with I:CO, that seems the only reality active today able to cope with big amounts of used clothes in order to give them a second life.

As we can see, the approach to sustainability issues is different according to the nature of the firm, but we can see a common path between realities that have a similar volume of production and a similar complexity in the supply chain. Our final considerations are presented in the following paragraph.

## 4.6 CONCLUSIONS

The polluting nature of fashion industry is luckily becoming a sad known fact. Part of the public has not yet educated about this issue, but those who are aware of it, together with NGOs and public institutions, are requiring companies to change their way of doing businesses. Companies are in general doing something, but to really limit the impact of this industry on the environment, its entire system should be revolutionized, and we are far from reaching this point. Brands are engaging in projects to improve their situation, initiatives that differ according to companies' size.

Small firms are rightly focusing on the choice of raw materials whose impact on the environment is low or balanced by other actions. Since this is in general their main attention, we can say that one of their bigger contribution to this cause is boosting the demand for this kind of materials, with respect to more polluting ones. The suppliers of sustainable fibres are the ones that are proposing the real innovations, and their efforts are being recognized and prized by important organizations. Brands, on their side, should be more active in those parts that could compete directly to them, that are services to the customers to extend the life of their garments and the implementation of take-back systems or of a sustainable way to dispose of them. Moreover, even if their way of doing businesses is in general a virtuous one, they are too small and unconnected to perform a real change and have a significant impact on the economy.

The big groups in the fashion industry are starting to exploit their power and their central position in the supply chain to perform some changes. In particular they are financing and supporting the research to increase the quality of traditional materials and lower the impact of their production on the environment. However, it will be unlikely to find a way to reach a low level of pollution maintaining the volume and the rate of production this kind of firms are used to. The path towards a production system whose impact on the environment is minimal is something still far. Another kind of contribution they are offering is the organization of awareness rising campaigns, that, given the visibility of these brands, are for sure more powerful than they would be organized by small realities.

Returning to the three main aspects that we analysed in the previous chapters of this study, we can say that they are at different points of development. The creation of a sustainable value chain is probably the most considered one, in particular, in the design phase. Improvements are being made regarding also the traceability of the supply chain and the conditions of workers. In a short supply chain, the problems that they can face are limited, but in a dispersed one such as the one of OVS or Benetton, they are easily exposed to difficult situations. It is true that brands are showing interest in their social upgrading, but their or third-party control over them is something still difficult. Luckily, the attention put on these issues by NGOs is slowly changing this situation.

Finally, we can affirm that the circular economy concept is the least developed, both by small and big firms. They are far from closing the loop, since the recycled materials are still

underutilized and, moreover, they are coming from other industries. A reverse logistic system is present in just few realities, not exploited at its full potential. Moreover, it is still technologically difficult and economically costly to recycle old fabric. As long as these problems would not be solved, and the consumption behaviour changed in a way that the production is made slower, it will be difficult to effectively contrast the pollution produce by the fashion industry.

## APPENDIX A – Good Citizens Principles

SOURCE: Kerr John, Landry John, *Pulse of fashion Industry*, Global Fashion Agenda & Boston Consulting Group (2017)

	STEP IN VALUE CHAIN	MINIMUM REQUIREMENTS
DESIGN DEVELOPMENT	SAMPLING	<ul style="list-style-type: none"> <li>- Considerate production of samples.</li> <li>- Avoid short notice samples due to potentially negative implications on social labour conditions in facilities.</li> </ul>
	OPTIMIZATION OF MATERIALS	<ul style="list-style-type: none"> <li>- Impact assessment of materials made available for designers, at least for those with high volume.</li> <li>- Recommendations set on preferred materials and environmentally friendly substitutes.</li> </ul>
	PLANNING OF DURABILITY	<ul style="list-style-type: none"> <li>- Durability criteria for large majority of materials, supported by lab testing.</li> </ul>
	OPTIMIZATION OF DESIGN RECYCLING	<ul style="list-style-type: none"> <li>- Optimization of basic items for waste reduction (e.g. when cutting fabrics and sewing with minimized excess fabric).</li> </ul>
RAW MATERIALS	SUPPLIER TRANSPARENCY AND TRACEABILITY	<ul style="list-style-type: none"> <li>- First initiatives started to improve low transparency (participation in multi-stakeholder collaborations).</li> </ul>
	ENVIRONMENTAL FOOTPRINT TRACKING	<ul style="list-style-type: none"> <li>- First measures in place to track environmental impacts for known suppliers, initiate setup of certified supplier base.</li> <li>- Active collaborations to tackle environmental issues more efficiently.</li> </ul>
	SUSTAINABLE MATERIAL MIX	<ul style="list-style-type: none"> <li>- Provision of guidelines for sustainable sourcing of main materials (mandatory certifications, minimum compliance requirements).</li> </ul>
	SOCIAL LABOUR CONDITIONS	<ul style="list-style-type: none"> <li>- Clear action plan developed to track social labour standards for known suppliers and to set up certified supplier base, work towards preventing child labour.</li> <li>- Active in collaborations to tackle social labour issues more efficiently.</li> </ul>

PROCESSING	SUPPLIER TRANSPARENCY AND TRACEABILITY	<ul style="list-style-type: none"> <li>- Minimum 50% transparency on 2<sup>nd</sup> tier suppliers (name, location, owner, certificates)</li> </ul>
	ENVIRONMENTAL FOOTPRINT	<ul style="list-style-type: none"> <li>- Environmental impact tracking established for half of 2<sup>nd</sup> tier suppliers with plans laid out on how to extend tracking.</li> <li>- Leveraging collaborations to improve footprint.</li> <li>- Provision of targets and guidelines for minimum 1/3 of facilities.</li> <li>- Full enforcement of Restricted Substance List; use of industry collaborations to find substitutes.</li> <li>- Measures initiated to single out most reliable suppliers, consolidate supplier base, build long term cooperation to help suppliers improve their environmental performance.</li> </ul>
	SOCIAL LABOUR CONDITIONS	<ul style="list-style-type: none"> <li>- Clear action plan developed to track social labour standards only use certified supplier base; part of collaborations to tackle social labour issues more efficiently.</li> </ul>
MANUFACTURING	SUPPLIER TRANSPARENCY AND TRACEABILITY	<ul style="list-style-type: none"> <li>- High transparency on 1<sup>st</sup> tier suppliers; only exceptions not covered. Majority of suppliers visited by brand or third-party auditors.</li> </ul>
	ENVIRONMENTAL FOOTPRINT	<ul style="list-style-type: none"> <li>- &gt; 1/3 of 1st tier suppliers with tracked environmental impact; clear targets set (e.g. by jointly assessing manufacturing efficiency with facilities).</li> <li>- Reduction of packaging waste, supported by clear target setting.</li> </ul>
	SOCIAL LABOUR CONDITIONS	<ul style="list-style-type: none"> <li>- Measures in place to track social labour standards, only use certified supplier base; part of collaborations to tackle social labour issues more efficiently.</li> </ul>

TRANSPORTATION	ENVIRONMENTAL FOOTPRINT	<ul style="list-style-type: none"> <li>- Full tracking of impact, at least for closer transportation steps (to and from warehouse), dedicated tracking of air freight.</li> <li>- Target setting to reduce impact per garment.</li> </ul>
	UTILIZATION OF TRANSPORT SPACE	<ul style="list-style-type: none"> <li>- Supplier cooperation initiated on efficiency for closer transportation steps (final transportation to warehouse, warehouse to retail outlet).</li> <li>- Target setting in place.</li> </ul>
RETAIL	COMMUNICATION OF SUSTAINABILITY	<ul style="list-style-type: none"> <li>- General communication in most PoS advocating sustainability (environmental impacts of materials, engagement in collaborations to promote these standards across the industry).</li> </ul>
	ENVIRONMENTAL STANDARDS AT THE PoS	<ul style="list-style-type: none"> <li>- Tracking of energy usage in retail outlets, plans developed to minimize energy and water consumption as well as waste, use of certifications - LEED - for at least the newest retail outlets.</li> </ul>
USE	CARE AND REPAIR	<ul style="list-style-type: none"> <li>- Care &amp; Repair information on garment tags optimized for low environmental impact (recommend less and low temperature washing, highlight urgency of repair versus throwing an item away), successively implemented.</li> <li>- Providing replacement buttons and yarn with the item.</li> </ul>
	EXTEND LIFECYCLE THROUGH RE-USE OPTIONS	
END OF USE	PREPARATION OF ITEMS FOR RECYCLING	<ul style="list-style-type: none"> <li>- At least on core items, materials which can be recycled are labelled explicitly on the item to allow easier recycling process.</li> </ul>
	COMMUNICATION OF RECYCLING OPPORTUNITIES	<ul style="list-style-type: none"> <li>- High level education of customer on recycling potential.</li> </ul>
	SUPPORT AND SETUP OF DEDICATED RECYCLING INFRASTRUCTURE FOR CLOTHING	<ul style="list-style-type: none"> <li>- Specific communication of recycling offerings by other providers external to brand.</li> <li>- Taking part in collaborations to push setup of recycling infrastructure in public spaces.</li> </ul>

## APPENDIX B – Main fashion and textile industry certifications

REGULATED AREA	NAME	LEVEL OF APPLICATION	GENERAL AIM	PRINCIPLES/ CRITERIA
Environment	OEKO-TEX STANDARD 100	Single product at all stages of production and for all kinds of articles. The final product can obtain it only if all its components comply with the OEKO-TEX criteria.	Test for harmful substances.	- Product safety from a consumer point of view
Environment People	OEKO-TEX MADE IN GREEN	Single product at all stages of production and for all kinds of articles. The final product can obtain it only if all its components comply with the OEKO-TEX criteria.	Test for harmful substances and sustainable production (= made in environmentally friendly facilities and in safe and socially responsible workplaces).	- Product safety from a consumer point of view - Safe workplaces - Environmental concern
Environment	OEKO-TEX LEATHER STANDARD	Single product at all stages of production and for all kinds of articles. The final product can obtain it only if all its components comply with the OEKO-TEX criteria.	Leather goods tested for harmful substances.	- Product safety from a consumer point of view
Environment People	OEKO-TEX STeP (Sustainable Textile Production)	Brands, manufacturers or retail companies.	Certification of the management of chemicals, environmental performance, environmental management, occupational health and safety, social responsibility and quality management.	- Product safety from a consumer point of view - Safe workplaces - Environmental concern
Environment	OEKO-TEX ECO PASSPORT	Textile chemical suppliers.	Tested and verified textile chemicals, certification that they can be used in a sustainable textile production.	- Product safety from a consumer point of view
Environment	OEKO-TEX DETOX TO	Manufacturers.	Assessment of the status of	- Product safety from a consumer

	ZERO		chemicals management systems and of the quality of the waste water and sludge	point of view - Environmental concern
Environment People	BLUESIGN SYSTEM	Entire supply chain.	Elimination of harmful substances and greener practices.	- Resource productivity: efficient use of resources. - Consumer safety: high quality and sustainable product. - Water emission: wastewater treatment technology. - Air emission: reduction of CO <sub>2</sub> emissions. - Occupational health and safety: safe working conditions. - Use of the Best Available Technology. - Limitation of some substances (BSSL).
Environment	ISO14001	Companies.	Requirements for environmental management system.	- Air pollution - Water and sewage issues - Waste management - Soil contamination - Climate change mitigation and adaptation - Resource use and efficiency
People	SA8000	Supply chain (process-type standard).	Protection of human rights.	- Child labour - Forced and compulsory labour - Health and safety - Freedom of association and right to collective bargaining - Discrimination - Disciplinary practices - Working hours - Remuneration - Management systems
People	FAIR WEAR		Code of Labour practices derived	- Employment is freely chosen

	FOUNDATION		from ILO Conventions and the UN Declaration on Human Rights.	- No discrimination in employment - No exploitation of child labour - Freedom of association and the right to collective bargaining - Payment of a living wage - Reasonable hours of work - Safe and healthy working conditions - Legally binding employment relationship
People	FAIRTRADE TEXTILE STANDARS	Supply chains.	Criteria for workers and for the environment.	- Living wage - Empowerment of workers - Worker engagement - Occupational health and safety - Conditions of employment - Training and capacity building - Supporting youth employment - Reducing negative impacts on workers and environment - Health and safety standards - List of prohibited materials
Animal	ANIMAL FREE by LAV	Products and products lines.	Regulation about the presence of materials coming from animals.	V: no fur VV: no fur and down VVV: no fur, down, silk and leather VVV+: no fur, down, silk, leather and wool
Environment People	BETTER COTTON STANDARD by Better Cotton Initiative (BCI)	Cotton farmers.	Production of cotton with attention to environment: minimization of negative effects of fertilisers, water saving, soil health. Decent work principles.	
Environment People	GLOBAL ORGANIC TEXTILE STANDARD	From harvesting to labelling of organic materials. Applicable to	Minimum of 95% certified organic fibres for a textile product to be	

	(GOTS)	textile made from at least 70% certified organic natural fibres	considered organic. Environmental criteria Social criteria	
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