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Sustainability in the fashion world: A competitive advantage not a limitation

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Summary

1. Sustainability in the fashion world

1.1 What is sustainability?[1]

Since it entered into common vocabulary, the concept of "sustainability" has taken on a variety of meanings and extensions, which have been applied to different contexts.

One of the topics that fall most under this concept is certainly ecology. The environmental issue, which emerged from the consequences of the Modern Age, originating in the Industrial Revolution and establishing itself with the appearance of the age of mass consumption, has become a sensitive debate of the 21st century, taking various forms depending on the times, circumstances and places.

The theme of ecology, therefore, is historically and inevitably a post-modern phenomenon, triggered by a world that has become industrialized, technological, commercial, and globalized, in which issues related to environmental emergencies, the wastage of natural resources, energy costs, global warming, global overpopulation and the consequent depletion of habitats and scarcity of raw materials, the toxicity of industrial products, air, and water pollution, and waste disposal are opening up and growing.

Ecological arguments address all this, identifying some solutions in the necessary change of lifestyles and consumption, in energy efficiency and saving, in recycling and reusing objects at the end of their life cycle, in continuously feeding the public debate on environmental and health protection, in limiting or reducing emissions of pollutants and harmful substances.

Being a sustainable company in the ecological sense can therefore mean making choices that lower the ecological impact of one's production activities, containing consumption, designing and producing objects that, due to the raw materials used, the way they are processed and their end-of-life behavior, will not burden the environment.

But 'sustainability', of course, does not only mean 'ecology'. In this sense, being a sustainable business tout court means not only respect for the environment, but also respect for the health of workers and consumers, saving raw materials and economic resources, respect for human rights, rationalizing creative and production processes, reducing waste, creating new and more transparent links with communities of interest and exploring new, more 'human' (fair trade) market areas.

In short, everything that could be covered by the word ‘responsibility’; is no coincidence that those who deal with sustainability in large companies often work in Corporate Social Responsibility (CSR) departments.

It is also no coincidence that the extended concept of sustainability, rather than the more limited concept of ‘ecology’, is now shared and experienced by the latest generations with the sense of seeking well-

[1] Part of the information contained in this paragraph is taken from the Portal of the Archivi della Moda – Progetto SAN – Sistema Archivistico Nazionale, Ministero per i Beni e le Attività Culturali, Direzione Generale per gli Archivi.

being, better quality of life, greater responsibility towards the world in which they live, and not as a simple idea of "world to be saved".

If we wanted to encapsulate in a few words the current meaning of "sustainability" related to economic, social, and production dynamics, we could say that it is conscious consumption, fair trade, transparency in the relationships between producers, suppliers, final consumers, tools and policies to support less "wasteful" production and economic processes, research and promotion of new portions of the market adhering to the sustainable lifestyle.

1.2 Sustainability in the fashion industry

Why do we talk about sustainable fashion? Because the fashion industry cannot ignore the use of raw materials: land, water, plants, animals. Today's overproduction of clothing requires increasing amounts of energy and is irreparably consuming our natural resources.

The current economic models of the fashion industry have also led to an exacerbation of the social divide in many countries where labor is concentrated. The disproportionate demand for clothing and the lack of worker protection are responsible for inhuman working conditions, non-existent wages, and modern slavery. When we talk about sustainability in fashion, we mean considering a new model, one that measures the demand for goods against the availability of resources while pursuing the goal of social justice.

With ethical and sustainable fashion, we are not defining a trend or a category codified by aesthetic canons and storytelling that convinces the buyer. Instead, we are talking about a way of thinking and acting on a global scale, in which the most effective action on the part of the consumer remains that of not buying new items when not necessary. The mechanism of supply and demand involves two actors (the requester and the supplier) both equally involved in turning the wheel. While in recent decades the fashion industry has conditioned an ever-widening public, making 52 collections a year "necessary", sustainable fashion aims to dismantle this functioning and reverse it. The fashion industry has to change direction, starting from the design of the project, through the choice of materials, to the packaging. Everything has to be rethought from the perspective of environmental sustainability and social justice.

As proof that fashion is becoming increasingly "eco", numerous events have been held in recent years at an international level to inform and support those who create this type of fashion and those who use it, such as Eco Fashion Week (which debuted in Vancouver in 2009) and Green Fashion Week (2010).

In this sense, fashion is increasingly taking on other values that go in the direction of social responsibility. Giorgio Armani, for example, already said goodbye to animal fur in 2016, in agreement with the Fur Free Alliance. The Milan atelier thus joins numerous international fashion houses that had previously expressed their denunciation of violence against animals. Today, this violence can be avoided: "Technological progress in recent years has given us valid alternatives that make cruelty to animals unnecessary," said "King Giorgio "[2].

[2] https://d.repubblica.it/moda/2016/03/22/news/giorgio_armani_dice_basta_alle_pellicce-3025112/

Sustainability also urges the textile industry to eliminate environmentally harmful chemicals, not just in terms of animal welfare, but in wider areas including design, choice of materials, production, and distribution.

1.2.1 History of fashion sustainability: from necessity to choice

It can be said that the concept of 'sustainability' was born, in a sense, from the instinctual need of the human being to consider every resource next to it as precious and unique, already predisposed in nature to its reuse and, eventually, to its recycling.

One word is probably enough to encapsulate this concept about archaic and pre-industrial human activities: 'cycle'.

In this sense, every vegetable fiber, leather, metal, or other raw material is and remains (through use, reuse, and recycling) part of the cycle of nature, today we would say 'the environment', with which the whole of mankind is daily engaged in interacting, in an uncertain and often conflicting way, to solve the problem of the scarcity of resources and their finding/working/optimal use. In short, being in nature means being sustainable.

It can also be said with a good deal of certainty that, at least until its 'debut in society' at almost the end of the pre-industrial era and at least until the era of mass consumption, fashion was sustainable out of necessity, or tried to be so in two distinct and opposite ways:

1. despite the still scarce knowledge of technique and science to devote to the reduction of waste and thus, mostly, through the craftsmanship of the resources provided by nature;
2. thanks precisely to the lack of technical and scientific knowledge, meaning by this the most revolutionary (and polluting) part that both have played in history, namely the advent of the paradigm of the technical reproducibility of consumer products (and the meanings associated with them) and the consequent birth of the mass consumption society[3], with all that this entails in terms of the waste of economic, energy, environmental and social resources.

The essential element on which fashion was based in the centuries before its debut in society in the European nations was color, the result of the processes of extracting and working with natural dyes and their adaptation to the tastes of the times and places.

It is color that makes the difference, in the true sense of the word. For example, throughout the period that historically defines the Middle Ages, color makes the difference between the wealthy classes, who can afford colorful and therefore expensive clothes, and the poor, whose grey clothes of rags continue to blend in with the earth and stone they are forced to work to live on. But in these cases, it is the latter who retain, and nurture, the (necessary) idea of sustainability in every aspect of their lives. And it is also they who use their manual labor to work with natural dyes and make colored fabrics for the upper classes, once again preserving that immanent link with the cycle of nature, which is gradually being forgotten in the rooms of the nobility.

[3] P. Flichy, "L'innovazione tecnologica", Parigi 1995.

Even at the beginning of the 19th century, the wealthier classes belonging to what can be defined as the "aristocracy of the factories" adopted a way of dressing that strongly differentiated them from the aristocracy of the courts, the most authoritative laboratory of new fashions and new models of the elegance of the pre-industrial age.

While the attire of the courtier was a riot of color, that of the entrepreneur of the first English industrial revolution presents a limited range of colors in which only dark shades are allowed. The jacket replaces the livery and the trousers are lengthened, decreed the disappearance of an essential accessory in the courtier's clothing: iridescent silk stockings.

Colour continued to represent the most marked element of social difference, but this time it was in the opposite sense to previous eras: grey defined the style of the ruling class, as opposed to the colors of the aristocratic robes which now took on an "antique" meaning and were seen as an example of "waste" from the legacy of the pre-industrial aristocracy.

Moreover, in these years, coinciding with the acceleration imposed by the industrial revolution, the textile industry began to use artificial elements and processes (synthetic dyes) to replace the historical natural dyeing processes, while grey and dark colors also began to rhyme with "pollution".

In addition to color, it is shaped that defines the differences of belonging to a certain social context, especially in recent times. Details became the hallmark of the elegance of the new aristocrat at the end of the 19th century: the perfect cut of the suit, the white shirt collar starched under the jacket, the polished shoes: clothing that expressed the renunciation of flaunting wealth through conventional symbols of luxury, but also the need to develop new ones.

While sober men's clothing retains the function of denoting an identification with a new social class, women's clothing, for the first time in history, takes on the function of manifesting the wealth that comes from belonging to it. In this sense, the crinoline is indispensable. Many meters of fabric are needed to make a crinoline and to make it unique, layers and layers of fabric embellished with trimmings are superimposed.

In the last decades of the nineteenth century, the birth of department stores and the multiplication of fashion magazines, together with the spread of the sewing machine, made it easier to imitate and reproduce the latest fashions: we can say that a process of "democratization" of fashion, especially for women, was born.

Thus, around 1870, Charles Frederick Worth (1825-1895) interpreted the need for differentiation of the richer social classes by reducing the volume of crinoline, which had reached enormous proportions, to half. Again, a paradox: the idea of "reducing" materials is a□an analogy to the desire of the wealthy classes to differentiate themselves from the lower classes, and unintentionally "sustainability" is on the side of the wealthy.

Paradoxically, the haute couture created by Worth was the first to "cut back" on the waste of materials and redundant functions of clothing, a choice dictated more by the demand for differentiation of its most profitable customers than by environmental sensitivity. The word "differentiation", one of the keystones of the idea of sustainability applied to new business models, will return frequently in the following pages.

Only a few years later, however, a different idea appears, this time related, perhaps for the first time in history, to the search for new sustainable production models rather than to the feeding of the desired circuit: Between the end of the 19th and the beginning of the 20th century, during the growth of scientific research into 'artificial silk', Count Hilarie de Chardonnet invented a continuous filament of cellulosic origin capable of being woven in 1883, and in the following years registered over 40 patents, presenting the prototype of the spinning machine at the Paris International Expo in 1891. The idea of searching for new artificial products capable of lowering production costs (and therefore environmental costs) and maintaining their natural qualities (and therefore respecting the value of the organic material, in this case, cellulose) became more and more popular.

We will see later on how color and shape (design), today more than ever, play an important role in green fashion and sometimes even become its distinctive feature together with the other characteristics that define its sustainable potential.

To see the first form of the idea of sustainability as we understand it today, we have to go back to the late 1950s. The post-war recovery led to an across-the-board explosion in Western countries of what we commonly call the era of mass consumption or, to put it more simply, "consumerism". According to some, it is precisely this emerging culture that gives rise, we might say once again paradoxically, to a marked sensitivity towards recycled material, waste, and abandoned materials. A culture that began to become a lifestyle, art, social commitment, and fashion. It is what Lawrence Alloway calls the "aesthetics of abundance", a new form of cultural mix in which the overcrowding of goods and products, new stylistic and artistic forms, multiple elaborations and interpretations of the collective imagination, pushes and escapes towards a different way of life coexist.These themes were also addressed in a certain sense by Dadaism, but even more so by Andy Warhol's Pop Art, which was fascinated by the changing relationship between consumer goods and the waste produced by consumer surplus.

In these years, the international geography of fashion was enriched by another protagonist: a new generation of British designers emerged, which contributed to redefining the standards of fashion. The key to their success was their ability to interpret and exploit the social changes represented by the emergence of a new type of consumer: young people, a social category that refused to conform to traditions and conventions.

The years of protest at the turn of the sixties and seventies, thanks above all to unprecedented forms of expression of the various youth cultures and subcultures, brought to the fore for the first time "antagonistic" points of view towards the prevailing models of development based on mass consumption.

The sense of unease and rebellion widespread in the world of youth is also expressed through the contestation of traditional clothing symbols. While young people in London were divided between rockers and mods, the hippie look was born in the United States, a form of anti-fashion that became a sign of identification of the youth movement that rejected consumerism and condemned American foreign policy. This resulted in alternative practices in clothing, food, and social relations, which quickly became powerful identifying and symbolic elements of the rejection of massification. An example is given by the independent

American magazine "Rags", founded in 1970, whose pages describe and suggest new practices in clothing, in line with the tendency of the exponents of the American counterculture to define alternative forms of expression through clothing.

It was in these years, among other things, that the question of 'sustainability' first appeared on the scene of public debate, rhyming with an antagonistic and pauperism vision of environmentalism, with which one must identify, for example, through 'renunciation' clothing, a manifest symbol of rejection of the consumer society.

It was from this idea of renunciation that a trend towards sustainable fashion first emerged on the markets in the nineties, the vanguard of which can certainly be identified in the countries of Northern Europe, Scandinavia, Germany, and Canada.

The idea that emerged was that of an aesthetically poor and ideologically deprived sustainability, according to which you have to give something up to be sustainable.

The trend towards sustainable, or rather 'eco-sustainable', fashion emphasizes respect for nature and the value of work, thus overshadowing one of the most characteristic features of the fashion industry: creative originality combined with an aesthetic idea.

1.3 Technology innovation

The most significant obstacle to a 'sustainable' conversion process in the fashion industry is the need to transform business models that have so far only evolved to increase market share. This is a very costly Copernican revolution that risks being a pipe dream, especially for luxury brands, while it is certainly more within reach for start-up or emerging brands. Certainly, fashion sustainability cannot be separated from technological innovation, which impacts all the different stages of the value chain in terms of research into sustainable materials (the so-called material revolution), energy-saving solutions, environmental policies, supply chain traceability, consumer protection, extending product life and managing product 'end of life' (waste end).

At present, the technologies in use, some of which are experimental and some of which are now consolidated, can be implemented throughout the entire product life cycle, right from the design phase and the creation of samples and prototypes using 3D CAD solutions, digital printing technologies, and 3D printing in fabric and/or materials. The production phase is the one most in need of innovation, both in terms of materials and processes, and in terms of overproduction, which is now dysfunctional. R&D is the focus for the development of systems based on the use of innovative and synthetic materials and the limited or total removal of harmful substances/materials. Innovative materials, such as nanomaterials, biodegradable materials, or materials with organic or plant fibers, whose supply has increased in recent years, still suffer from a significant production cost that discourages their widespread use. A business model aimed at the circular economy must start from production processes that are technologically capable of re-using or recycling production waste and/or warehouse stocks.

According to data from the Ellen Mac Arthur Foundation, the global fashion industry produces around 53 million tonnes of fiber every year, of which more than 70% end up in landfills or bonfires. Less than one percent is reused to make new clothes. The automation of production processes is certainly a solution to rationalize the use of raw materials derived from non-renewable resources, which is difficult to implement given the fragmentation of the supply chain, as it is characterized by a multiplicity of players with different production systems, with different locations that cause the supply chain to become opaque. Traceability of raw material, semi-processed product and finished product using blockchain is a remedy to control the entire supply chain from the origin of materials, monitoring supply processes, distribution, and retail channels to warehouse management and second hand, with the maximum guarantee of transparency, given the modifiability of the information recorded on the blockchain.

In addition, to support product traceability, especially in the retail phase including the management of sold and unsold products, there are identification technologies with real-time detection through IoT devices, ranging from the well-known Rfid, Epc, Nfc systems to the latest generation 'smart labels' that send information to databases, where it is possible to identify and trace the life cycle of the product. Intelligent labeling also becomes a guarantee for the consumer in terms of product authenticity, as the product is associated with identification codes that prove its origin and possible sale outside the channel. Retail, which is also theoretically traceable with blockchain, thanks to innovation become a valuable link in the value chain capable of collecting data from consumers (big and small data) that are fundamental for managing overproduction through omnichannel and predictive systems.

The "buy less-choose well" mantra of Vivienne Westwood, a pioneer of sustainable fashion, represents responsible consumption, increasingly common among consumers, especially millennials and Generation Z, which is forcing a change of direction for brands: Good On You and Buycott are among the best-known applications that allow consumers to identify ethical/sustainable products. Brands are responding to this market shift by adopting their digital platforms equipped with sales optimization algorithms that enable the use of personalization systems, product customization, or on-demand sales through artificial intelligence, machine learning, and deep learning. These solutions should, in principle, rationalize production by changing business models, the scalability of which is unknown, given the bulimic tendency for continuous capsules, which could have an inverse impact on a more selective and more sustainable business model. The proliferation on an international scale of press campaigns on sustainability and indices measuring the ethicality of brands (we do not know how truthful and objective they are) has resulted in a consolidated trend if we think of multi-brand platforms such as Asos and The Iconic, which have introduced recycled materials in their search "filters. At a time when sustainability in fashion will be an imperative, dictated by rules and regulations at the national and supranational level, innovation of processes and the value chain can only be the only real answer for brands to become truly sustainable.

1.3.1 Alternative textiles

One way the fashion industry is looking to scale back waste and pollution is by using alternative fabrics.

Natural fibers, like cotton, are resource-intensive. Making one cotton shirt requires 713 gallons of water, approximately what one person drinks in 2.5 years. Synthetic materials like acrylic, polyester, and nylon degrade very slowly and may contain harmful chemicals.

Some fashion brands are turning to agricultural waste products like leaves and rinds to make more eco-friendly textile alternatives.

For example, British company Ananas Anam turns pineapple leaves into a leather textile called Piñatex. Fibers are extracted from pineapple leaves and after processing, emerge as a non-woven mesh forming the bottom of the textile.

Ananas Anam doesn't use any substances that are hazardous to the environment, and its non-woven mesh is biodegradable. The startup has caught the eye of some high-profile designers: menswear brand Hugo Boss crafted limited-edition sneakers using Piñatex[4].

Another startup exploring biodegradable fabrics is Italy-based Orange Fiber. the corporate extracts cellulose from the rinds of juiced oranges and converts it into a cloth resembling silk. When combined with other yarns, the fiber is often made into garments. Italian fashion label Salvatore Ferragamo launched a capsule collection of dresses, pants, and shirts made up of orange fiber in 2017.

[4] Ananas Anam https://www.ananas-anam.com/

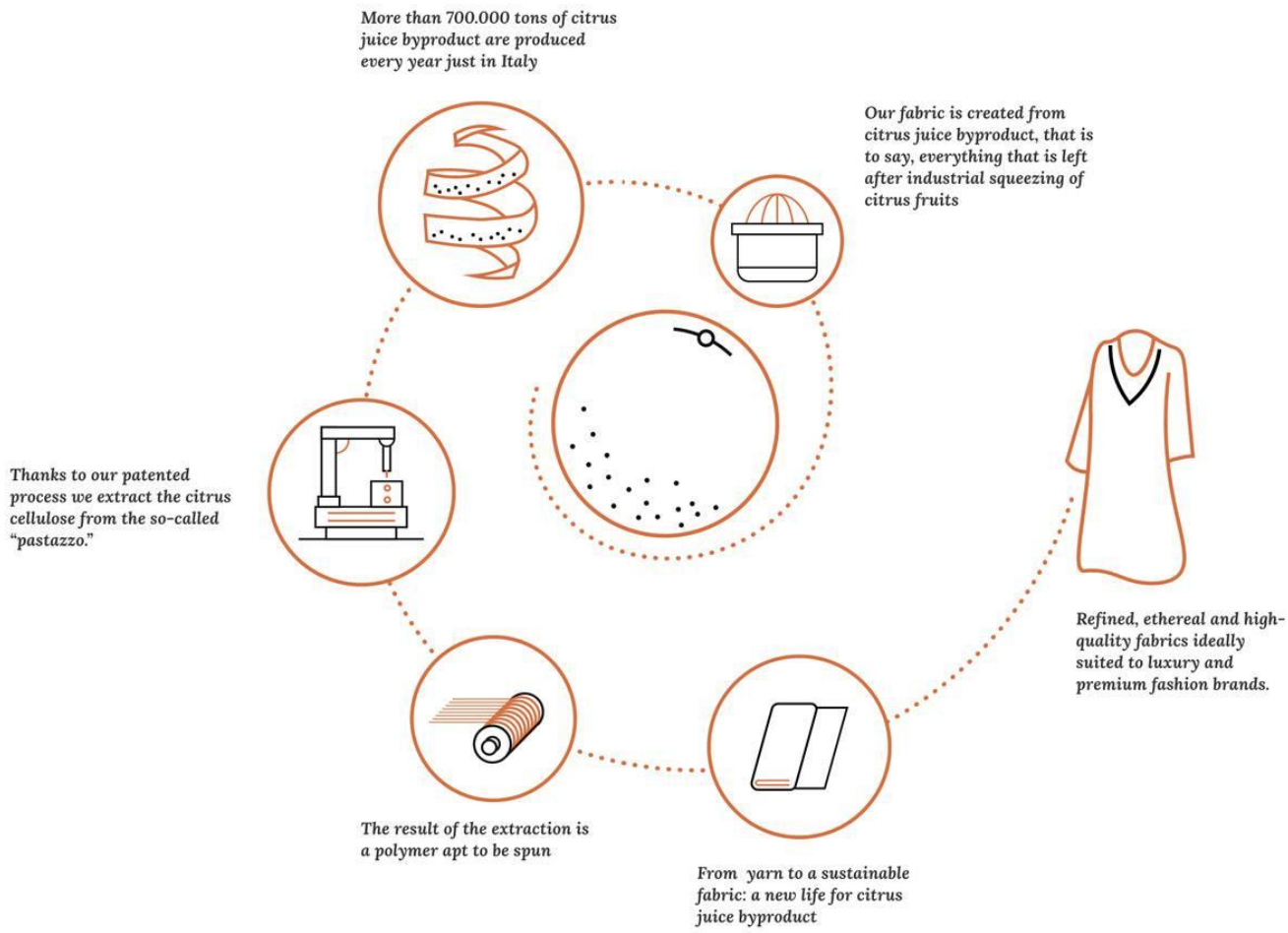


Figure 1 Orane Fiber https://www.agrocities.com/in-depth-cards/orange-fiber/

For now, natural textile sources seem to be geared toward low-volume, high-priced brands like Hugo Boss and Ferragamo. More investment could also be needed from large brands to tailor these textiles to their high-volume requirements.

1.3.2 Regenerative farming

Due to its use of cotton and other raw agricultural materials, the style industry and its supply chains are directly linked to soil degradation and biodiversity loss.

Now fashion brands are starting to look to regenerative agriculture to curb these negative effects on the environment. Regenerative agriculture works to revive soil health through practices like composting, avoiding synthetic fertilizers & pesticides, and planting crops that grow year-round to complement the soil and stop erosion. The resulting natural CO2 sequestering could help to reverse the consequences of global climate change.

French luxury brand Kering in 2018 has partnered with the Savory Institute, a non-profit organization supporting regenerative agriculture, to assist identify and develop a network of regenerative farms. Kering, which hopes to chop its environmental impact by 40% over the subsequent 6 years, will use Savory's Ecological Outcome Verification (EOV) methodology in its supply chains for leather, wool, and cashmere.

EOV tracks ecosystem functionality to assess the health of the land and farming systems that support the assembly of those materials, which can help Kering build a more sustainable and transparent supply chain[5].

Kering and therefore the Savory Institute hope that the resulting network of farms will provide an example of restorative practices for other companies to follow so that they will be incorporated in fashion and luxury supply chains more broadly.

Other brands like Patagonia and Prana also are investing in regenerative farming. Both companies are allies of the Regenerative Organic Alliance (ROA), which is functioning to make a Regenerative Organic Certification to line a typical for what can legally qualify as regenerative farming[6].

Patagonia CEO Rose Marcario is a member of ROA's board, and therefore the company is functioning on pilot projects to form existing organic cotton farms in India fully regenerative. It hopes to include regenerative cotton from the farms into its product lines within the subsequent 6 seasons. Regenerative farming seems to be a promising solution for the style industry's sustainability problems, but it still has significant obstacles to beat. Once the ROA's certification is finalized, achieving it'll present another cost for farmers.

Because the method of converting an organic farm to a regenerative one takes multiple years, farmers may need a tough time investing without a brand paying the premium. Fashion companies must be willing to support farmers who don't have the financial resources to shift to regenerative methods.

1.3.3 Automated manufacturing

Automation exposes the chances for an area supply chain, which needs less transportation and will end in reduced pollution. It could also minimize concerns around labor conditions in offshore manufacturing facilities.

[5] Kering, https://www.kering.com/en/news/savory-institute-collaborate-first-verified-regenerative-sourcing-in-fashion

[6] Patagonia, https://www.patagonia.com/actionworks/grantees/regenerative-organic-alliance/

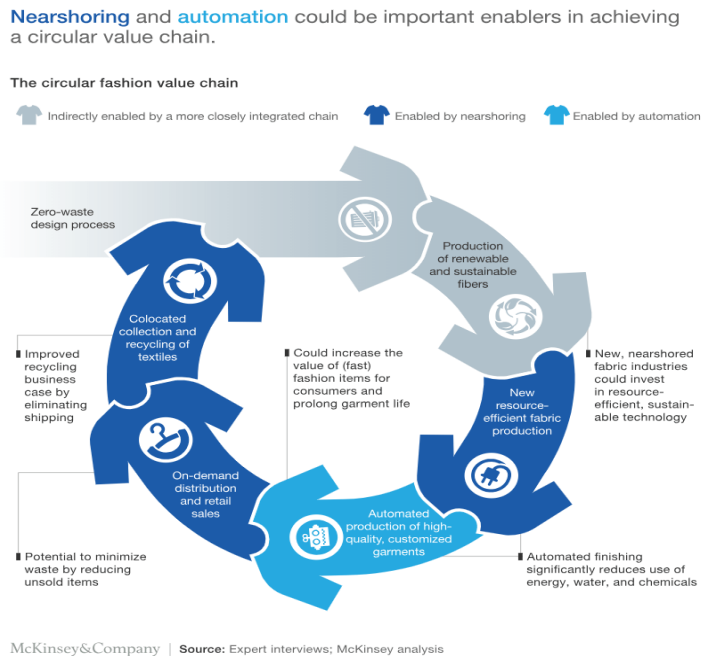


Figure 2 Expert interwiews: McKinsey Analysis

To that end, sewing bots are making their presence known within the manufacturing floor, helping with everything from spinning and weaving fabric to assembling complete towels, pillows, and even T-shirts. Early-stage startup Sewbo has developed an industrial robot that works with temporarily stiffened fabrics to stitch an assembled shirt. Software Automation's sexbots, on the opposite hand, have vacuum-powered robotic grips that feed fabric into a stitching machine, adjusting it accordingly using machine vision.[7]

Fashion permanently, a worldwide initiative to form fashion more sustainable, estimates that Software Automation's sexbots can help lower emissions by around 10% by creating products closer to consumers and reducing material waste.

3D printing technology could also help automate the manufacturing process. Adidas teamed up with 3D printer startup Carbon to make 3D printed midsoles for its Futurecraft 4D shoes. Other industry players produced footwear within the same vein, including Under Armour's Architech shoes with 3D printed cushioning and support, also as Reebok's Liquid Floatride Run shoes with 3D printed outsoles and laces.

3D printing could have a good bigger impact when paired with sustainable materials. for instance, Tamicare's Cosyflex technology enables 3D printing of finished fabrics from natural latex and viscose fibers. This eliminates waste from cutting and trimming and removes the chemical hazards of the material dyeing process.

Fast fashion retailers, especially, may benefit from automated manufacturing, which might allow them to manufacture clothing at a faster pace. Emerging brands like Fashion Nova became leaders during a so-called "ultra-fast fashion" trend.

The company works with clothing manufacturers located near its LA headquarters, enabling faster prototyping. With automated manufacturing, the method could speed up even more, especially in an ever-changing fashion scene, where the fashionable designs of today may render unpopular tomorrow; it might

[7] Sewbo, https://www.sewbo.com/

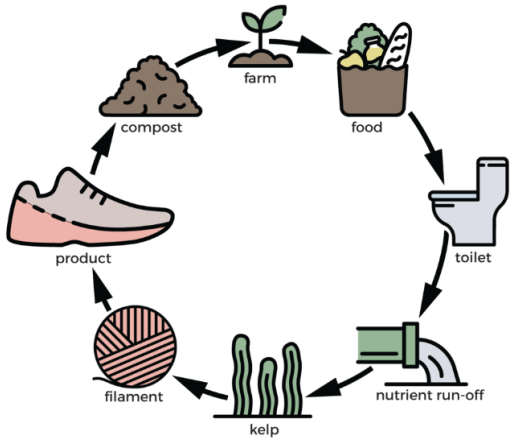
allow retailers to react to emerging fashion trends, and manufacture a product more quickly than by traditional means.

But while automation may reduce emissions and improve labor conditions, it might be at the expense of people's jobs. 86% of wage workers within the garments industry in Vietnam are at high risk of automation, consistent with a 2016 report by the International Labour Organization. an equivalent is true for 88% of wage workers in Cambodia's garments industry.

1.3.4 Future-forward biotech

Most garments are made up of cotton, which needs heavy use of fertilizers, insecticides, and water for irrigation. Other synthetic fibers, including acrylic, nylon, and polyester, are laced chemically and are non biodegradable. Dyeing fabrics also pollute rivers and waste an enormous amount of water. To mitigate these effects, companies are exploring alternative fiber and dye sources.

Biomaterials company AlgiKnit has developed degradable yet durable bio yarn from kelp, a seaweed present in coastal waters that absorbs CO2 and may grow with no fertilizer. The corporate, which recently closed a $2.2M seed round of funding, has created prototype sneakers knitted from its bio yarn.



AlgiKicks use Just-in-time Degradability to match the product's lifetime with the lifetime of its constituent materials. Using a Kelp based biomaterial developed with AlgiKnit, these shoes can be composted and their nutrients reclaimed through existing infrastructure and cycles.

Figure 3 Aaron Nesser

California-based startup Bolt Threads uses bioengineering inspired by spider webs to spin silk proteins into fibers. Modern Meadow, another startup within the space, uses the principles behind cell biology to make animal-free, lab-grown leather.

Agricultural waste is additionally a lucrative source of the latest fibers. MycoWorks combines corn husks and sawdust with mycelium, the vegetative tissue of mushrooms, to supple leather. Germany-based QMILK is popping sour milk into silky fibers. In a similar vein, PrimaLoft, a corporation known for its synthetic microfiber insulation utilized in outdoor clothing, altered the molecular structure of polyester to contribute less to plastic pollution. the corporate attached an easy sugar to the polyester polymer, turning it into a more attractive food source for microbes and thereby speeding up the biodegradation process.

When it involves minimizing pollution within the fabric dyeing process, bacteria might be key. Pigments naturally secreted by bacteria might be wont to dye textiles, as evidenced by findings from Faber Futures within the UK and Kukka and TextileLab Amsterdam within the Netherlands.

These biotech innovations aren't as resource-intensive as conventional fibers or fabrics. They require no oil or fertilizers, contain less harmful chemicals, and use little to no water. But they're still in their early stages, so more funding is required for further development and exploration on the way to scale these innovations on an industrial level.

1.4 Production process innovation

The world of fashion is putting a strain on our planet and the sustainability of production processes is the first concern of brands.

However, the use of eco-fibers and eco-friendly fabrics is not always synonymous with feasibility, and there are many critical issues related to its use.

Firstly, the cultivation of natural textile fibers of plant origin such as hemp or cotton cannot be carried out in every territory and is often subject to numerous regulatory restrictions regarding both cultivation and export.

Hemp plantation is an exemplary case: it is a plant suitable for warm tropical areas or moderately cold and temperate climates, where the soil is well-drained, rich in nitrogen, and low in acid. In the past, it was very common in continental Europe because of its rapid growth, its relative ease of cultivation, and above all the large quantity of products that could be obtained from it: in addition to textile fibers, ropes, and paper from the stalks, oil from pressing the seeds, as well as feed and other edible products for livestock.

Cotton, the most widely used vegetable fiber in the world, is another extremely significant case. It requires well-worked soils, abundant organic and mineral fertilization, sunshine, a warm climate with frequent rainfall during development, and drought during the ripening period. The season needed for a good harvest is sunny, with at least 180 days without low temperatures, which is why cotton plantations are generally found in tropical and subtropical regions. It should be noted that world production in the Republic of China, India, Pakistan, Mexico, and Egypt is constantly increasing[8].

[8] www.alternativeaps.org/2018/02/19/agricoltura-della-canapa-possibilita-e-prospettive/

Figure 4 International Cotton Association

Although cotton is a breathable, hypoallergenic, and hygroscopic fiber (it absorbs water and sweat well), it is a fabric that is not very elastic and easily creased. It has also been known to create forced employment, slavery, and exploitation of workers for centuries. Furthermore, its cultivation has a strong impact on the environment through the pollution of groundwater by the use of pesticides and insecticides. Often, but quite wrongly, traditional cotton appears to be a sustainable alternative because it is associated with the green advantages of organic cotton. It should be borne in mind, however, that the latter represents only 1% of world production, which increased steadily until 2010, when it reached a peak of 241,698 tonnes, but then gradually declined in the following years until it reached only 112,488 tonnes between 2014 and 2015.[9] The world's cotton production is still growing, but it is still growing. Among the nineteen countries producing organic cotton, India and China hold the first and second places respectively, while Turkey is the third. This is followed by Kyrgyzstan, the USA, and Egypt, which provide 92% of the total production.

At present, therefore, 99% of the world's cotton is conventional and production is not keeping pace with the industry's demand for organic cotton. The main reason for this is that the textile certification of organic cotton is based on the complete exclusion of fertilizers, herbicides, and other harmful substances (pesticides, resins, and toxic solvents), which are used in large quantities in the production chain. Banned in Europe, their use is so common in India that they are the main cause of death for cotton growers.

As we have already seen in the case of cotton and vegetable fibers, important production and environmental problems also arise from the use of natural fibers of animal origin, with consequences that should not be underestimated. Yarns that might seem at first glance to be preferable because they come from the natural world, such as wool, actually generate high methane emissions during production and processing, even though compared to synthetic fibers the carbon dioxide emissions produced during use are much lower. Presumably, this is because a wool garment is used more times than equivalent synthetic garments and is often hand-washed.

[9] M. Milone, *100% Made in Cotton. Cotone e moda sostenibile*, Fondazione Mario Luzi, 2017

The health risks of cotton, both for those who grow it and those who work with it, have already been mentioned. But, in addition to the damage to people and land caused by the indiscriminate use of invasive fertilizers and pesticides or other unsafe substances, it should be borne in mind that the production of cotton, certainly the most widely used natural fiber, requires around 11,000 liters of water for one kilogram of material, which is on average 2700 liters for a normal T-shirt[10]. Organic cotton, which would seem to be a sustainable alternative, according to some studies needs more resources overall as it is not genetically modified to maximize production. The assessment of the sustainability of fabric is therefore extremely complex and requires careful analysis of the many factors involved: it is important to avoid falling into the trap of automatically believing that what purports to be 'organic' is ecological and safe, and it is much better to move towards more sustainable alternatives that use fewer natural resources.

Technological development has undoubtedly made a fundamental contribution to sustainability in terms of higher production yields, reduced labor, greater machine versatility, and reduced energy consumption. In particular, about sustainability in the world of textiles, there has been a progressive transformation of machines and equipment for handling systems and for the purification, filtration, and air conditioning of production environments.

Among the various solutions offered, two main methods have been tested:

- Plasma treatments
- Enzymatic treatments

Plasma treatments work by activating electrons and ions that bombard the textile surface, transforming its characteristics. The advantages of this type of technology, which is still in the research and experimentation phase, are many since they reduce environmental costs and drastically reduce the use of water.

Enzymatic treatments, on the other hand, are used to change the surface of fabrics and obtain discoloring effects or to modify their tactile consistency through less aggressive treatments. The benefits of this type of 'biodegradable' technology reduce costs for chemicals, energy, water, and waste treatment.

However, it must be borne in mind that improving the quality of both products and the working environment and increasing their sustainable characteristics requires non-recoverable investments in research and innovation, as well as in Human Resources.

The choice of sustainability, once started, leads to a point of no return and the driving force behind this change is also the awareness that it will no longer be tolerable or possible to pursue traditional production models. Proof of this can be seen in the gradual decrease in production factors derived from oil, the increase in raw materials of natural origin, and the constant changes in legislation. In addition, consumer awareness and inclination to protect the Earth's resources have forced fashion brands to support and invest their capital in new eco-friendly resources.

[10] https://thevision.com/attualita/fast-fashion-distrugge-pianeta/

Scholar Alex MacIntosh, a member of the Centre for Sustainable Fashion (an innovative research center at the University of Arts London) confirmed that "Sustainable fashion should not be seen just as a trend, but as a growing awareness of the need we have to mature the practices and principles of design, production processes, forms of communication, as well as our way of consuming fashion. What we cannot do is unlearn what we have learned and what we finally know about the value and importance of sustainability: we will inevitably have to change, by choice or by necessity "[11].

1.4.1 Sustainability in production processes

The documents that can be consulted by a simple search on the website of the National Chamber for Italian Fashion show incontrovertibly that "Sustainability is one of the pillars of the strategy that, since 2010, has been committed to placing it as a founding value of the Italian fashion system".

"Achieving the highest standards of sustainability" is the main objective for imagining a different future for the planet and for fashion that takes into account production, environmental and social factors. The entire Italian fashion system has been involved in this process through a capillary operation in which NCIF has involved not only its Members but also all the operators in the supply chain.

Maintaining and consolidating its leadership represents a fundamental competitive impulse for Italy, the world's leading producer of luxury fashion. Consequently, the NCIF has drawn up guidelines on the eco-toxicological requirements applicable to clothing, footwear, leather goods, and accessories, which are aimed at all those involved in the fashion supply chain, from the conception to the marketing of a product. These guidelines "promote the introduction and evolution of virtuous and sustainable practices through effective management of the use of chemicals in the production chain and aim to guarantee chemical safety standards on articles that are higher than those prescribed by the laws in force, to the benefit of consumers and the community".[12]

They are, therefore "a constantly evolving tool, subject to periodic revisions and additions because of the progress of knowledge deriving from existing legislation at the international level, from studies on risks and toxicology and from the best available technologies as well as from the consultation process with the various stakeholders"[13].

The number of chemicals used, their potential hazard, the machines used, and/or the processing cycles practiced substantially change how substances are used in production, chemical, and manufacturing chains. In this extremely complex situation, it is necessary to operate by good manufacturing practice, which is based on the best available techniques/technologies.

In production chains, individual chemicals are rarely used (except for basic chemicals such as acetic acid) because in most cases mixtures of substances are used, which are used in the countless processing steps

[11] http://www.rec.org.tr/?module=press&item=press_news_homepage&news_homepage_id=314

[12] https://www.cameramoda.it/media/documents/roundtable/lineeguida/linee_guida_it_1.pdf

[13] https://www.cameramoda.it/media/documents/roundtable/lineeguida/linee_guida_it_1.pdf

in a sometimes very complex web. For example, the tanning industry uses raw or semi-finished hides as raw materials that almost exclusively come from the food industry, of which they are a by-product.

To guarantee their preservation during transport and storage in the tannery, the hides and skins are previously subjected to preservation treatments (the most common is undoubtedly "salting" with sodium chloride, or undergo refrigeration or dehydration processes).

Once in the tannery, the hides undergo chemical and mechanical treatments to produce the finished leather for manufacture. The process can be summarised in four main phases, each of which consists of a series of chemical and mechanical processes, which can vary according to the different animal, process, and article types.

The main working phases of the tanning process, involving the use of chemical products, are identified below:

1.Re-tanning and pre-tanning operations

The hides are rehydrated, washed, and treated to eliminate superfluous unused parts (e.g. flesh, hair) to be prepared for subsequent treatments:

- Washing and desalting
- Greening
- Limestone
- Decalcification
- Maceration
- Degreasing

2. Tanning process

Stabilizes leathers through the use of chemical agents of various kinds that chemically bond to the collagen structure, stabilizing it. Depending on the agent used, there are different tanning systems:

- Mineral tanning
- Vegetable tanning
- Synthetic organic tanning
- Mixed tanning (combination of tanning agents)

3.Post-tanning treatments

Series of chemical treatments and mechanical operations aimed at ennobling the leather, making it suitable for the uses for which it is intended.

- Neutralisation (for mineral tanning)
- Retaining
- Dyeing
- Greasing.

4. Finishing

Phase in which the leather is given its final appearance, with mainly surface treatments, which can be different. Among the main ones:

- Spraying or roll coating (with several successive applications: base coat, covering layer, sizing coat).
- With transfer sheets
- Printing (screen printing, digital printing, etc.)[14]

1.5 Slow model

Slow Fashion, is a movement to define a new model of textile production that is also sustainable, based on less production with the main artisan slant. The term, coined in 2007 by sustainable design consultant Kate Fletcher, indicates a type of production inspired by the principles of the "Slow Food" movement, of which our country was one of the first promoters.

Slow Fashion implies a different approach to consumption by a more conscious customer, customers want brands to play more important roles in communities, support collective wellbeing and adopt sustainable practices and provide transparency and traceability. However, currently, 73% of consumers believe that the global industrial system is failing to take care of the health of the Planet.[15]Quoting Godard: “Changes in fundamental or enduring modes of dress in society are indicative of changes in the social roles and self-concepts of members of that society”[16]. If fashion can make sustainability first a trend and then a basic consumer priority, then it will be able to contribute to making environmental awareness a primary societal need, in all its conjugations. A significant example can be seen in the "Water&Oil" photoshoot (Fig. 5) for the August 2010 issue of Vogue Italia: set on a beach polluted by oil from the Deepwater Horizon disaster in the Gulf of Mexico, the largest oil spill in the history of the United States, it portrays the model Kristen McMenamy now as a fish trapped in a black net, now as a mermaid lying on the beaches devastated by the oil spill. Editorial director Franca Sozzani's choice caused an outcry by "shaking the consciences around the world", as a BBC journalist who announced the news said[17].

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[14] https://www.cameramoda.it/media/documents/roundtable/lineeguida/linee_guida_it_1.pdf

[15] Accenture,Havas Media re:purpose, 2014, The Consumer Study: From Marketing to Mattering The UN Global Compact-Accenture CEO Study on Sustainability. <https://www.unglobalcompact.org/docs/news_events/8.1/UNGC_Accenture_CEO_Study_2013.pdf>

[16] Godart F.C., 2018, Culture, structure and the market interface: Exploring the networks of stylistic elements and houses in fashion, Poetics, Vol. 68, pp. 72-88.

[17] Franca: Chaos and Creation, 2016. Film. Diretto e prodotto da Francesco Carrozzini.

*Figure SEQ Figure * ARABIC 5 Fashion shoot denouncing environmental pollution problems Source: Vogue Italia, 2010, "Water&Oil".*

The demand for ethical and sustainable fashion has led to the emergence of the Slow Fashion trend, the name of which gives the idea of an opposite system to Fast Fashion. The concept of slow fashion was conceived by Kate Fletcher, founder of the movement, who supports the idea of an industry with more sustainable time and resources. Higher initial costs are associated with better quality materials and more careful manufacturing, so the expected life of the product is extended, creating 'investment dressing', effective especially for classically styled clothes. Fig. 6 shows a summary list of the characteristics of Fast Fashion as opposed to those of Slow Fashion, whose logic underpins and supports all initiatives that seek and promote innovative and more sustainable solutions along the production chain.

Fast Mindset	Slow Mindset
Mass-production	Diversity
Globalisation	Global-local
Image	Sense of self
New	Making and maintaining
Dependency	Mutual trust
Unaware of impact	Deeply connected with impacts
Cost based on labour and materials	True price incorporating ecological and social costs
Large scale	Small to medium scale

Figure Cimatti, Campana e Carluccio, 2016, "Eco Design e produzione sostenibile nella moda: un caso di studio nel settore degli accessori personali di lusso"

1.5.1 Sustainable business models

The business model describes how a business identifies and creates value for customers and how it organizes itself to use this value profitably. While no official and unambiguous definition of the term is

established, it can be summarised as "the logic by which an organization creates, distributes, and captures value". There is also no unanimous consensus on the number of key components of its structure: one of the most widely used methods to represent the business model is the one by Osterwalder and Pigneur, called Business Model Canvas. It allows for an immediate representation of the business model thanks to a single matrix that encapsulates the nine key activities of the enterprise: 1) the value proposition, i.e. the products and services that represent value for a specific customer segment; 2) the distribution channels; 3) the customer relationships through which the enterprise acquires new consumers and retains existing ones; 4) the revenue streams, including payment methods and prices; 5) the key resources; 6) the key activities; 7) the key partners; 8) the cost structure; 9) the customer segments, i.e. the groups of people and organizations the company target.[18]

The introduction of sustainable logic, an aspect of innovation that is essential over time so that companies do not risk becoming obsolete and losing their competitiveness, influences each of these key elements, making the business model sustainable.

Geissdoerfer, Vladimirova, and Evans define sustainable business models as "business models that incorporate pro-active multi-stakeholder management, the creation of monetary and non-monetary value for a broad range of stakeholders, and hold a long-term perspective"[19]. They, therefore, differ from the basic meaning of the business model not only in their ambition to generate positive social impacts or eliminate negative ones, but also in their ability to integrate multiple dimensions of economic, social, and environmental value. Precisely because of their inter-organizational capacity, such a process requires companies to broaden their set of actors, including customers, suppliers, partners, non-governmental organizations, and government, thus bringing together different types of value present in the "People, Planet, Planet" chain.[20]

Benefits from the model include the possibility of generating additional revenue streams and improved profit banks; risk mitigation through diversification of strategies; access to new market segments, or increased market share, or the acquisition of existing second-hand markets. The possibility of greater access to subsidies or political incentives, consumer loyalty, and involvement, strengthening corporate identity and value.

Strengthening corporate identity and brand value constitutes additional opportunities for competitive advantage. On the other hand, the main barriers to innovation in sustainable business models include, from a market perspective, the need to develop additional activities in some models beyond the core sales activities, thus increasing the risks and costs due to extended liability. Another disadvantage is the cultural effort

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[18] Business Model Canvas. <https://www.businessmodelcanvas.it/cosa- e-un-business-model/>

[19] Geissdoerfer M., Vladimirova D. and evans S., 2018, Sustainable Business Model: A review, Journal of Cleaner Production 198, pp.401-416.

[20] Circle Economy, 2015, Service-based business models & circular strategies for textiles. <https://www.circle-economy.com/case/sitra/#.XhXpzUdKhPZ>

needed to change the mindset of both industry and consumers. Consequently, the communication strategy is crucial, as it is difficult to measure the actual environmental and social impact of a product.

The explicit need for renewal requires the use of multiple tools and diversified strategies that can bring together the new trends and needs that have emerged, to reconcile ethics and aesthetics. For this reason, Confindustria identifies three additional innovation drivers for sustainability: Mass Customization, Intelligent Production Systems, and Product Servitisation.[21]

Mass Customization, the first challenge, and opportunity of industry 4.0 include in its etymology a sort of apparent paradox: the new consumer requires customization of the product that makes him feel as if he were a part of the world. Customization of the product that makes them feel unique ("Customisation"), but this experience wants to be offered to everyone ("Mass"). Mass customization, in fact, an evolution of the mass production phenomenon, is defined as the production strategy of goods and services oriented to satisfy the individual needs of customers and, at the same time, preserve the efficiency of mass production in terms of low production costs and thus low selling prices. However, customization and low cost have been two mutually exclusive characteristics, as mass production allows low cost due to product uniformity, while exclusivity requires high costs. Although the system of mass production has dominated in recent decades, over the years the phenomenon of globalization has begun to show its weakest and most distorted side: the creation of a faceless culture. The fear of a homogenized society has challenged the system and has led to the re-emergence of a common desire for individuality and uniqueness.

The solution to this need leads to the use of the second driver of innovation, Intelligent Production Systems, web-based information and communication technologies. Thanks to innovative technologies and the ability to acquire data that was previously inaccessible, companies can actively interact with actors all along the value chain.

The technology driver also plays a supporting role for the last innovation tool, the adoption of Product Servitisation. The Product Service System (PSS), a concept formulated by GoedKoop in 1999, combines marketable products and services to meet specific consumer needs, either hitherto unmet or even previously unknown. It encompasses three approaches: the Product-Oriented PSS consists of augmenting the traditional product offering with the introduction of complementary services; the User-oriented PSS develops new business models based on the logic of allowing temporary access to the product, whereby consumer satisfaction is achieved by its particular function, rather than by its physical possession[22]. Finally, the Result-

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[21] Mantelli A., 2016, Confindustria Udine Industria 4.0: protagonisti della quarta rivoluzione industriale, Almaviva Spa.

<https://www.confindustria.ud.it/upload/pagine/Industria%2040/Mantelli- Almaviva.pdf>

[22] Adam M., Strähle J., Freise M., 2018, Dynamic capabilities of early-stage firms: Exploring the business of renting fashion, Journal of Small Business Strategy, Vol. 28, no.2, pp. 49-67.

oriented PSS replaces the product with the service. These models, based on the philosophy of functionality rather than ownership, have the potential to disrupt traditional consumption systems: the product is still important but the customer experience is central to the company's offering and value proposition, allowing the disjunction between profit and production volume, between economic growth and resource use. For companies, PSS is a potential source of competitive advantage due to the possibility of differentiation, competing with cost pressures, and strengthening customer ties.[23]

Customers, on the other hand, appreciate the time and cost savings due to the elimination of product liability. Services also can extend the time of use of the good and postpone the psychological idea of obsolescence that consumers feel towards it. In the fashion industry, selling as an experience in itself is also referred to as "retail therapy", given the strong intangible value and significance that is inherent of the fashion product buying experience[24].

The adoption of a more sustainable circular economic system, the use of advanced technologies, the desire for customization, and the value of experience and service represent the guidelines that have led to the innovation of sustainable business models, summarised by the 6R concept: 'Reduce, Reuse, Recover, Redesign, Remanufacture, Recycle'[25]. The most profitable and effective business models in the category include the Resale model and the Recycling model, based on the idea of a regenerative and waste-free production cycle; the Repair model and the Renting model, applications of the Product Servitization concept; and the Co-creation model, able to respond to the demands for more efficient use of resources through accessible customization.

1.5.2 The Resale business model

The Resale model consists of the sale of second-hand clothes. The adopting company wants to implement a 'take-back scheme' of branded garments, whereby products are returned by its customers and resold as second-hand garments by the company itself or through a third party. As third-party retailers generate profit from second-hand clothing sales, brands are increasingly considering the potential of centralizing and formalizing second-hand activities to retain profits for themselves. Among the opportunities of this system is the enhancement of the brand image, thanks to the innovative and sustainable concept, and its protection, thanks to the direct control over the resale. The possibility of opening up to new markets and a customer segment with lower disposable income than the brand's standard target group is a further advantage,

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[23] Zhi-Hua hu, ET AL., 2014, Sustainable Rent-Based Closed-Loop Supply Chain for Fashion Products, Open Access Journal, Vol. 6(10), pp. 1-26.

[24] EllenMacarthur Foundation. 2017. A New Textiles Economy: Redesigning Fashion's Future. https://www.ellenmacarthurfoundation.org/assets/downloads/publications/

[25] Cimatti, Campana e Carluccio, 2016, Eco Design and Sustainable Manufacturing in Fashion: a Case Study in the Luxury Personal Accessories Industry, Procedia Manufacturing, Vol.8, pp. 393 – 400.

especially for the inclusion of a new consumer interested in 'vintage' or second-hand clothing[26]. On the other hand, the model requires a rethink in organizational and logistical terms, given the prolonged product responsibility beyond the moment of purchase.

On the other hand, the model requires a rethink in terms of organization and logistics, as the responsibility for the product extends beyond the moment of sale, such as washing and quality control of the garments. Another difficulty is the creation of a special retail experience for customers, who do not want to feel like inferior consumers, but rather to be valued for their sustainable choice. At the same time, the brand runs the risk of cannibalization, whereby it is feared that second-hand goods may diminish the sales of new products.

There have never before been so many second-hand garment customers: according to a survey carried out by ThreadUp, in 2018 64% of women said they were willing to buy second-hand garments, a percentage that has grown consistently from 52% in 2017 and 45% in 2016. In 2019, the second-hand clothing market involved customers of all ages, particularly the youngest (Figure 7): 37% of Gen Z (18-24 years old) and 29% of Millennials (25-37 years old). This was followed by Boomers (56-65+) at 19% and, finally, Gen X (38-55 years) at 18%[27].

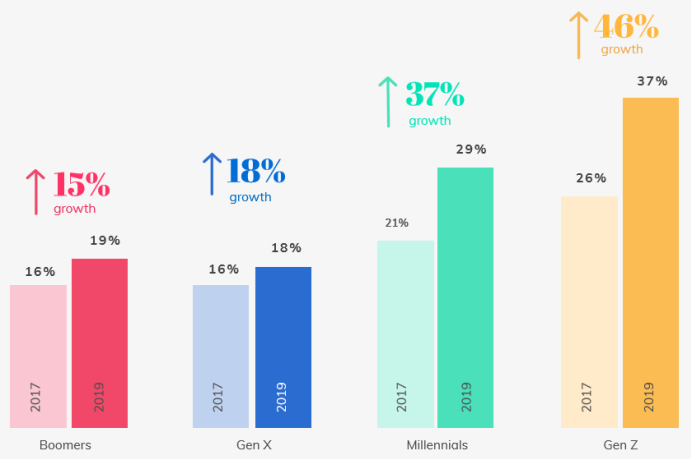

Figure ThreadUp, 2019, "Resale report".

The business model based on the resale of used clothes thus represents a credible threat to all competitors, in particular to the Fast Fashion model. Quoting the author of the book "The Conscious Closet" Elizabeth L. Cline: "Resale offers the wardrobe-rotating fun of fast fashion without the guilt of waste. By driving preferences away from disposable fashion towards higher-quality clothes, reuse is a boon for our style and the planet."[28]Indeed, in 2018, the Resale business model grew considerably ($24 billion in 2018, up from

[26] Circle Economy, 2015, Service-based business models & circular strategies for textiles. <https://www.circle-economy.com/case/sitra/#.XhXpzUdKhPZ>
[27] Thredup, 2019 https://www.thredup.com/resale/2019?tswc_redir=true
[28] Thredup, 2019 https://www.thredup.com/resale/2019?tswc_redir=true

$9 billion in 2008), although it performed less well than Fast Fashion ($35 billion in 2018). However, by 2028, Resale is expected to overtake the currently predominant model, reaching $64 billion, compared to its rival's $44 billion (Figure 8).

Figure 8 ThreadUp, 2019, "Resale report"

1.5.3 The Recycling business model

The recycling model consists of breaking down a used garment into raw materials and reusing it to create new garments or using other waste materials as raw materials for the new product. It is based on the principle of value creation from waste: the three major channels of textile waste include post-industrial textiles (the discarded and wasted offcuts); pre-consumer textiles (returned garments or inventories) and post-consumer textiles (used clothes not suitable for reuse). In the latter case, strategies such as incentivized returns can be used to recover the recycled garments, also creating a financial benefit to the consumer. Currently, goods obtained from recycling are positioned at a significant price premium, partly due to the additional costs of the process, partly because they are sold as "specialty products" and therefore resold at prices with a very high mark-up[29]. This model has been adopted by companies with a wide range of price positions, from luxury brands such as Prada and Falconieri to fast fashion brands such as Zara, ASOS, and H&M. In addition to the well-known companies that have followed the recycling trend, the model has also given rise to new businesses based entirely on this practice. One of the most successful examples is Freitag, a company founded in Switzerland and now present worldwide with over 400 shops and 2700 employees. It produces bags, backpacks, and fashion accessories made from a wide range of old materials, mainly vehicles, such as truck tarpaulin, old seatbelt straps, inner tubes, and airbags.

1.5.4 The Repair business model

The Repair model takes care to offer the additional service of repairing garments purchased by consumers, who have easy access to high-quality services at little or no extra cost. It is an example of Product-Oriented PSS, whereby the company not only sells products, but also the services needed during the use phase of the product. The model works best for high quality and premium-priced products where customer service plays a key role: it can create a personal attachment between the consumer and the product and, by extension, the brand. On the other hand, extreme durability can lead to market saturation if repeat

[29] Circle Economy, 2015, Service-based business models & circular strategies for textiles. <https://www.circle-economy.com/case/sitra/#.XhXpzUdKhPZ>

sales do not occur due to the quality of the first purchase. Therefore, new variations need to be continually introduced to renew consumer interest, for example through the addition of colors, styles, and limited editions.[30]

Patagonia, a manufacturer of high-performance outdoor clothing and equipment, is one where this system is well established. Known for its environmental activism through campaigns, donations, and many other initiatives, the company also offers repair services under the motto 'repair is a radical act'. The brand promotes the return of damaged garments so that they can be repaired at a "reasonable price" at its Service Centre in London.

The brand promotes the return of damaged garments so that they can be repaired at a "reasonable price" at its Service Center in Reno (Nevada), the largest repair facility in North America, which is capable of carrying out 30 000 repairs a year with 45 technicians.[31] In addition, thanks to the partnership created with the iFixit application, the "Worn Wear" initiative has been introduced, offering a do-it-yourself guide on the Patagonia online site. Online Patagonia website with a do-it-yourself guide explaining step by step how to repair any type of damage to your clothes. The proposal was promoted and communicated through the "Worn Wear Tour", a van tour organized by Patagonia. At each stop, people can bring in their damaged Patagonia garments, which are repaired free of charge on the spot. The latest tour was carried out in winter 2019 in Europe's top ski resorts[32].

1.5.5 The Renting business model

The Renting Model is an example of User-oriented PSS: the company holds possession of the product, offers it via rental to the consumer, and is responsible for its maintenance upon return. This model is proposed as an alternative to personal ownership, replacing it with the use of the product, increasing its quality and longevity, cutting unnecessary consumption, and reducing the use of natural resources. It also allows luxury products to be made more accessible, creates a community among subscribers, gives consumers access to a continuously renewable wardrobe, and decreases customer uncertainties, especially for more expensive products. Indeed, the Renting model is particularly effective for high-quality, durable, expensive goods, but also garments designed for special occasions and seasons, maternity, and children's clothing[33]. Introducing this model into a traditional business does not require immediate adjustments to product design and production, so the cost and time of implementation can be relatively limited. Moreover, it has the advantage

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[30] Circle Economy, 2015, Service-based business models & circular strategies for textiles. <https://www.circle-economy.com/case/sitra/#.XhXpzUdKhPZ>

[31] Patagonia. <https://eu.patagonia.com/it/it/company-info.html>

[32] Tedeschi M., 2019, Perché sprecarlo se puoi riutilizzarlo? Torna il Worn Wear tour di Patagonia, La Stampa (online), <https://www.lastampa.it/tuttogreen/2019/01/25/news/perche-sprecarlo-se-puoi- riutilizzarlo-torna-il-worn-wear-tour-di-patagonia-1.33672338>

[33] Circle Economy, 2015, Service-based business models & circular strategies for textiles. <https://www.circle-economy.com/case/sitra/#.XhXpzUdKhPZ>

of being able to collect much more data on consumer behavior and preferences than a normal retail system[34]. However, product liability is extended to additional care such as washing and repairing the garments, so the supply chain becomes more articulated than the traditional one (Figure 9). Rental also requires a form of administration supported by dedicated software and a strong online presence to reach as wide a market as possible.

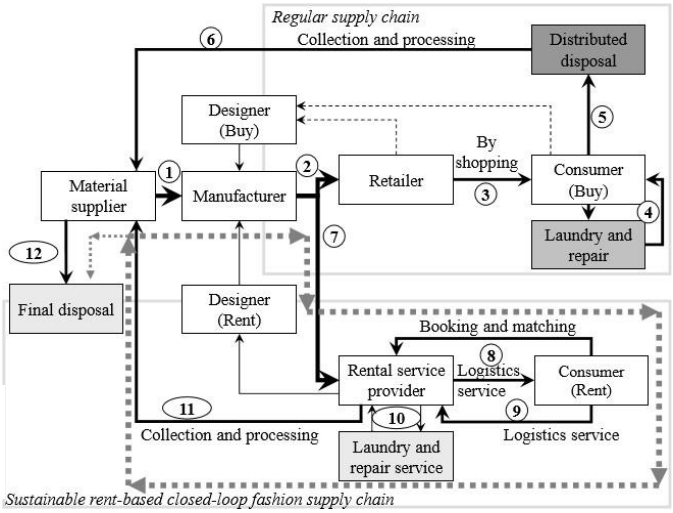

*Figure SEQ Figure * ARABIC 9 Zhi-Hua hu, ET AL., 2014, Sustainable Rent-Based Closed-Loop Supply Chain for Fashion*

The most difficult challenge is to acquire new members and to retain them: Brick&Mortar should only be opened once a high volume of e-market is established or by creating, in parallel, retail models based also on sales[35].

Renting customers prefer to have a wider variety and more creative choices from the selection, so they can access the latest trends at a reasonable price: to do this, it is necessary to create long-term co-operations with various designers. The success of this model depends on the acceptance of its adoption by consumers, as the system is based on the denial of the established habit of garment ownership. One of the companies interviewed in the report by Adam, Strähle, and Freisestates: "With more knowledge on sustainability, acceptance of renting clothes will increase. It will become the new normal but we have to work for that."[36]. Indeed, the fashion rental system, worth $1.18 billion in 2018, is expected to reach $1.96 billion by 2023[37].

Some successful entrepreneurial realities born from this model are Girl Meets Dress in England, Meizu in China, Drexcode and DressYouCan in Italy, and, first of all, Rent The Runway in America. The latter was

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[34] Zhi-Hua hu, ET AL., 2014, Sustainable Rent-Based Closed-Loop Supply Chain for Fashion Products, Open Access Journal, Vol. 6(10), pp. 1-26.

[35] Circle Economy, 2015, Service-based business models & circular strategies for textiles. <https://www.circle-economy.com/case/sitra/#.XhXpzUdKhPZ>

[36] Adam M., Strähle J., Freise M., 2018, Dynamic capabilities of early-stage firms: Exploring the business of renting fashion, Journal of Small Business Strategy, Vol. 28, no.2, pp. 49-67.

[37] Rabkin E., 2019, Buy, Don't Rent: The Virtues of Owning Clothes, Business Of Fashion, <https://www.businessoffashion.com/articles/opinion/op-ed-buy-dont-rent-the-virtues-of-owning-clothes>

founded in 2009 in New York as an online rental platform offering a service for renting designer women's clothes and accessories for special occasions. The idea was then developed with the introduction of casual clothes to replace the possession of clothes in everyday life and for every occasion. There are three rental options offered to consumers (Figure 10): RTR Reserve, the basic offer at a starting price of $30 for one garment; RTR Update, the intermediate offer whereby a maximum of 4 garments can be rented per month for $89; RTR Unlimited, which allows unlimited rental of garments, with a limit of 4 garments at a time, for $159 per month.

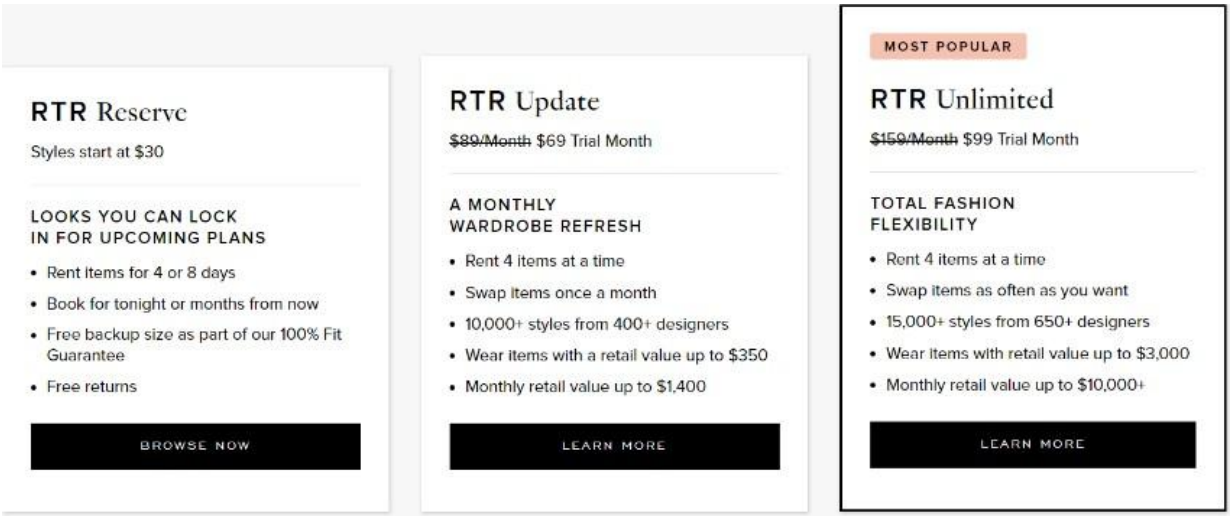

Figure 10 Rent The Runway's rental options.

The varied and diversified offer is given by the continuous creation and maintenance of strong ties with partners, to date more than 550 designers. In addition, since it is a question of renting clothes, it is necessary to ensure the highest quality and cleanliness of the products: the company takes care of the washing, care, and repair services in-house, becoming "the largest laundry in the world"[38]. Started as an online service, the company has since opened Brick&Mortar stores in NYC, San Francisco, Chicago, Santa Monica, and Washington DC. The telematics platform provides additional services such as the possibility to ask style experts for an image consultation via chat or in the shop and to review the service, which has resulted in a community of 9 million users[39]. The revolutionary system created has achieved palpable results, given its financial valuation of $1 billion in March 2019.

1.5.6 The Co-creation business model

Industrialized co-creation represents the fullest achievement of mass customization. This model is the answer to the desire for accessible customization: the basic idea is to turn the heterogeneous needs of customers into an opportunity to create value, rather than a problem to be minimized, challenging the 'one size

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[38] Maheshwari S., 2019, Rent the Runway Now Valued at $1 Billion With New Funding, The New York Times (online), <https://www.nytimes.com/2019/03/21/business/rent-the-runway-unicorn.html>

[39] Rent the Runway. <https://www.renttherunway.com/>

fits all' assumption of traditional mass production and linking to the concept of 'emotional durability'. Co-creation blurs the boundary between designer and consumer, empowering the latter to shape the product according to their preferences and tastes. Brands can harness consumer creativity to increase differentiation and create original designs, given also that the fashion industry has weak intellectual property rights.

The fashion industry has weak intellectual property rights. On the other hand, the restraining factors to the adoption of the model consist of the need for a vertically integrated supply chain, advanced production technology, or a highly skilled and flexible workforce. Indeed, new co-creation models are often driven by smart technologies, e.g. live printing, 3D printing, live knitting.[40]

On the other hand, the system offers the opportunity to cut intermediary costs thanks to direct contact with the final channel, and, since products are made on-demand, there is no need to forecast demand, deadstock costs, or waste resources.

The Padova-based company Full Spot, founder of O bag, bases its success on this system: the customizable rubber bag with replaceable components is its flagship product. In the "O bag ID" section of the online site, it is possible to choose every detail of the product, from the color to the materials, to the shape of the handles, the edges, and the internal bags.

1.5.7 Slow Design

Since the beginning of our century, on the wave of the "slow" trend (born mainly in the wine and food sector), the idea of a "slow" approach to design as a creative process rather than as an object has become widespread.

The term "Slow Design" was probably first coined by Alistair Fuad-Luke in 2002, in his article "Slow Design - A Paradigm for Living Sustainability?", which assumes a holistic idea of sustainable design, balanced between individual, social, cultural, and environmental needs. The concept can be applied in a broad sense, e.g. to the design of experiences, processes, services, organizations: a kind of path towards long-term sustainability that also takes into account the non-material nature of human beings and their well-being, thus adopting new creations to the increasingly widespread needs and demands for sustainability.

When a designer approaches the idea of "slow", the questions they will ask themselves are: "what quality of life will this design improve?", "How will it impact the quality of life and the environment?", "is it necessary?".

The distinctive features of Slow Design can be summarised as follows:

- holistic: it takes into account as many short- and long-term factors as possible

- interdisciplinary: recognizes pluralism and cultural diversity as valuable resources and promotes the

- sustainable: reduces as far as possible the risks of negative environmental and social impact through the precautionary principle

- customized: creates specific solutions for specific situations

[40] Circle Economy, 2015, Service-based business models & circular strategies for textiles. <https://www.circle-economy.com/case/sitra/#.XhXpzUdKhPZ>

- adaptable: it develops solutions that will continue to produce their effects over time and can be readjusted as necessary

- non-polluting: eliminates polluting or toxic substances and processes

- efficient: minimizes the consumption of time, labor, energy, and natural resources.

It must be said that Slow Design is a relatively new concept, and therefore its implications and potential are still to be explored. According to the followers of this approach, the slow design could evolve in the future in the following ways:

- lengthening of design time and processes with more time devoted to research, study, testing of real-life impacts, and improvements in testing

- use of local resources and technologies for industrial design/design to support local industries, communities, craftsmen

- identification of local cultures as a main source of inspiration

- more in-depth study of nature's cycles to be incorporated into design and production processes.

and production processes.

1.6 The new priority in corporate strategies: CSR

For many years, Corporate Social Responsibility (CSR) has been discussed by a limited number of companies, organizations, and experts. Today, the situation has changed and the debate has expanded to involve a growing number of actors, in particular the governments of the Member States, which have started to define and implement targeted initiatives and strategies, encouraged by the action of the European Commission, first with the Green Paper of 2001, then with the Communication of 2002, as well as by the increased attention of the market to these issues.

In 2002, the Ministry of Labour and Social Policies set up a working group entirely dedicated to the development of corporate social responsibility. On 14 November 2003 in Venice, during the third European Conference on CSR, organized by the Ministry in collaboration with the European Commission, Italy presented the CSR-SC Project.

The acronym SC, Social Commitment, expresses the project's intention to promote the creation of partnerships between the profit world and the third sector and between the public and private sectors.

CSR is a voluntary choice. Sharing the indications of the European Commission, the Ministry of Labour and Social Policies recognizes that the implementation of CSR practices by a company should be exclusively voluntary.

The project has the following objectives:

- to promote the dissemination of CSR culture among enterprises and Public Administration;
- to facilitate the exchange of experiences and best practices at the national and international level;
- to support SMEs in the implementation of CSR strategies;
- promote a common reference framework to minimize the risk of ambiguity linked to the proliferation of numerous standards and reporting models;

- protect citizens from misleading communication campaigns.

1.6.1 Social statement

The Social Statement (SS) is a voluntary tool, designed primarily to guide companies in the reporting of their social performance, standardizing how information is collected and presented, and encouraging forms of comparison and evaluation of the results obtained.

By issuing the Social Statement, the Ministry of Labour and Social Policies aims to increase the level of awareness of companies on social, environmental, and sustainability issues, promoting the spread of a culture of responsibility within the industrial system.

The Social Statement also aims to respond to the growing demand for information on Corporate Social Responsibility issues from many categories of stakeholders. The definition of a tool based on a clear and consolidated reporting model aims to ensure greater transparency in corporate communication, protect consumers, and benefit all citizens.

The Social Statement aims to be a simple, modular and flexible tool to enable all companies - regardless of size, sector, legal nature, reporting experience, etc. - to adhere to the system defined by the Government.

The Social Statement is based on the definition of CSR given by the European Commission in its Green Paper, published in July 2001. According to this approach, Corporate Social Responsibility is "the integration by companies of social and environmental concerns into their business operations and in their interaction with their stakeholders voluntarily", i.e., according to the definition contained in the original document "a concept whereby companies integrate social and environmental concerns into their business operations and in their interaction with their stakeholders voluntarily".

The definition of CSR in the Green Paper also suggests that being socially responsible means going beyond mere compliance with legislation, "investing "more" in human capital, the environment and relations with stakeholders".

Based on these assumptions and following a discussion with various categories of stakeholders, the Ministry of Labour and Social Policies has developed a proposal to guide companies in the preparation of the Social Statement.

The document is structured in two parts: the data sheet and the set of indicators.

The purpose of the personal data sheet is to focus on the general characteristics of the company that decides to adopt the Social Statement.

The main information required is:

- Name;
- legal nature of the organization (SRL, SPA, Cooperative, etc.);
- sector of activity (or sectors in which it mainly operates);
- turnover;
- main office;

- branch offices;
- main reference markets;
- number of employees.

In addition, more specific information should be included in the datasheet, aimed at highlighting the company's commitment to Corporate Social Responsibility. Companies are therefore asked to indicate the adoption of tools such as Codes of Conduct, Management Systems (e.g. quality, environmental, and safety management systems), certifications, and social, environmental, and sustainability reports. These documents can be attached to the Social Statement to demonstrate the company's commitment to the issues in question.

The Social Statement, therefore, is not intended to replace 'recognized' public and/or private initiatives on corporate social responsibility but should be considered as a complement to these projects. The approach indicated by the Ministry of Labour and Social Policies aims, if anything, to enhance these experiences, with the ultimate objective of encouraging greater transparency and clarity in information to stakeholders.

The set of indicators is at the heart of the Social Statement. Any process carried out by an organization needs effective and efficient measurement mechanisms and tools. Measurement is used to support decision-makers in defining strategic and tactical objectives, to monitor the efforts made to achieve these objectives, to evaluate the performance achieved, and to compare this performance over time and space.

As is well known, indicators are measures that, through a simplification of reality, are aimed at detecting and/or describing complex phenomena that are difficult to represent, balancing two divergent needs: scientific accuracy and the ability to synthesize.

In the project, the set of indicators has the specific aim of monitoring the commitment and the activities carried out by the company in terms of CSR, supporting the decision-making and implementation processes. To this end, through a series of discussions with the interested parties and after a pilot testing phase with the heads of company functions, a series of indicators were identified and selected.

For each indicator, a detailed review was conducted. Elements such as:
- relevance to the notion of CSR;
- comprehensibility for companies
- the producibility of the information needed to determine the indicator (e.g. any documentary material);
- the method of detection and measurement;
- applicability to different types of enterprises.

In the final scheme, individual indicators are organized in a three-level framework in which a stakeholder-oriented approach has been privileged. Therefore, the chart of accounts in the Social Statement is divided into:
- categories: groups of stakeholders to whom specific families (clusters) of indicators are addressed;
- aspects, i.e. thematic areas monitored by groups of performance indicators, within a given category of stakeholder;

- indicators, i.e. qualitative and quantitative measures providing information related to a specific aspect. They can be used to monitor and demonstrate the performance of an organization.

Indicators may be qualitative (e.g. where a description of a project or initiative carried out by the company is required) and quantitative (in cases where the required information is to be expressed in the form of numbers, percentages, ratios, economic or financial data, etc.). The set of indicators has been divided into two main categories:

- common indicators (C), which are to be used by all companies for the realization of the Social Statement (from SMEs to large companies);
- additional indicators (A), which can be applied to larger companies (from 50 employees upwards) based on specific criteria, alongside and complementing the common indicators.

The set of indicators and the Social Statement are intended to be an opportunity to guide companies towards objectives of excellence in CSR reporting, encouraging the continuous improvement of company performance in this field.

In this sense, if some of the additional indicators indicated should not apply to the company due to factors related to its structural and/or organizational characteristics (size, sector, legal nature and ownership structure, complexity of detection, and/or measurement of the information required), the reasons for exclusion should be duly specified and justified by the management.

The following is the complete set of indicators identified for the CSR- SC-Project. The indicators are divided into eight categories, according to the different stakeholder groups:

1. Human Resources
2. Members/Shareholders and Financial Community
3. Customers
4. Suppliers
5. Financial partners
6. State, Local Authorities, and Public Administration
7. Community
8. Environment

For each indicator, an explanatory sheet has been prepared to facilitate the application and to guide the way of reporting according to the model below.

The sheet contains:

- Progressive code and name of the indicator;
- Indication of relevance for enterprises (common indicator or additional indicator);
- Qualitative or quantitative nature of the information requested;
- Explanatory comment;
- Suggested method of measurement;
- Supporting documentation requested or suggested.

Card example

Set	Sequence code and name		
Explanatory comment	Relevance	Qualitative	Quantities
	Description of the indicator and the aims it aims to achieve		
How to measure the indicator	Description of the procedures to be followed to determine the indicator and how the measurement is to be carried out (supplemented by examples where appropriate)		
Supporting documentation	Indication of the documentation to be attached (or suggested to be attached) to support/guarantee the information submitted		

Concerning the reference time horizon, data and information were collected and the different indicators were quantified/constructed over years. This has made it possible to carry out significant evaluations on the evolution of the company's behavior and on the actions carried out in the field of CSR, favoring a better appreciation of the performance obtained (for example, investments having a multi-year value, which could not be correctly appreciated and valued by surveys extended to a single year).

1.6.2 The Non-Financial Declaration

DNF (Non-Financial Declaration) is a report in which social and environmental aspects are reported and is usually drawn up following four areas of sustainability identified as relevant to the company's business.

- Company: includes aspects relating to the creation of economic value, the effectiveness, and transparency of decision-making processes, the fight against corruption, and competitive practices.
- People: sets out the company's policies, initiatives, and activities in taking care of its employees, so that they can provide valuable services to customers and local communities. It, therefore, includes aspects relating to the quality of relations with workers, human resources development and training, health and safety at work, labor relations, diversity, and equal opportunities.
- Product: describes the policies and initiatives developed to offer products that guarantee safety and quality criteria and that give value and content to the experience lived in the operating sites. It, therefore, includes service quality and safety, product/service information and communication, supply chain management, accessibility to services.
- Planet: represents the policies practiced, initiatives and activities carried out by the company to achieve its environmental protection objectives. It, therefore, includes energy, emissions, and waste management.

The DNF provides information on the issues required by Legislative Decree 254/2016 (Decree), also by referring to other corporate documents prepared in compliance with the applicable legislation in force (Report and Financial Statements, the Report on Corporate Governance and Ownership Structure), if the information is already contained therein.

In particular:

- the company's organization and management model will be set out in specific chapters of the Report on Operations
- risk management, also concerning non-financial risks, implemented through the Risk Management Model ex. D. Legislative Decree 231/01 is described in the dedicated chapter of the Report on Operations;
- the Company's corporate main policies and social and environmental performances.

The Sustainability Policy aims to define the reference principles on social and environmental issues and to provide the Business Units with guidelines for defining a sustainable approach in the management of operational activities. The Policy represents the guiding document of the Company's Sustainability framework which, developed over several years starting from the results of the materiality of social analysis, defines, in line with the principles enshrined in the Code of Ethics and the 231 Organizational Model, the long-term objectives that contribute to creating shared value for all stakeholders.

People
The company wants to take care of our employees so that they can provide valuable services to customers and the community.
DIVERSITY
The company respects the personality and dignity of every individual and believes in valuing diversity without distinction.
DISCRIMINATION
The Company rejects all forms of discrimination and abuse, including in selection and career advancement.
FREEDOM OF ASSOCIATION
The company protects the right and freedom of association and collective bargaining, recognizing the indispensable value of these freedoms, in compliance with national laws.
CHILD LABOUR
The Company shall not tolerate the exploitation of children within its facilities and shall not engage in or support child labor as defined by international standards.

FORCED LABOUR
The company opposes all forms of worker exploitation.
DEVELOPMENT
The company believes in the value of human capital by enhancing and supporting the development of individual skills, promoting professional growth, and knowledge sharing.

Table 1 Sustainability Policy of a Company - an example of the main contents

The application of the policies and guidelines is delegated to the individual Business Units, which are responsible for defining the processes, procedures, roles, and responsibilities necessary for its correct implementation. Since the beginning of 2020, many companies have had to deal with the emergency linked to the spread of the so-called Coronavirus ("COVID-19"). Important measures have been taken to safeguard the health and safety of employees and customers and, in line with the measures issued from time to time, to ensure the operation of an essential service for the community.

PRODUCT
We want to think in an innovative way to offer products that ensure safety and quality criteria and that make you remember the experience you have in our stores.
CUSTOMERS
Promotes listening to the needs and expectations of its customers. It is therefore constantly engaged in the search for new service trends to seize innovative ideas to increase the level of excellence of its business in the most congenial telematic channels. It collaborates with international partners to share the know-how acquired in the promotion and management of the required services.
SUPPLY CHAIN
The company promotes the creation of stable and long-term collaborative relationships with suppliers, from which common value can arise; it, therefore, acts with transparency, integrity, impartiality, and contractual fairness. Moreover, it promotes the adoption of socially responsible behavior towards suppliers, in business relations with subjects that comply with international standards and principles on individual dignity, working conditions, health, safety, and the environment. Acknowledging, therefore, that the supply chain as a whole represents a fundamental dimension for increasing commitment to good sustainability practices, the company has drawn up procedures for evaluating and qualifying suppliers, defining the general standards for evaluating suppliers and the basic principles that characterize the company's approach to sustainable management of the supply chain.
COMPLIANCE
The company operates in compliance with all local regulations and approved standards in terms of safety in the workplace.

PLANET
We want to protect the environment by involving our partners, suppliers, and the contribution of employees and customers.
ENERGY CONSUMPTION
the company directs and contributes to reducing energy consumption, promotes the use of natural resources in favor of clean energy, and researches strategies aimed at reducing environmental impacts, improving its performance, and defining business concepts and innovative solutions according to the principles of energy efficiency.
WATER
the company promotes the responsible use of water resources.
WASTE AND RECYCLING
The Company promotes programs aimed at the reduction and proper management of waste, also through projects aimed at supporting the circular economy along the electronic supply chain.
COMPLIANCE
The Company operates in compliance with all local, national and international regulations.

PREVENTION OF CORRUPTION
The Company repudiates and prohibits corruption without exception (both concerning public and private counterparties) and is committed to complying with the anti-corruption laws of all countries in which it operates. All employees are firmly committed to carrying out every activity within their competence with loyalty, fairness, transparency, and honesty and in respect of legality and are required to scrupulously follow, apply and enforce the rules of the Anti-Corruption Policy in the performance of their activities.

To effectively monitor sustainability issues, a "CSR Operational Committee" should be set up. Once it has been set up, the CSR Operational Committee will be responsible for making decisions relating to sustainability and corporate social responsibility and will be in charge of coordinating the process of reporting the data relating to the future Sustainability Report of 2021, in terms of defining and managing the operational process of non-financial reporting, managing the collection, consolidation of data and information throughout the Italian perimeter of the Company and drafting the document. It would be appropriate for the members of this committee to be representatives of the various corporate functions: Finance, HR, Integration & Transformation.

The company should adopt a risk management system, as well as an internal control system, to identify, prevent and manage, as far as possible, the risks relating to the conduct of the company's business.

The Company should define risk management and internal control system as a set of policies, procedures, and actions adopted and implemented by the Board of Directors, managers, and others in the

corporate structure, aimed at providing reasonable certainty of the achievement of objectives falling into the following categories:

- effectiveness and efficiency of operating activities;
- reliability of accounting and non-accounting information, both for third parties and for internal purposes;
- compliance with the laws and regulations in force, and with internal rules and policies.

In the following table I will describe the major risks to which a company may be exposed:

Table 2 Risks description

CLIMATE CHANGE RISK AND ENVIRONMENTAL RISK
The risks arising from climate change recognized by the Company are related to the incorrect management of energy and emission sources; they are risks related to regulatory/regulatory changes associated with the fight against climate change and physical risks, i.e. risks arising from the progressive change in climatic conditions, linked to long-term variations and extreme weather events that expose the Company to damage or destruction of "material capital", plants and infrastructures, potential interruptions of essential supplies and potential contraction of production capacity.
RISK OF FAILURE TO RESPECT HUMAN RIGHTS
These are the risks associated with violations of human and workers' rights (abolition of child labor, forced labor, and protection of freedom of association and collective bargaining) and the possibility of cases of discrimination. In particular, the Company is committed to mitigating its impacts in this area, including indirect impacts, linked to its supply chain.
RISK OF FAILURE TO PROTECT HEALTH AND SAFETY IN THE WORKPLACE
These are the risks relating to the Company's activities which, as a result of failure to comply with internal regulations and provisions, may lead to the occurrence of accidents involving employees and external collaborators working at sites and/or under the control of the Company.
COVID-19 RISK
In the early months of 2020, the emergence of a new coronavirus in China, known as Covid-19, which very quickly became a true pandemic on a global scale, is having significant economic and social repercussions. From the very first signs of the seriousness of this phenomenon, the company should have taken precautionary measures to protect the health of its employees and promptly updated the Risk Assessment Document for all offices, including references to the biological risk following Legislative Decree no. 81/08. Given that the biological risk deriving from the Coronavirus epidemic is not an occupational risk, i.e. it is not directly correlated with the company's production activities, the DVR was prepared to focus mainly on information and prevention measures to be adopted in various application scenarios. Based on the DVR and based on the subsequent "Shared protocol for the regulation of measures to contrast and contain the spread of the Covid-19 virus in the workplace" drawn up between the government and the social partners, the company should have implemented basic information to all its employees and collaborators, also through its intranet. It is not possible to predict, at today's date, what the future evolution of this phenomenon may be, but it certainly represents a major threat, not only to public health but also to the world economy as a whole.

In addition, the Company should identify the following risks associated with:

- to the general conditions of the economy;
- to credit and liquidity;
- to dependence on key personnel;
- to Brexit.

The mission of an ethical company should be to grow and create wealth in harmony with people and the environment, with great willingness, passion, and love for their work. To achieve these goals, the company should aim to generate sustainable value for shareholders, employees, and business partners while respecting the environment and society.

The company should wisely combine quality and sustainability, committing itself daily to reduce the environmental impact of its operating sites, demonstrating a commitment to the protection of the ecosystem and the search for the best services to offer with the least emotional impact on the end-user. A fundamental and unavoidable commitment, especially for all those companies that provide services that meet the daily life of millions of people, in homes and public environments.

In the field, acting responsibly means integrating sustainability among the aspects to be considered in the company's daily choices, from the moment of service design to the moment of service implementation. Therefore, paying attention to the entire supply chain dedicated to carrying out the service and the actors that are influenced by it: employees, suppliers, customers, local communities, associations, and all those entities whose interests intersect with those of the company.

In this context, the company should strive to develop management systems, procedures, and policies that carefully consider respect for the environment and the society that surrounds it and of which it is an integral part.

From a social point of view, the company should contribute with constancy and dedication to increasing the prosperity of the territories in which it operates and the people with whom it interacts. In this regard, through its Local Units and business offices, the Company should actively promote employment.
Even during times of economic downturn, the Company should always be committed to its employees to maintain employment levels, provide safe workplaces, and pay attention to employee welfare and well-being.

Figure 11 Comdata CSR report

In the path of sustainable growth of a company, stakeholders play a fundamental role. Through their involvement and the consideration of their needs, the Company maintains a constant vision towards the contexts in which it operates, committing itself to consider their expectations, perceptions, and priorities within the decision-making processes and in the definition of economic, environmental, and social objectives.

For its Sustainability Report, the company should carefully identify the individuals or groups of individuals who have a relationship with the company and its activities, through an analysis that considers the following variables: tension, influence, responsibility, and dependence, as should already be present in the Social Statement.

With its stakeholders, the company should maintain a constant relationship of comparison and consideration of mutual needs. In this sense, the Company should commit itself daily to maintain active and constant relations with its stakeholders through various methods involving the different corporate functions.

To understand which aspects may have the greatest impact on stakeholder decisions, a materiality analysis is performed, which aims to identify aspects that reflect the significant economic, environmental, and social impacts of the organization.

Below are some examples of material issues:

Table 3 Materiality analysis elements

HEALTH AND SAFETY IN THE WORKPLACE
Management systems and policies related to the health and safety of workers in the workplace.
SUSTAINABLE INNOVATION
Activities and policies related to technological innovation and Research and Development activities aimed at

the continuous improvement of processes and products, with particular attention to the reduction of environmental impacts.
WELLBEING AND RESPONSIBILITY TOWARDS EMPLOYEES
Personnel management policies and activities aimed at ensuring the well-being of employees, the protection of workers' rights, diversity, and equal opportunities.
MANAGEMENT OF ENERGY RESOURCES AND EMISSIONS
Policies for monitoring and efficient management of energy consumption and emissions. Use of energy from renewable sources (green certificates, photovoltaic systems, etc.).
INTEGRITY AND COMPLIANCE
Ethics, integrity, and transparency in business activities including the adoption of policies and procedures to support compliance with applicable laws and any specific regulations. Adherence to national and international principles and guidelines that include areas of social and environmental responsibility, where the Company operates or related to business activities.
RESPONSIBLE SUPPLY CHAIN MANAGEMENT
Supply chain management is aimed at promoting transparency between stakeholders, responsible procurement practices in environmental, social, and human rights matters.

Every company should aim to improve its impact on society in economic, social, and environmental terms.

For this reason, concrete sustainability goals to be achieved should be declared each year and represent a commitment that the Company makes to its stakeholders. The definition of the objectives should consider the internationally recognized sustainable development guidelines, in particular the 2030 Agenda and its 17 Sustainable Development Goals (SDGs). From an analysis of the SDGs and related targets, the company should identify priority objectives on which to focus its commitment in the medium to long term.

Some examples might be:

GOAL 4: Ensure quality inclusive and equal education and promote lifelong learning opportunities for all.

GOAL 6: Ensure the availability and sustainable management of water resources and sanitation services for all.

GOAL 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

GOAL 12: Ensure sustainable consumption and production patterns.

Figure 12 Comdata CSR report

1.7 Supply chain

The supply chain theme began to be of interest in the 1980s when companies began to realize that the evolution of the markets, towards an ever-increasing reduction in delivery times and an increase in the range of products offered, would have led them to an organizational change at the supply chain level.

The supply chain is "the totality of all activities concerning the creation of a good, beginning with the raw materials and ending with the final product, encompassing the supply of materials, manufacturing, and assembly, storage and inventory monitoring, order management, distribution, and shipment to the customer as well as the management of the information systems necessary to control all these activities."[41]

1.7.1 Sustainable supply chain

The definition of sustainability proposed by the Bruntland Report in 1987 has completely changed the concept of development and the orientation of supply chain management. Initially, priority was given to economic growth, but now it is given to improving the human condition, without excluding attention to the environment, to natural resources.[42] Each supply chain must therefore contribute to improved sustainability performance. A supply chain improves its sustainability when objectives are shared, operational solutions are relevant to them and consistent with each other, and when their implementation is carried out in a perfectly coordinated manner throughout the supply chain.[43]

Sustainability applied to supply chains implies a reconsideration of production methods in terms of operation and material flows, to limit undesirable environmental effects and improve social conditions. The reconsideration of technologies, organizational choices at each stage of the production chain, product redesign, and the use of inputs with different characteristics, makes it possible to achieve several results:

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41 Quinn, J. F. (1997). What's the buzz? Logistic Management, 7-43.

42 Bell, S., & Morse, S. (2003). Measuring sustainability. Earthscan Pubblication.

43 Seuring, S., & Muller, M. (2008). Literature review of peer-reviewed publications on sustainable supply chain management. Journal Cleaner Production, 16, 1699-1710.

limiting production waste, encouraging its reuse, extending the life of products, reducing pollution and waste both during production and after consumption.

If previously the weight given to sustainability in the production phase was low, nowadays all phases are fully included in the more sustainable ones, undergoing deep remodeling and becoming longer, more articulated, and more complex.[44]

Traditionally, logistics was associated with a flow of materials, both raw materials, and finished products, moving from the producer to the final customer, with logistics operations being considered essentially concluded once the product was delivered to the customer. Nowadays things have changed, especially in the light of stricter legal regulations protecting environmental sustainability and making the manufacturer responsible for the entire product life cycle including the return channel of product-related flows.

1.7.2 Sustainable supply chain in fashion

Sustainability is a rather sensitive issue for the fashion supply chain due to its characteristic of high resource use and the accentuated delocalization of production to low-cost countries leading simultaneously to sourcing from countries with low attention to environmental and social sustainability. Due to this low awareness of the fashion industry and strong competition, sustainability principles represent both a constraint and an opportunity for the actors in the supply chain and lead to significant changes at the organizational level, both within each company and throughout the supply chain. It can be a constraint because the more diversified the supply chain, the more complex its management can become from the point of view of sustainability policies, but at the same time, it can become an opportunity if one can anticipate legislative changes to gain the competitive advantage ofthe first mover and thus to raise awareness among customers of the sustainable characteristics of a product. For these reasons, sustainability is becoming the banner of excellence in our decade, a phenomenon similar to that of quality in 1980.[45]

Moreover, as defended by Smith, sustainability initiatives are fundamental to business strategies, especially for those operating in sensitive business areas (high intensity of natural resource use, poor working conditions, etc.), as is also the case in the fashion industry[46].

A concern still present in the literature concerns the issue of compatibility between sustainability and economic growth. Through an empirical study, an attempt was made to find an answer to this question. It started with an analysis of the main sustainability behaviors in the fashion supply chain and continued with a discussion of how the implementation of sustainability in the supply chain could benefit the company both

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[44] Linton, D., Klassen, R., & V., J. (2007). Sustainable supply chains: An Introduction. Journal of Operation Management, 25, 1075-182.

[45] Larson, A., Teisberg, E., & Johnson, R. R. (2000). Sustainable Business: Opportunity and Value Creation. Interfaces, no 3, 1-12.

[46] Smith, N. (2003). Corporate social responsibility: Whether or how? Californian Management Review, 45 (4), 52-76.

internally and externally. After a series of interviews with various actors operating in the fashion industry (material recycling companies, certification agencies, consultants and designers, etc.), two groups of actors were identified: those attentive to sustainability and those indifferent to it[47]. In conclusion, the focus on sustainability leads to a widening of the space and sphere of coordination: adopting sustainable strategies means interacting with new actors, new stakeholders. New actors can mean the acquisition of know-how, of new sustainability-oriented strategies.

However, a common observation concerns the implementation of sustainability strategies within any supply chain: a deep reorganization is needed, both within each company and between the different actors to face the new sustainable challenges.

Subsequently, the performance model of companies has to be revised taking into account the reorganization. The challenge for companies is twofold: on the one hand, the sustainability principle has to be translated into qualitative and/or quantitative indicators; on the other hand, the multitude of SC actors have to co-produce the new performance paradigm.

However, there is a need to investigate the degree to which SC principles might conflict with the concept of sustainability. This is of particular interest for fashion SC, as success factors are commonly based on the principle of rapid response.

However, it should be stressed that the supply chain is not only unidirectional but can also integrate the management of return flows. Behind a non-functional or defective product, there is a problem of managing the interface between marketing after-sales activities and return logistics. As markets become more numerous and distant and customers more time and service sensitive, the need to manage this interface increases.

Several contributions in the literature, e.g. by Cairncross, focused their research on "reverse logistics" with a narrow environmental focus. The analysis was mainly concerned with the product life cycle, from birth to death, and the effects this can have on the environment. Willits and Giuntini propose an interesting theory on environmental management systems that considers the company financially responsible for the entire life cycle of a product. Another research of interest in product recovery has been deepened by Thierry et al.; this study deals with the management of product recovery in its various possibilities: concerning the part or component recovered, for the quality of the product to be put back on the market and to the final product assembled again.[48]

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[47] de Brito, M., Valentin Carbone, and Corinne Meunier Blanquart. 2008. Towards a sustainable fashion retail supply chain in Europe: Organisation and performance. International Journal of Production Economics 114: 534–53.

[48] Thierry, M., Salomon, M., Van Nunen, J., & L., V. W. (1995). Strategic issue in product recovery management.

Gungor and Gupta, on the other hand, go beyond return logistics, enriching their research with the concept of green logistics; they highlight the indirect relationship between reverse logistics and green logistics, highlighting the repercussions that the management of a product's life cycle can have.

1.7.3 How to measure sustainability: the LCA

Life Cycle Assessment (LCA) is a tool for analyzing the environmental impact of a product throughout its life cycle, from the extraction of raw materials to disposal.

LCA allows the study of every aspect of each component of a product/service, examining its entire life cycle, identifying the most impactful points, and giving an indication of the issues that need to be addressed. LCA is therefore useful for improving an existing product or guiding the process of creating new products.

At the heart of this model four phases form the common thread in an LCA study:

1) Objectives: initially, the purpose of the study is defined, the functional unit for which the environmental impact is measured, the scope of the system, the data requirements, and the related assumptions;

2) Inventory: this includes the quantification of input and output flow data for each process in the product life cycle;

3) Assessment of impacts: the data resulting from the inventory are classified and divided into different impact categories according to the effects they may have on the environment at a local, regional, or global scale;

4) Interpretation of results: the information and results obtained are interpreted and can then be translated into recommendations for reducing environmental impact.

The results of an LCA study can be used in different ways: to compare different alternatives for the same product, to assess where the major impacts lie and set priorities for action, to reduce the amount of waste and scrap, to choose new recycling and reuse possibilities[49].

The LCA method is the best context within which to conceptually represent all the life phases of a garment. Once discarded, the product is disposed of by its user. But there are different options for the end-of-life of a product: downcycling, upcycling, reuse, and closed-loop recycling. The process of downcycling through product recycling allows the life cycle of a product to be extended by transforming it into a new one (even with a different use than before) or into other materials. On the other hand, when consumers decide to transfer their clothes to other parties or sell them at second-hand markets, they enter a new life cycle. The 'second life' of such a product starts from the distribution phase and moves on to another phase of use. The most complex process is closed-loop recycling, which consists of a complete recycling process of the products, from fiber to fiber. This model comes from the Cradle to Cradle philosophy, elaborated in 2002 by William McDonough and Michael Braungart in a research in which they conceptualized a world in which all waste and rejects can become "food" for new life cycles, just as it happens in nature. The main concept is that industry must conserve and make the best use of nature's ecosystems and biological cycles in the form of

[49] Tartaglione, C., & Corradini, S. (2013). Il fine vita dei prodotti nel sistema moda, Roma: Fondimpresa.

'technological metabolism', according to which all other post-use materials must return to the industry for reuse in production processes.

The effective management of end-of-life products is a rather complex issue; the disposal phase can be addressed through the recovery of functionality (reuse, remanufacturing) or the valorization of the content (recycling, composting) or finally without any recovery (landfill).

Although there is no single model for end-of-life management of a product that can apply to every single industrial sector, waste management is mainly based on two approaches: proactive and reactive. The first refers to all measures taken to reduce or minimize waste at the source. The reactive approach includes waste management options that operate in response to the waste problem, at the point when the useful life of the product is over. The main difference between the two approaches is related to timing.

The end-of-life management of textiles is mainly supported by a reactive approach: the activities adopted to try to reduce waste are wide-ranging: from the materials used, to production methods, to changes in processes. Process changes play a decisive role both in the end-of-life management of fashion products and in the definition of a more sustainable fashion supply chain.

1.8 A new type of consumer

The new types of consumers, or neo-consumers, are both users and active participants in a complex dynamic of consumption, more inclined to make responsible choices and for this reason, also defined as consumer-actors. These are, in fact, LOHAS (Lifestyles of Health and Sustainability), that part of the population that is more attentive, critical in its purchases, and oriented towards sustainability. LOHAS are champions of anti-waste behaviors, such as attention to household resources or waste containment, and stronger supporters of alternative formulas to the use of owned cars, such as Car Pooling or Bike-Sharing services.

However, the eye of consumers is also becoming more vigilant in the clothing sector. According to the survey conducted by Ipsos MORI, a market research company in the UK, on behalf of Changing Markets Foundation10 and Clean Clothes Campaign, the majority of Italian consumers believe that clothing brands should take responsibility for the impact of their supply chains. For 82% of the sample, brands should provide information on the measures taken to reduce pollution and only 2 out of 10 respondents believe that consumers are adequately informed about the impacts that these supply chains have on the environment and the population. In addition, 2 Italians out of 3 (64%) are not willing to buy clothing whose production is associated with pollution and for 72% brands should ensure that their production and distribution sustainably takes place, as well as ensuring decent working conditions for employees.

In support of these data, there is also the survey I conducted which confirms the growing interest in sustainability and eco-sustainable living, regardless of age group. In fact, in contrast to the idea that the baby boomer generation has little interest in sustainability, my survey shows that in terms of interest in various environmental issues (air pollution, waste of resources, waste separation, and control of the product chain) their category is the most interested in 3 out of 4 issues.

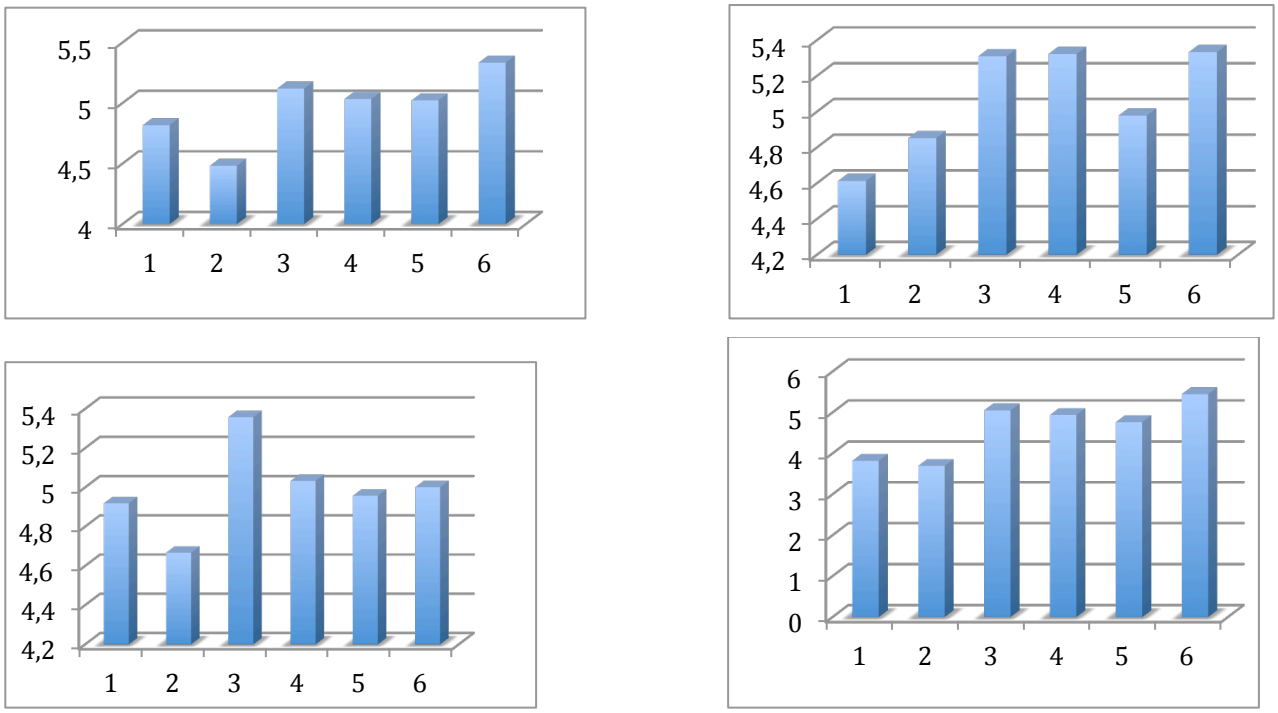

Figure 13 Clockwise graphs: atmospheric pollution, waste of resources, separate collection, control of production chain (Legend: 1=U34W; 2=U34M; 3=35-54W; 4=35-54M;5= Over55W; 6=Over55M)

The fact that they are interested in the topic of sustainability does not, however, limit their purchasing options to only sustainable products over 80% of respondents say they think about the sustainability of a product before purchasing it but do not therefore only purchase sustainable products. Furthermore, since over 85% of the sample analyzed states that they learn about the sustainability of a product through its label, almost all purchases of sustainable products are made physically in-store. From the point of view of disposal, it can be said that garments that are no longer used are not wasted. The answers are divided into 7 out of 10 people who donate to charities and the rest to friends and relatives. Finally, it is interesting to see how the idea of providing an incentive to properly dispose of waste products, from the garment itself to the packaging in which it was, has a satisfaction index of 84%. The big brands can no longer count on unquestioned trust but must take into account, on the part of those who buy, an increasingly critical eye on aspects concerning the environment, health, and conditions of workers.

This is an in-depth market survey of consumer perceptions of environmental and labor standards in the apparel industry. The survey reveals that consumers expect brands to take responsibility for what happens within their supply chains and demand greater transparency regarding both working conditions and environmental compliance. The results of the survey all point towards a clear change in mentality on the part of consumers, who are asking for a greater assumption of responsibility on the part of the industry and more information.

Ethical fashion, in conclusion, does not mean goodness, but also business opportunities. Also according to McKinsey "more than 65% of consumers in emerging markets, China and India in primis, and 32% of consumers in Europe and USA, actively research before their purchases and are interested in

sustainable fashion[50]". About 20% of them could translate this interest into a purchase decision, making sustainability one of the criteria used to choose what to buy and how much they are willing to pay.

50 https://www.vogue.it/vogue-talents/news/2018/03/01/brand-sostenibili-influencer-moda-green-emma-watson

2. Environmental laws in the fashion world

2.1 International laws

2.1.1 Introduction

In 2021, the textile industry faces increasing global pressures on climate disclosure, green marketing, and human rights. The increased focus on the environmental footprint of the textile and fashion industries suggests greater regulatory and enforcement controls in 2021, climate disclosure, environmental marketing, and human rights in the supply chain. Apparel manufacturers, retailers, and textile manufacturers will be most directly affected by these rising trends. Ultimately, industries whose work depends in some way on textile manufacturers - as suppliers or customers - will be affected. Early attention to these issues would be prudent, given that green disclosure and marketing requirements could go into effect as early as January 2022. Manufacturers and retailers should:

- Proactively assess and address their exposure concerning global disclosure requirements and track the evolution of requirements in key markets.
- Work with cross-functional teams, including marketing and in-house legal, other than reviewing all externally-facing environmental statements to avoid misleading consumers, ensure accuracy, and reduce enforcement risk.
- Ensure effective oversight of supplier practices and sufficient supply chain transparency to assess and meet human rights obligations.

Over the past decade, the textile industry has faced increased scrutiny from regulators, investors, and customers due to its significant environmental footprint and the high costs of producing, shipping, and selling textiles worldwide. All signs suggest that this trend is likely to intensify, concerning:

- requirements for greater supply chain transparency and mandatory climate-related information;
- enforcement against misleading environmental and sustainability claims;
- stronger measures to combat human rights abuses in the textile supply chain.

Globally, climate-related disclosures are increasingly changing from voluntary to mandatory, recognizing the importance for investors to understand companies' climate risks and environmental impacts.

The United States may be next in line to follow this trend. The Biden administration has announced its intention to require "public companies to disclose climate risks and greenhouse gas emissions in their operations and supply chains," presumably by modifying current U.S. Securities and Exchange Commission reporting requirements. Disclosures should be mandatory, rather than part of a voluntary sustainability disclosure framework.

Similar changes are at play in Europe. The European Union (EU) Textile Strategy seeks to increase transparency and incorporate reporting requirements related to the textile industry. In November 2020, the United Kingdom (UK) Chancellor of the Exchequer announced that the UK will require certain companies to improve their climate risk reporting, with reporting periods beginning in January 2021. The reporting rules will likely be aligned with the recommendations of the Task Force for Climate-Related Financial Disclosures (TCFD). Mandatory economy-wide climate risk disclosure rules are expected to take effect by 2025. In

addition, the EU released its Circular Economy Action Plan in March, identifying textiles as the "fourth highest-pressure category for primary raw material and water use, after food, housing and transport, and the fifth-highest for greenhouse gas emissions."[51] In addition to releasing a strategy for textiles in 2021 to improve circular practices, increase transparency and reduce waste, the action plan anticipates the Commission's intention to "improve the disclosure of environmental data by companies in the next revision of the [EU Non-Financial Reporting Directive (NFRD)]," also in 2021.

While the fashion industry faces growing demand for "green" and "sustainable" products, it also faces an increase in consumer protection litigation and law enforcement for making misleading environmental claims about their products.

Over the past decade, the U.S. Federal Trade Commission (FTC) has brought enforcement actions against several national retailers such as Nordstrom, Bed Bath & Beyond, and Macy's for labeling and advertising their products as being made of bamboo, an eco-conscious material, when the products were made of rayon. In May 2019, the U.S. Department of Agriculture (USDA) released a report detailing the many enforcement activities its National Organic Program has undertaken against manufacturers who deceptively label their products as "organic." Citizen groups are also joining the fray, filing complaints against companies for failing to comply with the FTC's green marketing guidance (known as the Green Guides, 16 C.F.R. 260 et al.).

On December 14, 2020, Greenpeace sued Walmart on these grounds in California State Superior Court, alleging that Walmart employs "unlawful, unfair and deceptive" advertising and marketing of certain products by marketing their products as recyclable, when in fact, consumers do not have access to recycling programs that accept the products, meaning the products go to a landfill.

Internationally, the EU environment commissioner described textiles as the "new plastic" in March 2020, noting that new rules (as part of the aforementioned Circular Economy Action Plan) will require clothing labels to disclose information about the resources used in production, holding customers accountable through greater supply chain transparency.

In November 2020, the EU released its New Consumer Agenda, emphasizing the importance of protecting consumers against greenwashing and proposing that companies substantiate environmental claims using Product and Organization Environmental Footprint methods. Also in November, the U.K.'s Competition and Markets Authority (CMA) announced that: (1) will begin investigating "eco-friendly" claims to determine whether consumers are being misled, and to potentially develop new consumer protection legislation; and (2) will work with the Consumer and Markets Authority in the Netherlands and the International Consumer Protection Enforcement Network to publish new guidance for companies on environmental claims.

In addition to growing disclosure requirements and the need for supply chain transparency to substantiate environmental claims, textile and fashion industries face increasing human rights requirements

[51]Circular Economy Action Plan https://ec.europa.eu/environment/strategy/circular-economy-action-plan_de

for market access.

In November 2020, U.S. Customs and Border Protection (CBP) took action to address human rights violations in textile manufacturing supply chains by issuing a Withhold Release Order (WRO) for cotton and cotton products from Xinjiang Production and Construction Corporation (XPCC) and its subordinate and affiliated entities. According to CBP's press release, CBP issued the WRO against cotton products manufactured by XPCC "based on information reasonably indicating the use of forced labor, including prisoner labor." The WRO applies to all cotton and cotton products produced by XPCC and its subordinate entities, as well as "all products that are made in whole or in part from or derived from cotton, such as clothing, garments, and textiles."[52]

The November WRO followed a series of other similar WROs targeting state-sponsored forced labor in the Xinjiang Uyghur Autonomous Region that may impact textile and fashion industry supply chains. In September 2020, CBP issued five WROs involving hair products, apparel, and cotton. In addition to the WROs issued by CBP during 2020, CBP made its first forced labor discovery since 1996, also targeting products originating in the People's Republic of China. Although the discovery is not directed toward a textile or fashion company, CBP's recent actions further suggest that the agency is increasingly focusing on forced labor issues and will continue to do so in the coming year.

The trend toward increased oversight, control, and enforcement of the fashion and textile industries through disclosure, crackdowns on deceptive marketing, and enforcement of human rights protections will continue in 2021. These trends are global, exemplified by the examples above. Given the many changes to come, stakeholders in the U.S. textile and fashion industry should continue to closely monitor legislative, regulatory, and enforcement developments, particularly with respect to the Biden administration's direction on mandatory non-financial disclosures, the expansion of green marketing enforcement by the FTC, and further human rights-related actions by CBP. In addition, ensuring effective oversight and accountability of providers will help address potential compliance risks, especially for new requirements that could prevent access to key markets such as the EU.

Finally, the same oversight and transparency of the supply chain will allow stakeholders to ensure that all environmental marketing claims are accurate, avoiding potential exposure for consumer protection enforcement.

2.1.2 Relationship between the SDGs and the fashion industry[53]

In 2015, all member states of the United Nations came together to create a "universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030." The 2030 Agenda for Sustainable Development contains the 17 Sustainable Development Goals (SDGs) which create a holistic guide to achieving the UN goals. According to the SDGs, the fight for human rights and the fight for

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52 FACT SHEET: New U.S. Government Actions on Forced Labor in Xinjiang https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/24/fact-sheet-new-u-s-government-actions-on-forced-labor-in-xinjiang/

53 Sustainable Development Goals, https://sdgs.un.org/goals

the health of our planet must go hand in hand, which is why the SDGs cover topics ranging from ending poverty to revitalizing biodiversity. In recent years, a belief is developing that fashion must integrate efforts to protect the environment and the people who work in supply chains to truly be a sustainable industry. With this in mind, it is interesting to see how the SDGs fit together to make the fashion industry more sustainable.

-Goals 1 through 4 speak to us basic principles such as no poverty, zero hunger, good health and well-being, and quality education. The goal is to end poverty in all its forms everywhere, by ending poverty we could end hunger, by achieving food security and better nutrition, and finally by promoting sustainable agriculture. Eating healthy would ensure that we live healthy lives and ensure the well-being of everyone at all times. Finally, ensuring inclusive and equitable quality education by promoting lifelong learning opportunities for all would provide the opportunity to achieve the above points. How can fashion build rather than destroy the regions where clothing is produced? Brands should partner with the industries representing their supply chains to improve their quality of life, instead of exploiting them for cheap labor. Fair wages, documented hours, and producer wellness programs are essential to leveling the playing field between brands.

-Probably one of the most talked-about topics in recent years, **Goal 5** which deals with gender equality reads, "Achieve gender equality and empower all women and girls." Regardless of whether they are public or private, everyone wants to be on the "right side of history." Unfortunately, looking at the data shows how what is preached is not instead put into practice. The 2018 New York Times article "Fashion's Woman Problem" reports that 85% of fashion design graduates are women. Yet, upper management continues to be overwhelmingly controlled by men.[54] And this remains consistent at the other end of the supply chain. Across the globe, the majority of factory managers, supervisors, and owners are men. Women continue to be excluded from the collective fashion consciousness, even though they are the backbone of the industry. Major female fashion personalities have tried to shake up this trend by sharing their stories with the hashtag #metoo, shedding light on the pervasive problem at all levels of the industry. In many industries, but especially in fashion, the wealth disparity between the women who make clothes and the companies that sell them is shocking. Companies need to close the gap and provide apparel workers with fair wages.

-Goals 6 and 7 speak to our natural and fundamental resources: clean water and sanitation and affordable, clean energy. Reading them carefully they enunciate to: "Ensure the availability and sustainable management of water and sanitation for all"; and "Ensure access to affordable, reliable, sustainable and modern energy for all." It seems obvious, but in any industry, and especially in seemingly beautiful fashion, production occurs through reckless pollution and inhumane working conditions around the world.

-Within the fashion world, we can treat **goals 8 and 10** as a single block, they speak of similar, or rather complementary topics: Decent work and economic growth and reduction of inequality. Or to put it in the same words as the 2030 Agenda: "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all"; "Reduce inequality within and between countries".

[54]Friedman V., NY Times, 2018, https://www.nytimes.com/2018/05/20/fashion/glass-runway-no-female-ceos.html

-Goal 9 focuses on innovation and infrastructure: "Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation." Like most modern industries, technology is playing an increasing role in fashion. As there is a growing demand for greater efficiency, human labor continues to be replaced by automation. While new technology provides greater economies of scale and sustainable solutions in some cases, how do we ensure that workers are not disenfranchised in the process? To combat widespread job loss, the industry must commit to training employees from the factory floor to more skilled positions within companies.

-Goal 12 talks about responsible consumption and production; in fact, it is designed to "Ensure sustainable consumption and production patterns".

There must be an awareness on the part of both the brands that produce fashion and the customers who consume it, as they need to recognize their role in causing environmental and human damage. Fashion needs to take a step back from the oversupply of clothes and rethink the system as we know it. I believe that to transform fashion into a force for good, it will take the action of individuals, companies, and governments not taken as individual entities but together as a united whole.

-Goal 13 was created for climate protection, in particular, it aims to "Take urgent action to combat climate change and its impacts". Nowadays, we are all well aware of the direct connection between climate change and the fashion industry. We know that the industry involves many other carbon-intensive industries (such as agriculture and transportation) that harm our environment. Consumers must take care of their clothes after purchase, it is important for the industry, in general, to make it easier for individuals to participate in a sustainable fashion.

-Goal 14 was created to protect life underwater, "To conserve and sustainably use the oceans, seas and marine resources for sustainable development". It's not widely known but every time a synthetic garment is washed, microfibers, also known as microplastics, are released into the water. These microplastics end up in our oceans, in the seafood we eat, and even in the rain.

-Goals 11 and 15 arise intending to make cities and communities sustainable, but if possible the whole of life on earth by making cities and human settlements inclusive, safe, resilient, and sustainable and protecting or sometimes restoring and promoting the sustainable use of terrestrial ecosystems, sustainably managing forests, combating desertification, halting and reversing land degradation and also halting the loss of biodiversity. So often clothing production is out of sight and, unfortunately, out of mind.

-Goal 16 represents universal ideals such as peace and justice, the purpose is to "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable and inclusive institutions at all levels." Fashion can no longer be a passive consumption industry without consequences.

-Goal 17 was created to promote partnerships to achieve the goals by strengthening the means of implementation and revitalizing global partnerships for sustainable development. But what can fashion do to be an example of collaborative sustainable development? A good start is the various collaborations and

industry pacts that have been formed over the years, but there is still a long way to go.

2.1.3 Charter for Climate Action in the Fashion Industry

The Charter, which is open for other companies and organizations to join, recognizes the crucial role that fashion plays on both sides of the climate equation: as a contributor to greenhouse gas emissions and as a sector with multiple opportunities to reduce emissions while contributing to sustainable development.

The Charter aligns with the goals of the Paris Agreement and contains a vision for the industry to achieve net-zero emissions by 2050. In it, several issues are addressed which will then be addressed by signatories, issues range from decarbonizing the manufacturing phase, selecting climate-friendly and sustainable materials, low-carbon transportation, improving consumer dialogue and awareness, working with the financial community and policymakers to catalyze scalable solutions, and exploring circular business models. To make concrete progress on these commitments, six working groups have been established where signatories will work to define implementation steps. The signatories are not waiting for these issues to be fully worked out and have set an initial goal to reduce their aggregate greenhouse gas emissions by 30 percent by 2030 and have defined concrete measures, such as phasing out coal-fired boilers or other coal-fired heat and power generation sources in their companies and direct suppliers from 2025.

"The fashion industry is always two steps ahead when it comes to defining global culture, so I am pleased to see that it is now leading the way in terms of climate action as well," said UN Climate Change Executive Secretary Patricia Espinosa. "I congratulate the signatories of this important charter, which represents a unique commitment and collaboration of a range of fashion leaders. The charter, like the world's renowned fashion runways, is an example that I hope others will follow."[55]

Over time, the list of signatories to the apparel industry Charter for Climate Action, the document that formalizes the commitment of several fashion companies to the Paris climate accords, has lengthened. However, at the moment, it highlights an important absence: that of Italian luxury. In fact, since yesterday, among the companies that support the commitment of the United Nations there is also Nike, number one in the world of sportswear, the 'Italian quota' is entrusted only to Pidigi from Verona, a supplier of materials, accessories, and components for the textile industry with a turnover of about 45 million euros. Missing, however, are the highest names of fashion made in Italy, although some of the latter are present indirectly, as they are controlled by the Kering group, which signed the UN document in December 2018. The Italian absence is also reiterated on the front of associations, in whose list there are no made-in Italy bodies. The Italian distance from a project such as the Apparel Industry Charter for Climate Action should not necessarily be understood as evidence of delay in the comparisons of sustainability. On the contrary, mere adhesion to international task forces or networks can often be counterproductive, if not accompanied by a structural commitment. However, in this case, the absence clashes with the many public commitments launched by companies and associations made in Italy.

The Apparel Industry Charter for Climate Action, a reflection of the United Nations Convention on

[55] 'Fashion Industry Charter for Climate Action' at the UN Climate Change Conference, 2018

Climate Change, was drafted in 2018 by companies and organizations that identified action guidelines to reduce the environmental impact of the textile and apparel industry. The primary goal, which affects member companies, is to become "net-zero emissions" players, meaning zero greenhouse gas emissions, by 2050. This document was launched at COP24 on climate in Katowice, Poland, at the end of last year. Nike, which is among the most recent signatories, is aiming for a 30% reduction in greenhouse gas emissions from its plants by 2030, and then moving in a carbon-neutral direction by 2050. "Issues as broad and complex as climate change require us to collaborate across our industry and beyond,"[56] Noel Kinder, Nike's chief sustainability officer, said in a press release. To date, the swoosh giant is already a member of the United Nations Global Compact, an agreement that promotes sustainable business development, and has linked its name to the RE100 global initiative, which involves 160 companies worldwide and monitors the use of renewable energy. Nike's membership further reinforces the incidence of sportswear in the apparel industry Charter for Climate Action, which already includes, among others, Adidas, Salomon, Peak Performance, VF Corp, New Balance, and Puma. Representing the high-end are Kering, Burberry, Hugo Boss, and Stella McCartney, while fast-fashion sees the presence of both competitors Inditex and H&M. Among the best-known names in the world of jeans, on the other hand, are Levi's and Denim Expert Limited. Finally, the case of The RealReal is interesting: last April, on the occasion of Earth Day, it was the first company in the resale market to join the initiative. The Apparel Industry Charter for Climate Action now frames a formal obligation that aims to be gradually measurable. In addition to significantly reducing their greenhouse gas emissions, signatories have pledged to use low-impact materials and to quantify, track and publicly report their emissions. They also said they will work with experts to structure a decarbonization pathway for the entire fashion industry. In luxury, to date, the green philosophy has focused on the multiple farewells to the use of animal fur or exotic skins: this has been announced by, for example, Chanel, Prada, Jean Paul Gaultier, Gucci, Armani, and Versace.

It is still difficult, however, to get an accurate picture of the environmental commitments that have translated into reality. Despite frequent declarations, a recent report by Global Fashion Agenda, Boston Consulting Group, and Sustainable Apparel Coalition highlighted how the fashion industry's efforts to reduce its impact are not growing fast enough to offset the impacts of its development has on the environment and the workforce. Although the industry's social and environmental performance has improved over the past year, the speed of this progression has slowed "by about a third."[57] Improvements would mostly come from brands that are laying the groundwork for their sustainability strategy, setting primary goals, and better governance. Slowing down, on the other hand, would be the solutions of large companies that have already taken the first steps and are now called upon to make the changes implemented more systemic.

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[56] 'Fashion Industry Charter for Climate Action' at the UN Climate Change Conference, 2018

[57] La moda parla green, anche Ralph Lauren presenta il suo piano di sostenibilità, Redazione, Pambianco news, 13/06/2019, https://www.pambianconews.com/2019/06/13/la-moda-parla-green-anche-ralph-lauren-presenta-il-suo-programma-di-sostenibilita-264021/

2.1.4 Fashion Pact: the commitment of leading companies to sustainability

The signing of the Fashion Pact is changing and will continue to change the landscape of the fashion and textile industry, with important consequences for large and small companies on the competitiveness of their products. An agreement promoted in April 2019 by French President Macron and François-Henri Pinault, president and CEO of Kering, the Fashion Pact unites more than 60 leading fashion and textile companies committed to halting global warming, restoring biodiversity, and protecting the oceans. Hailing from 14 countries, they represent over 200 brands and one-third of the total fashion industry. The primary objective is to achieve carbon neutrality by 2050. By 2025, the companies are committed to obtaining a 25% supply of raw materials with a low environmental impact and to achieving a percentage of 100% renewables by 2030.[58]

Regarding the use of sustainable materials, they commit to adopting certifications such as "Fair Trade Certified" and the "Better Cotton Initiative," the largest cotton sustainability program in the world. Among synthetic materials, companies are expected to favor recycled polyester and nylon. Similarly, certifications are also envisaged for natural fibers and in particular for animal fibers. Among the most active companies within the Pact, Prada and Moncler deserve special mention. Prada has launched an entire collection, Prada Re-Nylon, entirely in regenerated nylon thanks to the recycling of textile scraps and plastic material collected from oceans and landfills. Moncler is striving to use recycled nylon for 25% of its products by 2025.[59]

Regarding the use of renewable energy, several companies are already taking individual initiatives to reduce greenhouse gas emissions. Sustainability experts support companies in their decision-making and reporting processes to efficiently achieve these ambitious goals. This concept fits perfectly with the idea behind the Fashion Pact: creating shared goals, generating collective change. Other fundamental themes are the safeguarding of endangered species and the protection of endangered habitats. According to a United Nations research, about one million species are in fact at risk of extinction, while 75% of the earth's surface has been significantly altered, contributing to modifying ecosystems and reducing biodiversity.

The actions in this field are multiple: companies will have to develop an action plan and form collaborations with different partners to support the technical part, based on scientific analysis. Nature of Fashion has also been organized, a series of webinars together with leading experts on supply chain mapping for biodiversity and the development of common strategies to address the problem. Companies are committed to zero deforestation and achieving sustainable management of the world's forests by 2025. Burberry has implemented a program to improve soil carbon storage and promote habitat diversity; Kering is working in French Guiana to reforest a former mining site. From the perspective of competitiveness, the message that emerges from the Fashion Pact is clear: leading companies in the sector are making concrete commitments to a global problem, helped by growing consumer demand for ethical and low-impact products and the

[58] Fashion Pact, https://thefashionpact.org/?lang=it

[59] Moncler, Product and Innovation, https://www.monclergroup.com/en/sustainability/think-circular/product-and-innovation

emergence of new business models (such as second-hand goods) that will change the future of fashion. To remain competitive, companies in the industry, from SMEs to the largest along with the entire supply chain, will need to commit to integrating sustainability strategies into their practices, quickly.

2.1.5 The Sustainable Apparel Coalition

SAC is a global, multi-stakeholder nonprofit alliance for the fashion industry. More than 250 leading apparel, footwear and textile brands, retailers, suppliers, service providers, trade associations, non-profits, NGOs, and academic institutions made up this coalition, working to reduce environmental impacts and promote social justice throughout the global value chain.

The most important tool developed by the coalition is the Higg Index, a suite of tools that standardizes value chain sustainability measures for all industry participants. This tool measures the environmental and social impact of work across the value chain. With this data, you can identify hot spots, continuously improve sustainability performance, and achieve the environmental and social transparency that consumers demand. The advantage of a coalition lies in the fact that by joining forces, you can address urgent and systemic challenges that are impossible to change on your own. The Sustainable Apparel Coalition's vision is for a global consumer goods industry that gives more than it takes to the planet and people.

Underlying the SAC are guiding principles:[60]

- **It is advisable and probably more effective to build on the best of existing work rather than start with a blank page**; in fact, the coalition began by adapting an "Eco-Index" that had been developed over several years by the Outdoor Industry Association, whose members include Patagonia, REI, and Timberland. Similarly, they relied on Nike's data, which proved invaluable.

-It's important not to get too hung up on the details, sometimes in fact you have to not let perfection get in the way of sufficiency. The group decided to make progress through rapid prototyping: push forward, test ideas, renew them, test them again, but don't lose momentum.

-It's important to discuss and then decide, but don't wait for agreement on every detail: if principled or overriding goals emerge, those issues are addressed. Otherwise, the coalition moves forward.

The coalition is the brainchild of the CEOs of Walmart and Patagonia, who wrote a joint letter inviting CEOs of major global companies to join together to develop an index to measure the environmental impact of their products.

In 2010, apparel industry competitors come together to begin collaborative work on the Higg Index - the birth of SAC. In 2011, the first version of the Higg Index is released. In 2012, Nike donates the Nike Considered Index to SAC. The Higg index then becomes the Higg Materials Sustainability Index, now one of the tools in the Higg Index suite. In 2016 The Sustainable Apparel Coalition continues to grow, coming to represent members of the apparel, footwear, and textile industries with combined annual apparel and footwear sales exceeding $500 billion. Already, as of 2017, more than 10,000 customers worldwide are using the Higg Index. The Higg Index seemed destined to become the new tool for measuring environmental and social

[60] The Sustainable Apparel Coalition, https://apparelcoalition.org/

impact for the fashion industry, in an industry that is still searching for a common language to hold consumers accountable for product sustainability in straightforward several ways. Then, a few days ago, H&M first activated the Higg Index Sustainability Profile test on some garments present in its European and US e-commerce, and, right on time, the controversy arrived: the big brands are not recognized by consumers as champions of sustainability. In fact, in recent months several doubts have arisen among insiders about the effectiveness of the measurements made by this tool, which heavily penalizes natural raw materials and rewards synthetic ones. The SAC, Sustainable Apparel Coalition, which promotes it, has taken action by preparing a document on the "false myths" of the Higg Index.

The Higg Index is a measurement tool for the textile, apparel, and footwear sectors developed by the Sustainable Apparel Coalition to measure social and environmental impacts. There are different versions of the Higg Index, designed for those who produce materials or those who work along the production chain. And then there's also one for retail, **the Higg Brand and Retail Module**, which measures the environmental and social impact of a brand's products, from materials to workforce conditions and recyclability. The one that has been active the longest and thus has been populated with the most data is the Higg Material Sustainability Index (MSI). "Higg MSI is a resource for designers, product developers, and analysts to understand the costs, benefits, and tradeoffs of different materials that serve the same functional purpose (e.g., comparing a recycled fiber to its conventional version)," [61] reads the official website. MSI looks at environmental impacts including water use, global warming potential, fossil fuels, and water pollution. Nothing is provided on the social side in this set of measurements, thus also promoting a concept of sustainability that considers only the choice of materials and nothing about the garment production chain, its environmental impact, and respect for workers' rights.

Sustainability that is based only on raw materials is a ridiculous endeavor. The Higg Index Sustainability Profile shares information and data on the environmental impact of a product's materials compared to conventional alternatives. Each product is given a score from "basic" to "3" based on the environmental impact of the materials in the product. Products that score level 3 are made from materials that have the lowest environmental impact compared to conventional materials. For each product, customers also have access to detailed impact information on water use, global warming, and fossil fuel use. In early 2023, the program will be expanded to incorporate social data about companies, aiming to become the first holistic system for communicating sustainability performance across a product's lifecycle. Or at least that's the plan. As I mentioned, to test the new tool for measuring Sustainable Profile, Sustainable Apparel Coalition decided to start with big brands like H&M, C&A, Amazon, and Zalando: brands that you'd struggle to take as examples of sustainability. For this reason, SAC has found itself at the center of numerous controversies, which it has decided to silence with an official document where it provides its version of the facts.

First of all, SAC is not a private consulting group based in San Francisco, as you can read in some blogs, but it’s a non-profit multi-stakeholder organization presents all over the world. It has 250 members and

[61] Higg Index, https://apparelcoalition.org/the-higg-index/

45% of them are brands and retailers; the others are manufacturing companies, NGOs, governmental associations.

The harshest criticism certainly concerns the judgment on materials: for example, SAC is accused of openly preferring polyester. The organization defends itself by saying that it has not built a system in which one fiber is preferred over another, but rather that it has put together a series of tools that allow for an objective evaluation of the impact of materials. The fact remains that natural fibers are always penalized compared to synthetic fibers in the index rating. For example, when the impact of CO2 emissions is taken into consideration, natural materials always have to deal with very high numbers. But other factors are not considered. The release of microplastics, which is not taken into account when measuring the sustainability of materials: the official answer is that the reference scheme of measurement is that of LCA (Life Cycle Assessment) does not provide for it and therefore was not included.

The point, however, is that the Higg Index does not measure the impact of materials "from cradle to cradle", i.e. from their production to the end of their life, thus also taking into consideration the various options for recycling and reuse of the fiber. The measurement is "from cradle to gate," i.e., all the way to the production of the garment. Here, then, is another reason why natural fibers are penalized. By the end of 2021, these factors should be taken into account. The silk industry has filed an official complaint that is being reviewed by the Federal Trade Commission (FTC) on how silk is wrongly rated by the Higg MSI.

The more visibility the Higg Index gains, the more penalizing the score assigned to naturally sourced materials becomes. The influence of the measurement made by the various tools of which the Higg Index is composed is destined to grow. The Sustainable Apparel Coalition is sitting at the main tables where new rules are being defined for the fashion industry, which is increasingly committed to dealing with the issue of sustainability. For example, SAC is part of the Technical Secretariat of the European Commission's working group that is developing EU product environmental footprint category rules for apparel and footwear.

Many times having an index that summarizes assessments is a shortcut to allow the consumer to better orient themselves, using a tool that could become commonly used. Provided, however, that the road leads into a happy glade, and not a treacherous forest.

2.2 Europe

2.2.1 Green Deal[62]

*Figure SEQ Figure * ARABIC 14 European Parliament Backs Green Deal https://resource.co/article/european-parliament-backs-green-deal*

The Green Deal strategy to combat global warming and foster the circular economy affects all sectors of the economy. Climate change and environmental degradation pose a huge threat to Europe and the world. To overcome this challenge, Europe needs a new strategy, a Green Deal for growth. We need to transform the Union into a modern, resource-efficient, and competitive economy with no net greenhouse gas emissions by 2050 and where economic growth is decoupled from resource use and no person or place is left behind.

The European Union can already boast solid results in reducing greenhouse gas emissions while maintaining economic growth. In 2018, emissions were 23% lower than in 1990, while the Union's GDP grew by 61% over the same period.

The European Commission led by Ursula von der Leyen has repeatedly said that its priority in its first years in office will be the **European Green Deal**. A series of measures to make energy production and the lifestyle of European citizens more sustainable and less harmful to the environment. With the ambitious goal of "transforming the European Union into a fair and prosperous society. And with a modern market economy where greenhouse gas emissions will be reduced to zero. And growth will be decoupled from the use of natural resources."[63]

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[62] A European Green Deal, https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

[63] European Publication, https://op.europa.eu/en/publication-detail/-/publication/f2587cfe-643d-11eb-aeb5-01aa75ed71a1

Formally, the European Green Deal is a "strategy". That is a series of different measures, including new laws and investments to be implemented over the next thirty years. Currently, the Commission has planned the first two years. These are the most important to set up a structure that can withstand such a complex project.

The European Green Deal covers all sectors of the economy, namely:

- transport
- energy
- agriculture
- construction and industrial sectors such as steel, cement, ICT, textiles, and chemicals.

The Green Deal will be financed, in the first ten years, with about 1000 billion euros. The estimate will become effective after the approval of the European Union's multi-year budget for the period between 2021 and 2027.

The main objective of the Green Deal is to contribute to limiting the increase in global warming, which according to the estimates of the Intergovernmental Panel on Climate Change (IPCC) of the UN must remain within 1.5°C compared to pre-industrial times. This is in order not to cause probably irreversible damage to the planet, with certain negative effects on the development of the human species. This limit was established by the Paris Agreements of 2015, under which the European Union committed to zero its net pollutant emissions by 2050 and to meet interim targets for 2030 and 2040.

The most important commitment in this scenario is to make electricity generation cleaner. This is believed to be responsible for 75 percent of greenhouse gas emissions in the European Union. Above all, this means boosting the spread of renewable energies and at the same time stopping incentives for the use of fossil fuels, which are still widely consumed, especially in Eastern European countries. And where the spread of renewable energies is still limited. In Poland, for example, 80% of electrical energy is obtained from coal.[64]

The other line of action is to make high-impact human activities more sustainable, and at the same time to protect and promote biodiversity. That is, protecting forests and animal species and spreading the circular economy, reserving a set share of European funds for sustainable initiatives.

For each Green Deal goal, the Commission will first release a "strategic plan" and then a "concrete action" aimed at achieving it. Measures of a legislative nature will include directives and regulations binding on nation-states. The measures currently under discussion are:

- The Climate Framework Act, a legislative basis for all measures that will follow in the coming years, which makes binding the goal of zero net emissions across the Union by 2050;
- the Just Transition Fund, the financial instrument for sustainable initiatives in Europe's most backward and vulnerable labor market and employment regions. Between 2021 and 2027, the Fund will mobilize about 100 billion euros, rising to 143 billion by 2030, drawn from existing European structural funds, state co-financing programs, interest-bearing loans from the European Investment Bank, and a portion of the InvestEU Fund.

[64] Poland, Energy sector, https://www.trade.gov/country-commercial-guides/poland-energy-sector

This will be followed by: measures for the new industrial strategy and the action plan on the circular economy, the "Producer to Consumer" strategy for a sustainable food policy, and proposals for a pollution-free Europe.

2.2.2 How much will the individual states receive?

The Eastern countries will understandably receive the highest share of funds concerning their population. Germany, the only Western country still largely dependent on coal, will receive two billion euros in funding. Italy will get 364 million, similarly to France and Spain.

According to the rules of the Fund, for every euro of the European Union, the national states will commit between 1.5 and 3 euros to co-finance sustainable industrial and infrastructure conversion projects. This will have to happen through territorial plans agreed between governments, regional companies, and local stakeholders.

Paolo Gentiloni, European Commissioner for Economic Affairs, has already specified that this money "can certainly concern Ilva, Puglia and the Taranto area"[65]. Legambiente on another side has proposed to use it to close and reclaim the coal-fired power plants in Sardinia.

It is still too early to understand what impact the European Green Deal will have on the environment. The challenge is played out mainly on the intermediate objectives and the 2030 deadline.
Environmentalists believe that to comply with the Paris Agreement, the European Union should cut its net emissions by 65% compared to 1990 levels. According to Legambiente with the measures recently adopted and with full implementation at a national level 45% will be reached; the new biodiversity strategy, which will increase the capacity of forests and woodlands to absorb pollutants, will add a potential 10%.

The results of the Eurobarometer survey on EU citizens' attitudes towards the environment confirm broad public support for environmental legislation at the European level and EU funding of environmentally friendly activities.

The EU will continue to promote its environmental goals and standards under the UN biodiversity and climate conventions and strengthen its "green" diplomacy. The G7, G20, international conventions, and bilateral relations will be used to persuade others to step up their efforts. The EU will also use trade policy to ensure sustainability, and form partnerships with neighboring countries in the Balkans and Africa to help them in their respective transitions.

2.2.3 European Convention Human rights[66]

Human rights are a fundamental part of international law: they are often enshrined in international conventions and treaties. Such agreements can be regional such as the American Convention on Human Rights, or universal, such as the International Convention on the Elimination of All Forms of Racial Discrimination promoted by the UN.

Often, such treaties set up courts or tribunals whose purpose is to judge possible violations that the

[65] TGR Puglia 14,01,2020
[66] European Convention for the Protection of Human Rights and Fundamental Freedoms
https://www.echr.coe.int/documents/convention_eng.pdf

State has committed against an individual, thus ensuring already within a treaty, or through an additional protocol, more effective and efficient protection of human rights. Sometimes, it is the international organizations themselves, for example, the United Nations, that stipulate a treaty and establish a control mechanism. This is what happened with the Council of Europe.

One of the most significant achievements of the Council of Europe was the conclusion of the **European Convention for the Protection of Human Rights and Fundamental Freedoms (ECHR)**.

The ECHR, signed in 1950 in Rome, came into force three years later and is one of the most important regional conventions in international law.

The Convention is divided into two essential parts: the first, dedicated to explaining the human rights protected, and the second, more procedural, which establishes the European Court of Human Rights and explains the mechanisms through which recourse can be had to it. The ECHR is also composed of numerous additional protocols, which have been ratified in subsequent years. The sixteen Protocols provide greater clarity on several issues, and in some cases have significantly altered the composition of the Court.

The Convention consists of 59 articles, of which the first fourteen (Title I) list and describe the rights protected. Article 1 ensures that the Convention applies to every person under the jurisdiction of the ratifying state: this means that the state must ensure that the rights listed in the Convention apply to anyone under its control, whether nationals or foreigners. The State also exercises jurisdiction over flagged aircraft or ships.

The rights guaranteed are manifold and cover different areas, such as, inter alia, the right to life, the right to be free from torture, the prohibition of slavery and forced labor, the right to privacy, the right to a fair trial, and freedom of thought, religion and conscience.

However, some rights may be subject to limitations. These limitations generally must be provided by law, necessary for a democratic society, national security, the maintenance of public order, and the protection of the rights and freedoms of others. There are therefore criteria, very often specific ones, that the State must meet before it can limit a right prescribed in the Convention.

Some rights are considered non-derogable and therefore cannot be suspended even in the event of a national emergency, such as the right to life (Article 2), the prohibition of torture and inhuman or degrading treatment or punishment (Article 3), the prohibition of slavery (Article 4) and the principle of legality (Article 7).

A fundamental concept that characterizes the **ECHR** is the **doctrine of the margin of appreciation**. Initially relegated to Article 15 of the Convention, which provides that member states may derogate from certain treaty obligations in cases of war or extreme danger to the country, this doctrine has become more far-reaching and used in other contexts.

Indeed, the Convention establishes standard criteria about human rights, but then leaves room for states to apply those rights in the domestic context. This discretion operates as an elastic band, which widens in favor of states when there is no significant consensus on an issue, and narrows when the subject matter is broadly covered and there is a general trend shared by the contracting parties.

The margin of appreciation has been harshly criticized by several scholars, as they believe that by giving so much power to the state, it can then 'silence' less shared ideas, thus compromising the essence of the right. Other scholars, however, believe that the margin of appreciation does not leave so much room for interpretation, since some criteria are well clarified by the Court's jurisprudence, and indeed assert that the existence of this doctrine is appreciable since it allows the State to apply human rights according to different legislative systems, thus ensuring more consistency.

As mentioned above, the second part of the ECHR (Title II) in Article 19 establishes the European Court of Human Rights, with permanent function and seat in Strasbourg. The Court is composed of several judges equivalent to the Contracting Parties, who hold office for nine non-renewable years. They must operate independently from the State. The Court is articulated in Single Judge, Committee of three judges, Chamber of seven judges, and Grand Chamber of seventeen judges.

As we have seen, the European Convention on Human Rights is a fundamental instrument of international law, from which several other regional conventions have been inspired, such as the American Convention on Human Rights. The ECHR is not without its problems, but on many occasions its work has managed to have a real impact on the legislation of member states, remaining one of the greatest achievements of the Council of Europe.

2.2.4 REACH and CLP

The EU legislator has made great efforts in the development of regulation, import, and industrial use of chemicals, which resulted in the approval of the so-called "REACH" and "CLP" regulations.

These are Regulation (EC) no. 1907/2006 of the European Parliament and of the Council of 18 December 2006, known as the REACH Regulation (acronym for Registration, Evaluation, Authorisation of Chemicals) and Regulation (EC) no. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labeling, and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) no. 1907/2006, known as the CLP Regulation. REACH pursues the objective of guaranteeing a high level of protection for human health and the environment, ensuring that companies are fully aware of the risks deriving from the industrial use of chemical products, while at the same time reinforcing the free movement of chemical substances in the single market and the growth of the European chemical industry. In other words, the subjective scope of REACH refers to those who manufacture or import chemicals or chemical mixtures, to allow the user of the finished product to know the raw materials of which it is composed. CLP, on the other hand, deals with specifying classification, labeling, and packaging obligations for manufacturers, to protect the end consumer.

A study was carried out by the Italian Textile Association[67] at the request of the European Commission DG Enterprise based on art. 25 of EU Regulation 1007/2011 has announced that "in collaboration with SIDAPA, the Italian Society of Professional and Environmental Allergological Dermatology, an

[67] Rosa Draisci (a), Tiziana Briancesco (a), Roberta Lavalle (a), Ludovica Malaguti Aliberti (a), Domenico Spagnolo (a), Silvia Tramontin (b), Filippo Trifiletti (b), Rapporti ISTISAN, 2020, Istituto Superiore di Sanità

epidemiological survey on textile dermatitis has been carried out. The current case series consisted of 401 patients, with an average age of 41.6 years (from 5 to 84 years); 270 of these were female (67.3%). Family and personal history of atopy were positive in 18.2% and 24.2% of cases, respectively. At the end of the diagnostic procedure, textiles were involved in 69.1% of patients, metal clothing accessories in 16.5%, and shoes in 14.4%. Relative to textiles, the contact was non-occupational in 88.8% of cases. DC is the most frequent clinical picture, which in the vast majority of cases has classical morphology (although the vesicle-exudative component is often not very evident), has prevalent localization to the trunk and lower limbs, when of non-occupational nature, and to the hands when observed in textile workers. The DC from fabrics has mainly allergic pathogenesis (especially in occupational settings) and is mostly caused by fabric dyes". Well, for the activity of the company in the fashion industry is not considered the cause of the above diseases with its products, it must report the use of chemicals considered hazardous by REACH, through notification to the European Chemicals Agency, and, specifically:

-carcinogenic aromatic amines;

-allergenic dyes;

-heavy metals;

-formaldehyde;

-Pentachlorophenols.

This list is to be considered as an example of the most dangerous existing substances and, to deepen any further profile of criticality of the substances used, the Rapex Alert System is useful: it is the Community alert system, established by Regulation (EC) n. 764/2008 of 9 July 2008, to quickly identify "dangerous products and thanks to which the national authorities of Member States notify to the European Commission the products (except for food, medicines and medical devices) that represent a serious risk to consumer safety".[68] This system operates through the National Contact Point, established at the Ministry of Economic Development, which has the task of receiving reports on the presence of hazardous chemicals in products on the market, to be able to intervene to eliminate risks to consumers. Well, the reporting to Rapex of the fact that a given product is composed of a dangerous substance must induce the company to eliminate this substance from its production cycle. Moreover, the clothing industry is subject to REACH also concerning the treatment of leather. Specifically, the operators of the sector are considered by the Regulation in the different capacities of downstream users, importers of articles, and producers of articles. Well, in the light of REACH and CLP regulations:

-downstream users must provide adequate information on chemicals used to the actor immediately preceding and immediately following the branch;

-importers and producers of articles must operate based on information received from downstream users and comply with the provisions on chemicals classified as hazardous in the Annexes of REACH and, in particular:

[68] Regulation (EC) n. 764/2008 of 9 July 2008

-verify the possible presence of hazardous substances by direct request to suppliers through a policy aimed at selection or through laboratory analysis;-make a notification to ECHA in case the substance is in a concentration higher than 0.1% and if the total quantity of imported article is higher than 1 ton/year; -verify the existence of restrictions on the use of certain substances such as nonylphenols, azo dyes that release aromatic amines, and other dangerous molecules. Punctual compliance with the above-mentioned duties protects the company from possible objections of violation of the REACH and CLP regulations, which may entail, as will be seen below, a charge of criminal responsibility.

The fashion and textile industries present "new" and significant risks of a possible violation of domestic and European regulations concerning the use of certain chemical substances in the production cycle. The opportunity offered by the legislator to industries in this sector, in particular with the introduction of the crimes of manslaughter, serious injury, and fraud in commerce into the catalog of offenses for the application of Legislative Decree 231/2001, is that of analyzing processes and verifying their internal control system to assess whether it is adequate for the new challenges presented by globalization, technological progress and the evolution of national and supranational regulations.

For example, the introduction of the case referred to in Article 515 of the Italian Criminal Code as an alleged offense is a disruptive new element: in fact, it is capable of including ad libitum any legislative change regarding the use of chemical substances (without the need for a novel intervention by the legislator), exponentially increasing the "corporate conduct" that can give rise to risks of administrative liability for the entity that has adopted it. If it is true, as it is true, what has just been saying, companies in the sector must further strengthen specific control measures relating to suppliers, providing that the same are identified through transparent market surveys and chosen from those who have a high rating of legality and reliability. Moreover, an internal procedure must be implemented to check that each substance used for the creation of the final product respects the measures required by the regulations in force and does not fall within the list of those prohibited for the correct development, production, and marketing of the product. Small and simple measures to be implemented within companies, which can prevent serious repercussions for them.

2.2.5 Textile Regulation (EU) No 1007/2011

Textile products placed on the EU market must mandatorily report their fiber composition. This matter is governed by EU Regulation no. 1007/2011 of the European Parliament and of the Council containing harmonized provisions on the use of textile fiber names and the labeling or marking of the fiber composition of textile products and repealing Council Directive 73/44/EEC and Directives 96/73/EC and 2008/121/EC of the European Parliament and the Council.

The Regulation came into force on 7 November 2011 and has been applied since 8 May 2012 in all Member States.

Within the European Union (EU) borders, textile products made available on the market must be accompanied by a label or mark indicating the exact fiber composition and the possible presence of non-textile parts of animal origin. The labeling or marking of fiber composition should therefore ensure that correct and uniform information is made available to all consumers in the Union.

Every single textile product (i.e. every single piece of clothing, carpet, cushion, curtain, etc.) must have a label or marking showing the fiber composition of the product.

Art. 14, the first paragraph, states that **"textile products shall be labeled or marked in order to indicate their fiber composition whenever they are made available on the market"**[69].

The label and marking must be durable, easily readable, visible, and accessible. In the case of a label, this must be firmly attached, therefore sewn, stapled, etc. in the case of a hanging tag, this must be firmly attached.

The label is applied directly to the textile product, for example through printing, embossing, sewing, embroidery, or selvage weaving.

The information on the label or marking must be visible to the consumer before purchase. This information must also be visible to the consumer if the purchase is made electronically.

The fiber composition to be reported on the label or marking must be drawn up using exclusively the names contained in Annex I of Regulation (EU) no. 1007/2011 of the European Parliament and the Council and subsequent additions. No abbreviations or codes may be used on the label. The labeling or marking shall be drawn up in the official language or languages of the Member State on whose territory the textile products are made available to the consumer unless the Member State concerned provides otherwise. Not all textile products are subject to the labeling obligation. The regulation provides that some types of products are excluded from the scope of application of the rule.

The following are excluded from the scope of application of Regulation (EU) no. 1007/2011 (art. 2, points 3 and 4):

- textile products given for processing to home-based workers or independent enterprises working from materials supplied to them without giving rise to a transfer for consideration;
- textile products made to measure by tailors acting as self-employed workers;

The categories of products for which there is no obligation to label the fiber composition (see Annex V, Regulation (EU) No. 1007/2011). It should be noted that, according to Annex V, point 13, of EU Regulation 1007/2011, used made-up textile products, provided they are explicitly declared as such, are not subject to the labeling obligation; categories of products for which it is possible to affix a "comprehensive labeling", and not of the individual piece, (see Annex VI, Regulation (EU) No. 1007/2011), provided that they are of the same fiber composition.

Art. 13 of EU Reg. 1007/2011 also provides for special provisions regarding the labeling and marking of certain textile products (see Art. 13 and Annex IV), among which are corsetry, embroidered textile products, velvet or plush textile products, etc.

The general rule providing for the compulsory labeling of textile products placed on the market provides for some exceptions and derogations.

The Community Regulation foresees that a textile product can be made available on the market

[69] EU Regulation no. 1007/2011

without the foreseen labeling if it is NOT intended for the final consumer.

It is foreseen that labels or markings may be replaced or completed by accompanying commercial documents when the products are not intended for the final consumer but supplied to economic operators in the supply chain (or when they are delivered in the execution of an order by a contracting authority, according to Article 1 of Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts, and public service contracts).

Again, however, textile fiber names and descriptions of fiber compositions must be indicated in accompanying commercial documents.

2.3 Italy: environmental regulations

The purpose of the environmental legislation is to protect the environment, which can be traced back to the need to preserve the beauty of the landscape from a cultural point of view, but also to defend the quality of life through specific environmental legislation that has as its sole denominator the fight against pollution and good governance of the territory.

The concept of environment is commonly identified with a series of rather heterogeneous phenomena and contexts, both natural and the result of the continuous transformation of the territory by man. However, only the objective of safeguarding the quality of life makes possible in the environmental legislation the univocal correspondence between the protection of human health and the protection of the environment (understood as territory, habitat, and landscape) through laws and decrees that, from the Constitution to the specific legislation on environmental protection, have defined the principles of environmental action and sustainable development and identified the procedures of environmental assessment for the implementation of plans, programs, and projects:

- EIA: Environmental Impact Assessment
- SEA: Strategic Environmental Assessment
- AIA: Integrated Environmental Authorization
- AUA: Single Environmental Authorization

The legislative references to environmental legislation are already present in the text of the Constitution of the Italian Republic.

The Constitutional Law n. 3/2001 reformed Title V, Part II of the Constitution. The environmental matter has become the object of a specific discipline in Italian environmental legislation. In particular, in art. 117 (paragraph 2 letter s), the legislator has referred to the protection of the environment, ecosystem, and cultural heritage as a matter expressly reserved to the State's legislation, while it remains to the concurrent legislation of the Regions and the State (paragraph 3) to promulgate environmental regulations on the subjects of health protection, the government of the territory, civil protection, protection, transport and distribution of energy, enhancement of cultural and environmental heritage.

For many years, the production of Italian legislation on environmental protection has remained blocked, leaving judges the only possibility to solve serious emergencies using as legislative references the

rules of the Civil and Criminal Code.

Only starting from the ‘80s, laws, and decrees in the environmental legislation increased, while in the '90s, as a result of numerous ecological accidents and strong EU influences, are issued ad hoc legislative decrees for the protection of water, the Framework Law n. 447/1995 on noise pollution, the Legislative Decree 22/1997, modified by the D.P.R. 120/2003 with specific rules for waste management.

The need to ensure valid environmental protection and the need for urgent adaptation to the legislative references of European legislation led to the issuing of Law no. 308/2004, which gave the Government the proxy for the reorganization, coordination, and integration of environmental legislation, a proxy that was implemented by Legislative Decree no. 152/2006, also known as t**he Environmental Code**.

The Environmental Code contains in a single body of legislation the rules on environmental matters divided into seven parts:

- Common provisions and rules of principle

-Procedures for strategic environmental assessment, environmental impact assessment, and integrated environmental authorization;

- Soil protection, combating desertification, water protection, and management of water resources;
- Waste management and reclamation of polluted sites;
- Air protection and reduction of emissions into the atmosphere;
- Protection of compensation for environmental damage;
- Regulations governing penalties for administrative and penal offenses (Part VI bis).

As stated in article 2 of the Code, all these sectors are regulated with the sole aim of "promoting the quality of human life [...] through the safeguarding and improvement of environmental conditions and the prudent and rational use of natural resources"[70], in compliance with the delegated law, the community system and the competences of the State, Regions and Local Authorities.

However, while collecting in an organic text all the legislation on environmental protection, the Code leaves out specific sectors to which it refers and which are regulated by other provisions, some of which have transposed EU directives:

- D. Lgs. 26 June 2015 n. 105 (implementing Directive 2012/18/EU) on the control of the period of major accidents related to hazardous substances;
- The Legislative Decree 14 March 2014 n. 49 (implementing Directive 2012/19/EC) on waste electrical and electronic equipment (WEEE);
- the Legislative Decree 13 August 2010 n. 155 (implementation of Directive 2008/50/EU) on the assessment and management of ambient air quality;
- Law no. 447 of 26 October 1995 (framework law on noise pollution) and Law no. 36 of 22 February 2001 (framework law on electromagnetic pollution).

A fundamental step in the evolution of environmental legislation is Law no. 349 of 8 July 1986, which

[70] Legislative Decree no. 152/2006

established the Ministry of the Environment. However, it is necessary to wait for the coming into force of Legislative Decree 112/1998, regarding the conferral of administrative functions and tasks of the State to the Regions and local authorities (in implementation of the delegation foreseen by Law no. 59 of March 15, 1997, "Bassanini one") to fully define the competences of the State in environmental matters, exercised by the Ministry, and to identify, with residual criteria, the functions of the Regions and local authorities.

Environmental legislation provides that the State, and therefore the Ministry, is responsible for the tasks listed in art. 69 of Legislative Decree 112/1998:

- the fulfillment of commitments undertaken in the international and community field;
- the conservation and enhancement of protected natural areas;
- the drafting of the general report on the state of the environment and the adoption of the nature charter;
- technical support;
- the setting of limits, standards, quality, and safety objectives throughout the national territory;
- the protection, safety, and observation of the quality of the marine environment;
- the drawing up of the list of huntable species and their variations;
- the protection of the terrestrial and marine fauna and flora;
- special interventions for the protection of the environment;
- the tasks of supervision, surveillance, monitoring, and control;
- duties of direction and coordination of activities
- tasks connected with the exercise of state powers according to art. 18 of Law 349/1986 (repealed except paragraph 5).

Also as a result of the changes in environmental legislation following the reform of Title V of the Constitution made by Constitutional Law n.3/2001, the Ministry of the Environment and Protection of the Territory (established by art. 35 of Legislative Decree 300/1999) is assigned "the functions and tasks pertaining to the State relating to the protection of the environment, the territory, and the ecosystem", powers extended and detailed by the subsequent Environmental Code.

Today the Ministry, following Law no. 233 of 17 July 2006, has been renamed Ministry of the Environment and Protection of the Territory and the Sea and is divided into the Ministry's Offices of direct collaboration and 7 General Directorates, coordinated by a Secretary-General. Within the Ministry, there are support bodies for environmental protection activities (D.P.R. May 14, 2007 n. 90), and the Corps of Harbour Offices Marine Environmental Department and the Carabinieri Command for environmental protection depend on the Ministry.

According to what is stated by the Constitutional Law 3/2001, the competencies of the Regions in environmental matters are linked to the concurrent legislative power concerning the valorization of the environmental goods and the government of the territory. The regions can:

- Participate in decisions directed to the formation of regulatory acts;
- provide for the implementation and execution of international agreements and acts of the European Union;

- conclude agreements with States and understandings with territorial bodies within another State, in the forms and cases governed by state laws.

With D. Lgs. 112/1998, which implements the so-called administrative decentralization, functions, and tasks in the field of environmental protection are partly reallocated in favor of Regions and Local Authorities. In particular, besides the general functions (art. 69-70), the competencies of the regions in environmental matters are identified through specific functions conferred to Regions and Local Authorities in the field of water pollution (art.79-81), acoustic, atmospheric, and electromagnetic pollution (art. 82-84), waste management (art. 85) and water resources and soil defense (art.86-92).

Another body envisaged by environmental legislation, with legal personality under public law, is ISPRA, **the Superior Institute for Environmental Protection and Research**, established by decree-law converted into Law no. 133/2008. ISPRA is subject to the supervision of the Ministry for the Environment, Land, and Sea, is based in Rome, and absorbs the functions that were APAT, INFS, and ICRAM. The institutional tasks of this body concern the activities of strategic consultancy, research, technical-scientific assistance, cognitive, monitoring, and evaluation, as well as information and training in environmental matters.

Finally, Law no. 61/1994 provided for the establishment by the Regions and Autonomous Provinces of Trento and Bolzano of **Regional and Provincial Environmental Agencies** (ARPA). The competence of the agencies in environmental matters is related to the development of technical and scientific activities for the environmental protection of regional interest and further technical activities of prevention, supervision, and control identified by the Regions and Provinces.

ISPRA and ARPA are part of the **National Network System for Environmental Protection** (established by Law No. 132 of June 28, 2016), which implements the essential levels of technical environmental performance.

Man's intervention on the environment with the realization of large public and private works brings with it the problem of their impact on the environment, from which derived the need to submit the projects themselves to specific environmental assessment procedures, including the environmental impact assessment (EIA) which had already been dealt with by the European Community with dir. dir. 85/337/EEC and dir. 2011/92/EEC.

With Directive 2001/42/EC of the Council of Europe, the Strategic Environmental Assessment (SEA) was introduced into Community law.

EIA and SEA are dealt with in Part II of the Environmental Code, together with the environmental assessment procedures for issuing AIA (integrated environmental authorization) and AUA (single environmental authorization).

The environmental impact assessment (EIA) aims to protect human health, contribute to the quality of human life with a better environment, provide for the maintenance of species, and preserve the ability of ecosystems to reproduce.

The environmental legislation provides that the object of the EIA are all projects that may have significant environmental impacts, with the exclusion of those interventions having as their sole objective the national defense or to be implemented in response to emergencies involving civil protection.

The competent authority for projects subjected to EIA at the state level is the Ministry of the Environment and Protection of Land and Sea, while for those subjected to EIA at the regional level, the environmental legislation provides that the competent authority is the public administration, according to the provisions of regional laws or autonomous provinces.

This is a process that involves several stages:

- the verification of subjectivity to EIA (screening), a preliminary procedure by the proponent that consists in the transmission to the competent authority of a preliminary environmental study to assess possible environmental impacts. At the end of the verification, the authority within 60 days issues a measure (in case of a positive outcome), or (in case of negative outcome) the authority specifies the conditions necessary to avoid or prevent significant environmental impacts;
- the environmental impact study, a series of documents to be prepared by the proponent according to the indications of Annex VII of the Environmental Code; the study can also be prepared following a prior consultation phase (called scoping) of the proponent with the Authority to define the scope of information and methodologies to be adopted and on which the Authority will express an opinion (art. 21);
- the presentation of the request and the start of the EIA procedure, sent in electronic format with all the project elaborates, the environmental impact study and the non-technical synthesis, which are published on the website of the competent authority;
- the consultation, i.e. the preliminary phase foreseen by environmental regulations and characterized by extensive publicity and participation measures;
- assessment of environmental impacts and the EIA measure, the final phase (art. 25) after which the Authority issues a measure containing "the reasons and considerations on which the decision is based". Environmental regulations state that this measure has temporal effectiveness of no less than 5 years.

The Environmental Code defines strategic environmental assessment (SEA) in art. 5 of the text and is an environmental assessment procedure whose purpose is to "ensure a high level of environmental protection and contribute to the integration of environmental considerations in the preparation, adoption, and approval of these plans and programs, ensuring that they are consistent and contribute to the conditions for sustainable development (art.4)

The subject of SEA is plans and programs that may have significant impacts on the environment and cultural heritage.

As for the EIA, the environmental legislation states that also for the SEA the competence falls on the Ministry of Environment and protection of land and sea at the state level and the Public Administration at the regional level.

The Integrated Environmental Authorization (IEA) is the measure that "authorizes the operation of an

installation or part of it under certain conditions" aimed at the integrated prevention and reduction of pollution and the provision of measures to avoid and/or reduce emissions into the air, water and soil (including therefore also those relating to waste).

The object of AIAs are installations for energy activities, for the production and transformation of metals, for chemical industries, etc.. (as listed in Annex VIII of the Environmental Code).

For the AIA, the Ministry of the Environment and Protection of the Territory and the Sea is responsible at the state level for projects relating to Annex XII of the Code, while for the interventions listed in annex VIII, the competent authority at a regional level is the one identified by regional laws or autonomous provinces.

The procedure for issuing the AIA is governed by articles 29bis-29undecies of Part II of the Environmental Code and starts with the presentation of a specific application to the competent authority which, within 30 days, checks the completeness of the documents and within 150 days expresses its own decisions.

The Single Environmental Authorization (AUA) was introduced in the environmental legislation with Law no. 35 of April 4, 2012 (simplification decree) to streamline procedures and reduce the burden on small and medium-sized enterprises and for plants not subject to the provisions on AIA. The AUA is regulated by the D.P.R. March 13, 2013 n.59 and replaces all the permits required by plant operators for the following activities:

- discharge authorization;
- prior communication for the agronomic use of certain waters;
- authorization to emissions into the atmosphere for establishments;
- acoustic communication/clearance;
- authorization for the use of sludge deriving from the purification process in agriculture;
- communications regarding waste.

The measure is issued by the competent authority through the SUAP upon request of the plant manager drawn upon the appropriate form. The authorization has a duration of 15 years from the moment of issue.

All the environmental assessment procedures described so far are aimed at avoiding environmental damage caused by human activities (art. 300 and following of the Environmental Code).

In order to know which procedure to submit the interventions provided for by environmental legislation, as well as the administrative regime of the activities, it is necessary to consult Section III of Tab. An of Legislative Decree 222/2016, which lists the activities subject to AIA, VIA, AUA.

2.3.1 Labeling regulations

Labeling regulations establish the methods and requirements that textile products must have to be placed on the domestic market before any processing, during the industrial cycle, or during the various operations inherent to their distribution. In all the countries of the European Union, textile products offered

for sale to the final consumer must have a label showing their fiber composition, written and determined according to pre-established methods. All those who produce and market textile products, from the raw materials to the finished product, are therefore obliged to comply with the regulations on labeling, and may therefore be called to account for violations committed in the course of their business activities. The producer, the importer of textile articles intended to be marketed on the Italian territory, the trader (wholesale and retail), the organizations or individual stores that sell to the final consumer. The "producer" is:

1. the manufacturer of the product established in the EU and any other person who presents himself as the manufacturer by affixing his name, trademark, or other distinctive sign to the product, or the one who refurbishes the product;
2. the manufacturer's representative if the manufacturer is not established in the EU or, if there is no representative established in the EU, the importer of the product;
3. the importer of the product and other professional operators in the marketing chain insofar as their activity may affect the characteristics of the product.

The manufacturer is obliged, if he sells at retail:

- to offer for sale only properly labeled textile products
- to keep for two years the commercial supply documents (invoices and transport documents) on which the data referring to the composition of each type of product supplied are reported.

If he does not sell at retail:

- to label or mark the textile products at the time of each marketing operation pertaining to the industrial and commercial cycle;
- the label and/or marking may be replaced or supplemented by accompanying commercial documents when these products are not offered for sale to the final consumer;
- to indicate on commercial documents (invoices or transport documents) the full fiber composition. If it uses acronyms or abbreviations, it must indicate the meaning of the same document.

Textile products must be labeled, i.e., all products that, in their raw, semi-finished, processed, semi-manufactured, manufactured, or packaged state, are exclusively composed of textile fibers, whatever the blending or joining process used.

The following are excluded from the labeling requirement:

1. products intended for export to third countries for which the standards in use in the country of destination must be complied with.
2. products introduced in transit, under customs control, into member states but destined for foreign markets (non-EU);
3. products imported from third countries temporarily for processing;
4. products given for processing, without giving rise to a transfer for consideration, to home workers or independent contractors working on behalf of third parties.

The label has several functions:

- to ensure the consumer the correct information on the composition of the product, the person responsible

for placing it on the market and any other highlighted characteristic (product safety, labels filled out correctly and in Italian);

- inform operators of the obligations imposed on them by law, so that they place on the market products whose composition corresponds to the label, to the commercial documents, and whose highlighted characteristics are real;
- Verify the activity of operators and remedy any irregularities found;
- encourage fair competition between companies, identifying and repressing any fraudulent practices in the various stages of marketing.

The supervisory body is the Ministry for Economic Development (formerly the Ministry for Industry, Commerce and Handicrafts) which, to carry out controls, makes use of the Chambers of Commerce, which have been assigned the functions of the suppressed provincial offices, assisted by officers and agents of the Judicial Police. Subjects subject to supervision:

- producer: the manufacturer of the product established in the EU, or his representative, who affixes to the product offered to the final consumer his name, company name, trademark, or other distinctive sign;
- importer: The natural or legal person who places products from non-EU countries on the EU market. When the manufacturer is not established in the EU, he is assimilated to the producer as far as obligations are concerned;
- distributor/retailer: any professional wholesaler or retailer in the marketing chain who does not intervene in the product in order to modify it. If they do intervene, they are treated as the manufacturer.

Inspections are carried out at every place where a stage in the production and marketing of textile products takes place, they can take place:

- upon notification of interested parties;
- on the basis of planning;
- on the initiative of the office

The methodology may be:

- visual/formal;
- Documental;
- material, on the product, with the execution of sampling and laboratory analysis.

Law n. 883 of November 26, 1973, regulates the denomination and labeling of textile products (articles 14 and following). Articles 14 to 30 are in force (articles 1 to 13 were repealed by Legislative Decree n. 194/99) which regulate: the denomination of new textile fibers, the collection of samples and analyses (controls), and penalties (administrative).

The sanctions are reported in the table below.

Table 4 Label sanctions

DESCRIPTION VIOLATION	VIOLATED REGULATION	NORMA PENALTY	MINISTRATIVE SANCTION	ARREST AND/OR FINE REPORT TO THE A.G.	TRANSMISSION REPORT FOR APPLICATION OF MINISTRATIVE SANCTION
Sale of textile products whose label of composition does not correspond to the real composition	Art. 25 L. n. 883/73	Art. 25 L. n. 883/73	Da € 1.032,00 a €. 5.164,00 reduced payment allowed pursuant to art. 16 of Law no. 689/81	Comunicazione all'A.G.	Chamber of Commerce competent for the territory
Sale of textile products without a label or with label filled in incorrectly (non-decreasing order, use of foreign language only, use of acronyms)	Art. 8 D.Lgs. n. 194/99	Art. 15 D.Lgs. n. 194/99	Da € 103,00 a € 3.098,00 Article 16 of Law 689/81 does not apply.		Chamber of Commerce competent for the territory
Missing or incorrect indication of the indications of composition on commercial documents (invoice and delivery note)	Art. 8, c. 1 D.Lgs. n. 194/99 (Art. 25, c. 3 L. n. 883/73)	Art. 15 D.Lgs. n. 194/99 (Art. 25, c. 3 L. n. 883/73	Da € 1.032 a € 5.164,00 Article 16 of Law 689/81 does not apply.		Chamber of Commerce competent for the territory
Failure to keep business records business	Art. 8, c. 8 D.Lgs. n. 194/99 (Art. 25, c. 4 L. n. 883/73	Art. 15, c. 2 D.Lgs. n. 194/99 (Art. 25, c. 4 L. n. 883/73)	Da € 258,00 a € 4.131,00 Article 16 of Law 689/81 does not apply.		Chamber of Commerce competent for the territory
Anyone who fails to provide due cooperation to carry out inspections (safety products)	Art. 107, c. 2, lett. a) D.Lgs. n. 206/2005	Art. 112, c. 4, D.Lgs. n. 206/2005	Da € 2.500,00 a € 40.000,00 Art. 16 of Law 689/81 is applied.		Chamber of Commerce competent for the territory

2.4 France

2.4.1 Grenelle 2

The law on the national commitment to the environment, known as "Grenelle 2", was promulgated on July 12, 2010. This text allows "the concrete implementation of the guidelines of "Grenelle 1" (programming law of August 3, 2009, relating to the implementation of the Grenelle Environment Forum) which determined the government's objectives in environmental matters. Composed of more than 100 articles, this text defines six major areas of work:[71]

- buildings and urban planning, with a double objective: to divide by five the energy consumption of new buildings by 2012 and to modify the urban planning code to promote renewable energies;
- transport, with measures to promote the development of urban public transport or to encourage the development of alternatives to road transport for goods;
- energy and climate, with the central objective of reducing greenhouse gas emissions by 20% by 2020
- conservation of biodiversity with provisions for agriculture, protection of species and habitats, as well as rehabilitation and water supplies
- health protection and waste management with provisions against noise and light pollution and measures to make waste producers more responsible;

[71] Les principales mesures de la loi grenelle 2. https://www.nouvelobs.com/planete/20100630.OBS6397/les-principales-mesures-de-la-loi-grenelle-2.html

- definition of a "new ecological governance" that allows for consultation upstream of projects, in particular through the renewal of public inquiries and the integration of environmental education associations into consultation bodies.

The Grenelle law put the fight against climate change "at the top of the agenda," a chapter of the "Grenelle 2" law implements this objective along three lines:

- reducing energy consumption;
- prevention of greenhouse gas emissions;
- promotion of renewable energies.

Regions must draw up regional climate, air, and energy plans, establishing the main guidelines for reducing energy consumption and preventing greenhouse gas emissions. Based on an inventory of greenhouse gas and chemical pollutant emissions, as well as a balance sheet of regional energy production, these plans must determine guidelines for 2020 and 2050 to slow climate change, mitigate its effects and adapt to it, reduce air pollution, and set targets for the development of renewable energy potential.

Other chapters of the law include articles aimed at reducing energy consumption or limiting pollution. For example, in the chapter on housing and urban planning, provisions aimed at dividing the energy consumption of new buildings by five by 2012 and, in the field of transportation, those aimed at encouraging alternative transportation to road or promoting energy-efficient vehicles (hybrids or electric, for example).

This is a set of measures aimed at preserving animal and plant species and their habitats. This, of course, primarily affects rural dwellers, particularly farmers. Several measures aim to regulate the use of pesticides in agriculture, these products are used to destroy organisms considered harmful to crops, they are often synthetic products that can be grouped into a few categories: insecticides, herbicides, or fungicides (which "kill" fungi). State approval is required to deliver, use, or even recommend these products. Despite the opinion of many environmentalists, the advertising of these products will remain allowed but will be further regulated.

The main innovation of this biodiversity work is the creation of a "green and blue grid)" on the ground. This framework should make it possible to create territorial continuity between the different protected areas by connecting them through corridors that are also protected. The goal is to ensure (or re-establish) the flow of wildlife species between areas considered to be of high ecological value. A national "green and blue corridors" committee has been created, composed of representatives of local authorities and socio-professional partners. At the regional level, a "regional ecological coherence plan" is developed by the region and the state in association with the regional "green and blue grid" committee composed of the departments and representatives of municipalities and groups of municipalities, national parks, regional nature parks, associations and socio-professional partners concerned. It should be considered when developing or revising spatial or urban planning documents. New infrastructure projects (roads, railways, etc.) simply have to take this framework into account, although it cannot be used against them.

In recent years, people have begun to talk about "ecological democracy,"[72] it is mainly a matter of developing the right to environmental information by ensuring that public actors and companies make accessible how they take into account the imperatives of sustainable development in their strategy. The obligation to submit a social and environmental report is extended to all companies with more than 500 employees. From 2011, carbon emissions must be displayed for all freight and passenger transport services. An "environmental display" will be phased in, after experimentation, for consumer products whose environmental impact, particularly the "cost of carbon," must be explicitly stated. More coercively, parent companies are required to repair environmental damage caused by defaulting subsidiaries.

The text also provides for the generalization of public consultations for all draft regulations with an environmental impact. The impact assessment and public inquiry procedures are to be simplified and unified. Regional economic, social and environmental councils should be created on the model of the national economic, social and environmental council, with a greater role for representatives of environmental associations.

2.4.2 The law on the fight against waste and the circular economy

The Waste and Circular Economy Act aims to accelerate the change of production and consumption patterns to reduce waste and preserve natural resources, biodiversity, and the climate. It is part of the implementation of the 2004 Environment Charter. The law is based on several main guidelines: reduce waste and abandon single-use plastics, provide better information to consumers, take action against waste, improve production, and combat illegal dumping.

The law calls for an end to single-use plastics by 2040. But in recent years, other goals have been added; first, waste reduction is also set for 2030 with two points:

-15% of household waste per inhabitant;

-5% of waste from economic activities.

The law also sets a goal of 100% recycled plastic by 2025 and an end to the marketing of single-use plastic packaging by 2040. Targets for the reduction, reuse, and recycling of such packaging are set by decree for the period 2021-2025, and then every five years until 2040. At the same time, several measures have been introduced to reduce single-use plastics:

-in 2021, a ban on straws, disposable cutlery, fidget spinners, expanded polystyrene boxes in fast food restaurants (kebab box type), free distribution of plastic bottles in companies, etc;

-in 2022, a ban on plastic packaging for fruits and vegetables weighing less than 1.5 kg, a requirement to have water fountains in establishments open to the public, etc.;

-in 2023, a ban on disposable crockery in fast-food restaurants for meals served on-site, etc.; and in 2023, a ban on disposable crockery in fast-food restaurants for meals served on-site, etc.[73]

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[72] Grenelle environnement, https://www.connaissancedesenergies.org/fiche-pedagogique/grenelle-environnement

[73] Assemblee Nationale, Lutte contre gaspillage et economie circulaire, https://www.assemblee-nationale.fr/dyn/15/dossiers/lutte_gaspillage_economie_circulaire

The law also provides for better collection of plastic waste through the deployment of new collection systems, complementary to existing ones, developing, for example, deposits. The plastic bottle recycling deposit could be introduced if local authorities fail to improve the collection of these bottles by the end of 2022. Starting in June 2020, the French Environment and Energy Management Agency (ADEME) will publish a measure of local authorities' collection rates and assess their ability to meet the European targets of 77% of plastic bottles collected by 2025 and 90% by 2029 without using a deposit. The agency must produce an assessment each year and it is based on the assessment done in 2023 on 2022 practices that a decision will be made.

2.4.3 Consumer information

Consumer information on the environmental characteristics of products offered for sale (incorporation of recycled material, durability, etc.) will be harmonized in 2022. In particular, it will be prohibited to use the terms "biodegradable", "ecological" or any other equivalent term on a product or packaging.

A voluntary environmental or social labeling system has been introduced for all goods and services companies, as amended by Members. A mandatory environmental labeling methodology will be tested for 18 months, initially just with the apparel industry. This methodology will give an environmental rating to each garment. Other sectors will follow. Eventually, this labeling will be made mandatory.

Also based on an amendment by the deputies, companies that market products containing endocrine disruptors must as of 2022 inform the public of the list of these disruptors. Internet service providers and mobile phone operators must inform their customers of the greenhouse gas emissions associated with their Internet and mobile phone use.

To combat planned obsolescence, certain electrical and electronic equipment (such as washing machines or vacuum cleaners) will include a repairability index from this year (one score out of 10), and a durability index (reliability, the robustness of the product, etc.) will be introduced in 2024.

Information on the legal guarantee of conformity of certain goods is strengthened. In addition, the legal guarantee of conformity is extended by six months if the product sold is repaired under this guarantee.

The text completes the current system of consumer information on the Triman order, along with information on differentiation, which is mandatory from 2021 on household products, their packaging, or documents provided with these products. It is also planned that the color of sorting bins will be harmonized across the country by the end of 2022 at the latest.

2.4.4 The fight against waste, the priority to solidarity reuse

Measures to combat food waste have been strengthened (food waste reduction targets set by 2025 and 2030, stricter penalties, etc.). Destruction (incineration and landfill) of unsold new non-food items, such as clothes, shoes, beauty products, books, or household appliances, is prohibited in principle. Businesses must, with some exceptions, donate or recycle their products by the end of 2021 or 2023 depending on the industry.

Solidarity reuse funds are created to support recycling centers and all associations working in this

field. Wholesale sales are encouraged, based on amendments by parliamentarians. As of January 1, 2021, it will be possible to bring one's containers to stores, with a requirement for take-out sellers to offer a lower price when consumers bring their containers.

The current mechanism for diagnosing "waste" in the context of a building demolition operation is being revised. The goal is to encourage the reuse or recovery of these wastes. Administrations are subject to new "green" obligations, such as the inclusion of circular economy clauses in public purchases as of this year. The "polluter pays" principle, which makes the producer or distributor of a product responsible for financing its end-of-life, is reinforced. This is the extended producer responsibility (EPR). Manufacturers subject to the polluter pay scheme must develop five-year ecodesign action plans to make their products more recyclable. The scope of EPR is extended from end-of-life to product design. Manufacturers who design their products in an eco-friendly manner benefit from a bonus on the fee they pay for end-of-life management and treatment of their products. On the other hand, manufacturers who do not integrate eco-design into their production process see this contribution increase with a penalty.

To improve the management of textile waste and avoid illegal dumping, some waste can be picked up free of charge at waste collection centers. Other measures have been introduced to combat illegal dumping: fines of up to 15,000 euros, seizure of the vehicle used to commit the offense, strengthening of the special police powers of mayors, etc.

2.4.5 The development of the RSE and its articulation with environmental law

Corporate social responsibility (CSR) can be seen as an organization's control over the impact of its decisions and activities on society and the environment, resulting in ethical and transparent behavior that contributes to sustainable development, including the health and well-being of society; takes into account the expectations of stakeholders; complies with applicable laws and is consistent with international standards of behavior; is integrated into the organization as a whole and implemented in its relationships (international standard ISO 26000). Commitments made by companies in the area of CSR may be set out in charters, statements, or dedicated web pages. Most often, they will be collected in a "code of conduct".[74] By addressing their social responsibility, companies can build a long-term relationship of trust with their employees, consumers, and citizens, on which they can base sustainable business models.

It is, therefore, necessary to understand how RSE is developing in environmental matters, to consider its influence on the and criminal liability of companies.

Initially, CSR was based on an essentially voluntary and non-binding approach and is related to what is known as soft law. However, this responsibility has gradually become increasingly regulated in two respects: not only does it include compliance with existing legislation, but it also requires companies to take appropriate measures to achieve specific objectives and to develop a real understanding of these issues.[75]

French law has progressively imposed on French companies scattered duties of information and

[74] La responsabilité sociétale de l'entreprise et les droits fondamentaux, P. Deumier, D. 2013.
[75] La responsabilité sociétale de l'entreprise : du concept à la norme, R. Family, D. 2013.

vigilance in environmental matters. In this regard, Law No. 2001-420 of May 15, 2001, on New Economic Regulations required French companies listed on the market to provide social and environmental data in their annual reports. Law No. 2003-699 of July 30, 2003, on Prevention of Technological and Natural Risks and Damage Repair, placed an obligation on all joint-stock companies operating one or more facilities classified as "High Threshold Seveso" to inform their shareholders about their environmental activities. Similarly, Article L229-25 of the Environment Code requires private legal entities employing more than 500 people in mainland France to prepare a report on greenhouse gas emissions.

The Commercial Code requires corporations to publish environmental information on an annual basis. Article L225-100-1 requires the board of directors or management board of a joint-stock company, as the case may be, to report annually to the general meeting of shareholders, through a management report, on "the financial risks associated with the effects of climate change and the presentation of the measures taken by the company to reduce them by implementing a low-carbon strategy in all components of its activity." Article L225-102-1 of the Commercial Code similarly requires the company to report annually to the general meeting of shareholders, through a non-financial performance statement, on "how the company takes into account the social and environmental consequences of its operations," including the climate change consequences of its operations and the use of the goods and services it produces, as well as its social commitments to sustainable development and the promotion of diversity. Finally, and more specifically, Article L225-102-4 of the Commercial Code provides for the establishment and implementation of a supervisory plan to identify risks and prevent serious violations of human rights and fundamental freedoms, the health and safety of persons and the environment, arising from the company's activities and those of the companies it controls, as well as the activities of subcontractors or suppliers with which there is an established business relationship. It should be noted that Article L225-102-5 of the Commercial Code provides that under the conditions outlined in Articles 1240 and 1241 of the Civil Code, in the event of failure to comply with the obligations defined in Article L. 225-102-4, the responsible author is obliged to compensate for the damage that could have been avoided by complying with these obligations.

Finally, the PACTE Act of May 22, 2019, enshrined the jurisprudential notion of social interest in Article 1833 of the Civil Code: "The company shall be managed in the social interest, taking into account the social and environmental issues of its activity." Article 1835 of the same code also provides that the memorandum of association of a company may specify a raison d'être, consisting of the principles with which the company is endowed and for the respect of which it intends to allocate resources in carrying out its activity. The legislature has also amended the Commercial Code to incorporate the notion of corporate interest. Thus, articles L225-35 and L225-64 of the Commercial Code provide that the board of directors shall determine the direction of the company's business and ensure that it is implemented following the interests of the company, taking into account the social and environmental challenges of its activity. This interest must be taken into account at the group level, otherwise, the concept will be stripped of its substance. The reform,

therefore, has a de facto extraterritorial scope.[76]

As companies reinforce their commitments to the environment, they are faced with an ever-increasing duty of care. This duty of care is then capable of founding a fault of the company, leading to its civil liability based on Article 1240 of the Civil Code. Thus, on June 18, 2019, several associations, unions, and local authorities gathered in collectives sent letters of formal notice to companies to comply with their obligations regarding the duty of care. Legal action was finally launched against Total, accused of failing to take due account of its environmental impact in its due diligence plan.[77]

On December 10, 2020, approximately one year after the Nanterre Judicial Court had applied interim measures requesting that Total SA be ordered to "put an end to the manifestly unlawful disruption" resulting, according to the associations, from the company's failure to comply with its due diligence obligations and, in the alternative, to order it to amend its due diligence plan and implement the measures set out in the plan, the Court of Appeal finally held that the case fell within the jurisdiction of the Nanterre Commercial Court. It is therefore up to the commercial court, by Article L. 721-3, 2°, of the Commercial Code, to verify whether a commercial company's due diligence plan includes measures to "prevent the risks of serious violations" of human, social and environmental rights. In this case, the alleged risks concerned the implementation of two oil projects (TILENGA and EACOP) in Uganda. The Versailles Court of Appeal took the opportunity to establish that the company's due diligence plan must be analyzed as a management act, CSR is by its nature an area that has a strong impact on governance, internal and external control procedures, and the choice of economic partners and investments. However, it should be noted that the investigating judge of the Nanterre court more recently considered, in a case that also involved Total, that the supervisory plan could be analyzed as a mixed commercial act, leaving the plaintiffs with an option between the judicial court and the commercial court. This procedure could then lead to Total's civil liability based on Articles L225-102-5 of the Commercial Code and 1240 of the Civil Code. More generally, these obligations could fall under the duties of precaution and prevention provided for in Article L. 110-1 II 1st of the Environmental Code. It has therefore been well established by the Supreme Court that failure to comply with these duties may constitute fault and bring into play the civil liability of the offender.

A criminal route is also a possible option for sanctioning violations of the supervisory duties imposed on companies in environmental matters, both because of the risk this poses to the public and the profit unduly generated by false ethical commitments. Also intending to make companies more responsible, an environmental criminal summary procedure is now available to stop flagrant violations of environmental law.

Article 223-1 of the Criminal Code requires as a material element a course of conduct: the violation, by act or omission, of a particular duty of safety or prudence required by law or regulation. This conduct must directly cause a result: an immediate risk of death or injury that may result in permanent maiming or

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[76] L'article 1833 et l'intégration de l'intérêt social et de la responsabilité sociale d'entreprise, P.-H. Conac, Rev. sociétés 2019

[77] Éditions législatives, [Grand angle] Devoir de vigilance : deux entreprises mises en demeure de se mettre en conformité (2), 4 septembre 2019

disability. Finally, the moral element requires the characterization of possible fraud: the perpetrator must deliberately violate the duty of prudence or safety, without necessarily having been aware of the potentially harmful consequences of his act.[78]

Thus, it would be possible to consider that failure to comply with the duty of care in the context of particularly environmentally risky industrial projects could satisfy both the material and moral elements of the crime. The obligations at stake must indeed be particularly precise and detailed, but the constraints imposed on companies concerning CSR are increasingly concrete. The challenge to the inadequacy of Total SA's monitoring plan in civil court, as mentioned above, clearly demonstrates that these obligations could be specified to the point of constituting the crime of risk caused to others. At the very least, proof of knowledge of the company's obligations and the risks inherent in its activities could be facilitated by its information and monitoring obligations.[79]

Article 121-1 paragraph 4 of the Consumer Code prohibits misleading business practices by companies. The offense presupposes a commercial practice as a precondition, an element not defined by Articles L121-1 to L121-4 of the Consumer Code. In practice, case law will retain this element in the presence of an advertisement. This commercial practice must be deceptive by commission (L121-2), omission (L121-3), or assimilation (L121-4). The prohibited practice is one that "deceives or is likely to deceive" the recipient and that "induces or is likely to induce the recipient to take a commercial decision that he would not otherwise have taken" (Articles 6 and 7 of the Directive of 11 May 2005). Case law holds that intent is inferred from a knowing violation of a legal or regulatory requirement.[80]

Thus, it appears that ethical commitments displayed by a company may fall within the scope of deceptive trade practices. For example, if a company pledges to produce clothes with hides from a "sustainably managed" farm and this is not the case, the clothing retailer's practice could qualify as deceptive.[81] Thus, corporate codes of conduct are not as legally worthless as corporate leaders like to think. In this regard, it appears from criminal chamber case law that the criminal judge considers the code of conduct as a criterion for evaluating the professional's behavior and has thus been able to punish false or deceptive environmental allegations, particularly in the context of a CSR report.[82]

Finally, it should be noted that there is a mechanism not yet widely known, but far from lacking in interest, to compel a company to comply with certain environmental requirements imposed by law: the criminal summary procedure provided for in article L216-13 of the Environment Code. This article allows the judge of liberty and detention (JLD) to take, as part of a criminal investigation, any protective measure intended to put an end to a violation of articles L. 181-12, L. 211-2, L. 211-3, and L. 214-1 to L. 214-6 of the Environment Code. The challenged operations, deemed to be the cause of the pollution, may then be

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78 Crim. 16 févr. 1999, n°97-86.

79 Lobe-Lobas M., L'engagement volontaire RSE au service de la preuve pénale, Dr. env. 2014, no 3, étude 4

80 Crim. 15 déc. 2009, n°09-83.059

81 Répertoire de droit civil / Contrat : généralités Civ. – Mathias LATINA – Mai 2017

82 Cass. crim., 6 oct. 2009, no 08-87.757 ; Robert J.-H., Pollueurs, menteurs et irresponsables, Dr. pén. 2009, comm. 153

suspended for one year. The application is open to the public prosecutor, who acts ex officio or at the request of the administrative authority, the victim, or a recognized environmental protection association.

Recently, the Supreme Court had the opportunity to provide some clarification on the modalities of this mechanism in a January 28, 2020 ruling. The facts concerned the discovery in July 2018 of concentration levels of nitrite, phosphate, and ammonium ions above regulatory standards in a waterway, the Brévenne, at a treatment and purification plant. The management of the plant was entrusted to the Suez Eau France company by the Syndicat Intercommunal des Rossandes (SIVU), which had built it. At the request of the Rhône departmental federation for fishing and protection of the aquatic environment (FDAAPPMA), the Lyon public prosecutor's office made a request to the JLD based on Article L. 216-13 against the inter-communal syndicate and the operator to stop all discharges into the aquatic environment that exceeded the thresholds laid down in the texts. The JLD had granted the request in an order dated September 5, 2018, for six months with a fine. However, the order was overturned on November 9, 2018, by the Court of Appeals to the extent that the JLD had not characterized a criminal offense against the individuals involved. The Supreme Court reversed the decision of the Court of Appeals, stating that summary judgment did not require prior proof of the imputability of a criminal offense to the persons named in the order, the failure to comply with a mandatory statute of limitations being sufficient. The effectiveness of the system was thus reinforced by the Supreme Court, which considered that precautionary measures have primarily a preventive and not a repressive purpose, according to the letter of Article L216-13 of the Environmental Code.

2.5 United Kingdom

2.5.1 Waste law

In England, over the years, a process of progressive adaptation of national legislation to the precepts and objectives established by European institutions has taken place, as we have seen elsewhere. Thus, as a result of the entry into force of Directive 91/156/EEC, the Environmental Protection Act of 1990 was first amended by the Waste Management Licensing Regulations of 1994 and then, in 1995, repealed and replaced by the Environment Act. The Waste Regulations 2011, which are based on EU Directive 2008/98/EC, are the reference legislation for waste management in England. Divided into eleven parts (or sections), these clearly show the influence of Europe, especially where they elevate the principle of prevention to a golden rule in waste management given the goal of achieving a "zero waste" society. This is further confirmed in some documents of programmatic value adopted by the British government, first of all, the Waste Policy Review which set environmental policy objectives related to waste management achieved by 2020.

As far as the organization of the service is concerned, it must first be said that this has been strongly influenced by the idea of public service that has become established in this legal system. In any case, and despite all this, about waste management, it should be remembered that the Environmental Protection Act of 1990 identified three types of authorities for the performance of the service in question. In detail, these were the Waste Regulation Authorities (WRAs), the Waste Disposal Authorities (WDAs), and the Waste Collection Authorities (WCAs). The Waste Disposal Contractors (WDCs) were added to the latter. The first

of these authorities, the Waste Regulation Authorities, had the task of carrying out administrative and regulatory functions at a local level while respecting the provisions of the central government in this and related matters. In 1995, however, with the Environmental Act, the English legislator abolished these authorities and established two national agencies, the Environment Agency and the Scottish Environment Protection Agency (SEPA), responsible respectively for England and Wales and Scotland. [83]

Therefore, since the mid-90s of the last century, there has been a sort of attraction or, if you prefer, a shift of regulatory functions towards central government levels, since the task of drawing up waste management programs, as well as that of issuing authorizations to carry out related activities, has been carried out on a national scale by the Agencies created and no longer on a regional level by the Waste Regulation Authorities. On the other hand, the Waste Disposal Authorities are still responsible for the disposal of waste generated in the territorial areas under their jurisdiction and collected by the Waste Collection Authorities. Their tasks, however, are sometimes carried out by Waste Disposal Contractors who, in turn, may be entirely private companies or a sort of longa manus of the Authority in charge of disposal, i.e. a company created ad hoc and controlled by the latter. The Waste (England and Wales) Regulations 2011, adopted - as already mentioned - to implement the Waste Directive 2008/98/Ce, were then inserted into the organizational system described above. From the point of view of the allocation of functions among the various levels of government, however, the new provisions are in line with the 1995 reform, since they also attribute a key role to national authorities. It can be deduced from current legislation that the English legislator has not left much room for autonomy to local authorities, at least in terms of strategic choices regarding regulation and management of the service. This is although in some policy documents, first and foremost the Government Waste Policy Review1, the government seems to recognize and even emphasize the importance of local authorities in the organization, as well as in the material provision, of the service in question.

2.5.2 Modern slavery act

In 2015, the United Kingdom enacted the Anti-Slavery Act and with it, following the model adopted in 2010 by California (Transparency in Supply Chains Act), requires larger companies to periodically make a public statement on the steps taken to ensure that no form of modern slavery can be found in the business and the supply chain; so that consumers not only do not have to make unwitting purchases of goods produced with the exploitation of forced labor but can help determine the success of any social responsibility policies adopted by companies.

The Modern Slavery Act 2015 is a wide-ranging regulatory text, articulated on different levels of discipline that organically address the phenomenon, on the assumption that it is not reduced to episodic violations of the law that the chronicle reports, but are the expression of economic crime logic of wide scope, pervasive even in the productive fabric and trade.

The reformulation of criminal law and certain rules on jurisdiction is followed by the establishment of a specific Authority, the Independent Anti-Slavery Commissioner (section 40), with functions of prevention,

[83] Environment law UK, http://www.environmentlaw.org.uk/rte.asp?id=82

investigation, and prosecution of crimes, identification, and protection of victims. It prepares and implements three-year strategic plans, while the results of its action are reported annually (s. 42). In its first strategic plan, the Antislavery Commissioner identified as one of its priorities engagement with the private sector to promote policies to ensure that supply chains are free of slavery.[84] It should be considered that it must act based on the prior consent of the Secretary of State (the Home Secretary), given that the latter is called upon to approve in advance the strategic plans (s. 42.6 and 42.7); some perplexity then arises about the actual independence of the newly established Authority, considering also that it is appointed by the Home Secretary and that the latter determines the financial resources allocated to it annually (s. 40.4).

Through the T.I.S.C. (acronym for transparency in supply chains) provisions of art. 54 of the Antislavery Act, the British legislator requires companies to certify for each financial year the steps taken to ensure that no exploitation of forced labor finds a place in the supply chain and business. This is not a generic certification, but a detailed document, intended for the information of the consumer public, describing the organizational structure, the business and its supply chains, the lines of conduct, and the due diligence processes adopted concerning the forced labor risk, the parts of the business and supply chains where it may be present, the measures taken to assess and manage this risk, their effectiveness, measured based on appropriate performance indicators, the training for staff on forced labor, slavery and human trafficking.

The recipient of these requirements (s. 54 sub-sec. 2, 3, and 12) is any organization, corporate company, or a partnership (and for the directors, officers, and "property"):

- that provides goods or services and conducts business or a portion thereof in the U.K., regardless of the place of incorporation or establishment;
- whose turnover is not less than the amount determined by the Secretary of State; in first application 36 million pounds; consolidated turnover, where "turnover" means the amount derived from the supply of goods and services attributable to the ordinary activities of the holding company and subsidiaries (including those operating abroad) after deducting trade discounts, VAT and any other taxes based on the amounts so derived.

According to the Antislavery Commissioner, the measure affects approximately 12,000 companies.[85] Unlike the Californian model, the critical economic-financial threshold that triggers the obligation of transparency is a criterion for the selection of the company from the point of view of the size that is not linked to a quantitative calculation of the services offered in the territory, since the prescribed evidence can also be satisfied through reputational minimal findings.

The company may also declare that the organization has not adopted the procedures foreseen by the law (s. 54.4, sub b), without this entailing the initiation of sanctioning procedures of any kind against the company and its managers; but it must still make the declaration. Non-compliance, i.e. failure to make the

[84] Indipendent Antislavery Commissioner, Annual Report for the period 1 October 2016 to 30 September 2017 – presented to Parliament pursuant to Section 42 (10) (b) of the Modern Slavery Act 2015 – October 2017, 33 ss.

[85] Indipendent Anti-slavery Commisioner, Annual Report for the period 1 October 2016 to 30 September 2017 – presented to Parliament pursuant to Section 42 (10) (b) of the Modern Slavery Act 2015 – October 2017, 33.

required declaration, can lead to the institution of civil proceedings before the High Court, at the request of the Home Secretary, for the pronouncement of an injunction (to provide); similarly, but perhaps also reductively, to what happens in California, where the action is taken to the Attorney General for a remedy aimed also at obtaining relief.

Given that no such initiatives seem to have been reported, the relevant point is another. The sanctions profile identifies the logic behind the legislation. Only the awareness of a serious economic and financial risk connected with recourse to forced labor (whether intermediated or not) induces a reconsideration of the usefulness of a business model that contemplates the possibility of this illicit drift.[86] The real sanction is then the realization of the negative consequences to which the risk exposes.

The focus is this: determine and regulate the risk. As for the determination of the risk, this is the relevance of the choice of the British Parliament, and before that of the California legislature. A choice that is epoch-making: to recognize upstream, without hypocrisy, the phenomenon to which the risk is connected, declaring the structural importance that the use of forced labor has in the global dimension of the economy.

As for the regulation of risk, the options to be considered are along two lines. One can look at the economic-financial consequences deriving from the responsibility for violations of the many and varied prescriptions that recourse to forced labor can determine; this approach refers, in terms of effectiveness, to an evaluation of the concrete possibilities of the exercise of the State's sanctioning power. The English perspective seems to me to go in a different direction, where the real sanction linked to non-compliance is reputational; according to a model based on the trust that the market, if adequately informed, is determined to make ethically correct choices, without chasing the advantages that the exploitation of forced labor favors in terms of prices; on the trust that the damage to the image translates into lower turnover and that, therefore, it is the market itself that favors the establishment of virtuous behavior by companies.

To avoid that in the supply chains modern slavery finds space is not a result that realistically can be taken for granted. Perhaps the exact opposite is taken for granted, i.e., that labor exploitation and forced labor may take root in supply chains: therefore, what can be asked of the entrepreneur is, on the one hand, to implement best practices to try to deal with the scourge and, on the other hand, to declare to the market what he has done in this regard. This is, in short, the legal specification of a managerial duty, that of operating in compliance with the duty of obedience (the duty to act in compliance with the provisions of the law, in this case, those which prohibit recourse to forced labor), on the front of private and commercial law relations, the real sanction for failure to comply with this duty is left to the Market, on the trust that it knows how to distinguish, rewarding or "sanctioning" accordingly.

The Anglo-Saxon approach is not without its problems. Ryan J. Turner mentions it,[87] recalling that providing or not providing information on the company's supply chain, intervening or not intervening on the

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[86] Buccellato Domenichini, “Rischio danni” e obblighi gestori, in in Buccellato Rescigno (a cura di), Impresa e forced labour (nt.2), 291 ss.

[87] Turner, Transnational supply chain regulation: extraterritorial regulation as corporate law’s new frontier, in Melbourne Journal of International Law, June, 2016(17 Melbourne J. of Int’l Law 188), sub II D.

same, affects the interests of consumers, suppliers, and shareholders, which often do not converge; that the disclosure of inaccurate or wrong information may violate the legal prohibitions concerning declarations relating to listed companies; that, finally, altering the market conditions of trading may lead to objections of violation of the diligence obligations of managers (even if instrumental).

Concerning the actual availability to the public of access to the statements, the Antislavery Act provides only that they be published on the company's website with a visible link on the home page, or that they be made available to anyone who requests them. What is lacking, however, is a centralized archive of statements, although the Antislavery Commissioner declares itself in favor of the prospect of establishing one, both in public and private forms. Some non-governmental organizations have already started this work, with good results but not without serious problems. A significant number of key stakeholders agree on the criticality of the issue and the urgency of a transparent, free and open centralized registry. Regarding the publication of statements, it seems that this is the choice that also Australia intends to follow; whose Government, in August 2017, announced the introduction of regulation similar to the English one. Also missing from the regulatory text is a definition of the supply chain, and the question is then whether companies subject to the transparency constraint are required to give indications only concerning the first links in the supply chain, about subjects with whom they have a direct contractual relationship, or also concerning those who appear as more distant stations in a transmission structure based on outsourcing and subcontracting.

The supply chains absolve (or at least can absolve) to the realization of a unitary entrepreneurial plan, to which are functional contractual relationships that of norm reflect the condition of the economic power of the subjects involved: beyond considering the requirement of a re-balance negotiation, like jurists we look at the relationship of control between enterprises that they can configure, having for acquired in our instrumentation of action that (to the senses of law and like it remembers the Cassation) the control can infer itself of fact, on the base of contractual relationships whose constitution and whose to last represent the condition of existence and survival of the ability of enterprise of the supplier. [88]

2.5.3 WRAP

WRAP is an independent, non-profit organization that aims to promote and certify production from a legal, humanitarian and ethical perspective around the world.

Founded in 2000, WRAP is the world's largest labor and environmental certification program for the production and processing of labor-intensive consumer products. WRAP is supported by 25 international trade associations, including the International Appareil Federation, which represents 36 national associations, and more than 150,000 individual firms.

The WRAP Principles provide for core standards related to labor practices, factory conditions, and environmental and customs compliance. It consists of 12 points:

[88] Buccellato, Delocalizzazione e ‘forced labour’: un passo indietro nell’azione di contrasto in Dir. comm. internaz., 2017, 684 ss

- Compliance with laws and regulations concerning the workplace
- Prohibition of forced labor
- Prohibition of child labor
- Prohibition of harassment or abuse
- Compensation and benefits
- Hours of Work
- Freedom of association and collective bargaining
- Health and safety
- Prohibition of discrimination
- Environmental Protection
- Customs Compliance
- Safety and Security

Certification can be granted for 6 months, one year, or two years, depending on the outcome of the audit and the period during which the company has been WRAP certified. The first phase is an application, manufacturers first contact WRAP for an audit request and send the full application with payment due to the entity to begin the certification process. The second phase is self-assessment, the facility must adopt internationally accepted workplace standards, local laws, and workplace regulations, and follow the procedures found in the WRAP manual, providing evidence that these have been in place for at least 45 days (no less than 90 days for first-time applicants). The next step is monitoring, at which point the facility selects and contacts an accredited auditor to perform the monitoring and review. The report and recommendations are sent to both the facility and WRAP. The fourth phase is evaluation; WRAP staff may notify the facility that it needs to correct certain procedures, perform monitoring, further inspection, and reporting, or may make their recommendation to the Certification Committee for the company to be certified. The last step is certification, the Certification Committee studies the recommendation made by staff, including the monitoring report, and votes for or against certification.

WRAP also laid the groundwork for the revolution through the Sustainable Clothing Action Plan (SCAP 2020), a plan used to reduce resource use in the fashion industry by 2020. The goal was to reduce consumption of carbon, water (both to 15%), and waste (3.5%) throughout a product's life, and to use less landfill by the end of the year. Voluntarily, as many as 88 UK organizations have signed up to this initiative, and 13.4% of carbon, 18.1% of water, 4% of landfill waste, and 1.4% of waste has been saved over the lifetime of the product.[89]

Textiles 2030 is WRAP's innovative new, expert-led initiative that leverages the knowledge and experience of UK sustainability leaders to accelerate the entire fashion and textile industry's move towards circularity and system change in the UK.[90]

[89] Sustainable Clothing Action Plan, https://wrap.org.uk/taking-action/textiles/initiatives/scap-2020
[90] Wrap Textile, https://wrap.org.uk/taking-action/textiles

The new voluntary agreement builds on the learning and success of the Sustainable Clothing Action Plan (SCAP 2020) and aims to engage the majority of UK fashion and textile organizations in collaborative climate action. Leading sustainability companies across apparel retail, supply, reuse, and recycling, including SCAP signatories, will work together as "partners" to accelerate the UK's circular economy. Other fashion and textile brands and retailers can sign up as "Member" signatories and benefit from WRAP's support to get a climate strategy ready, science-based and robust, and to measure their GHG emissions.

Innovators, pioneers, researchers, academics, and industry member groups can join as Affiliates to contribute their expertise. Textiles 2030 is a voluntary agreement, which will be funded by its signatories and the government. Signatories will collaborate on carbon, water, and circular textiles targets, and will also contribute to national policy discussions with UK governments to shape extended producer responsibility and other critical regulatory developments.

2.6 China

2.6.1 Introduction

While much news about the environment in China focuses on smog and air pollution, less attention has been given to water supply problems and groundwater damage.

In recent years, the problem has become so severe that, according to the Institute of Public and Environmental Affairs, only 35% of researched sites across China have good quality water, 32% are suitable for water supply, another 20% can be used for industrial production and agriculture but not for human contact.[91]

With this reality, and with the continued pace of economic expansion in recent decades, it was clear that something had to be done to address China's pollution problem. By tackling this problem head-on with strict new environmental regulations, China has begun to make progress in addressing water pollution.

Within the textile industry in China, companies have also found themselves in the environmental spotlight. As the world's largest producer of textiles, the industry has historically been one of the worst polluters in terms of carbon emissions and water pollution. In a January 2018 article in Devex, Kurt Kipka, senior project manager at the Natural Resources Defense Council (NRDC) attributed China's 1,715 million tons of carbon dioxide emissions, or 5.4 percent of the global total, for 2015 alone. Kipka also stated that these factors make the textile industry one of the top five polluting industries. China's official data from the Ministry of Environmental Protection also shows that in the same year, 2015, the textile industry in China was the third-largest source of wastewater and released 10.1% or 1.84 billion tons of effluent into the environment.

Since the passage of China's original Environmental Protection Law in 1989, China's economy has changed dramatically and rapidly. However, the passage of a law is only as good as the commitment and enforcement that accompany it. And while the wording was comparable to environmental laws in other industrial countries, the failure came in the lack of enforcement and accountability, and commitment to

[91] Global water forum, https://globalwaterforum.org/2017/10/09/tackling-chinas-water-pollution/

implement a true Chinese environmental policy. As the crisis worsened in the early 2000s, it became apparent that more needed to be done to address the overall issue of pollution and environmental damage before the damage became irreversible. As a result, changes and revisions to the environmental law have increased year by year since 2014 to implement supervision and enforcement of industrial impact on the environment.

2.6.2 China's Environmental Law in 2015

Adopted in April 2014, revisions to China's 1989 environmental law were designed to begin to address enforcement issues and bring civil society and the media into the process through awareness and transparency. The revisions took effect on January 1, 2015, and addressed several areas:

- Clarification of public interest litigation: The 1989 law was vague in its wording for who could qualify as a plaintiff in pollution cases. The new law clarified the process and definition of who could bring cases, thereby increasing the likelihood that judges would hear the case.
- Enforcement: Previously, pollution fines were small and unevenly enforced, allowing offending industries to pay the fine as a cost of doing business rather than purchasing equipment to mitigate the pollution itself. The revision allowed daily fines and removed the cap on environmental fines by making the cost of non-compliance more severe. The changes also allowed up to fifteen days in jail for business executives who are negligent in following the law or intentionally circumventing regulations.
- Transparency: The revision also expanded and strengthened requirements for environmental impact studies and made pollution data publicly available. It also implemented a control system for the total emissions of certain pollutants and created requirements for emergency control plans.

2.6.3 China's environmental law in 2016-17

As new laws and regulations began to take hold, 2016 saw changes in participation, awareness, and responsibility.

As the new environmental protection law took effect, several trends emerged:

- Local and Regional Government Action: As the revisions took hold, local and provincial governments began to increase involvement, with most providing an environmental report for their region and many provinces creating environmental protection plans. Spending by these local governments on environmental protection initiatives has also increased.
- Enforcement and Courts: As understanding of the new laws became clearer, courts began accepting cases based on the new EPL at a rate 2.5 times higher than in previous years. In addition, direct actions taken in over 22,000 cases brought to court in 2016 included equipment seizures (44%), work stoppages (25%), daily fines (4%), detentions (18%), and in some cases, criminal charges (9%).
- The Paris Agreement: In September 2016, China fully committed to the Paris Agreement and set intentions to reduce fossil fuel use by 20%.
- Environmental Impact Assessment: This change strengthened penalties and simplified the process to peg penalties to the total value of the project cost. Penalties could be imposed up to 5 percent of the total project cost, a substantial amount for large-scale projects.

Beginning in 2017, there were changes to the law that began to specifically target certain types of pollution and increase penalties for non-compliance:

- Construction: Revisions were added for construction companies to require an environmental impact study. Local governments were charged with reviewing and approving the study and ensuring compliance.
- Local Accountability: Additional changes in 2017 emphasized local government officials making them responsible for ensuring businesses fully implement the law and EPL regulations. Local and provincial officials can now be held directly responsible for environmental issues.

2.6.4 China's Environmental Law in 2018

As 2018 dawned, further revisions and restrictions were made to the existing law to further strengthen China's environmental policy:

- Environmental Protection Fee Law: This law replaced the emission discharge fee and shifted all proceeds of the fee to the local government. Local and provincial governments can set applicable rates on their terms to promote compliance and fund initiatives.
- Water Pollution Prevention and Control Act: This law defines responsibilities for government officials along the waterway and holds them jointly responsible for pollution control and maintenance. The law is designed to encourage officials to pool resources to work toward environmental control instead of just addressing concerns for their specific area. The law also greatly increased fines for illegal discharge into a waterway.

As China's new environmental policy matures and companies, state and provincial governments, and civic organizations begin to gain experience in their new roles, there has been a resulting impact on the textile industry. The strictness of laws and regulations is such that entire industrial sections of cities or regions are temporarily closed for inspection. Officials may conduct surprise inspections to assess compliance, and companies found in violation may find themselves subject to heavy fines, reduced production, seizure of equipment and work stoppage, and in extreme cases where flagrant violations are found, company executives and managers may be arrested or even criminally charged. As companies rush to become compliant with ever-increasing legislative stringency, production costs have also increased. Capital must be spent to upgrade equipment, training must be conducted for staff, and costs are passed on to consumers. Additionally, if updates and training must occur during a production curtailment or work stoppage due to an inspection, the entire supply chain is threatened as factories struggle to meet expected delivery times.

Additional impacts to textile companies include:

1. More than 90% of Chinese textile companies are small and medium-sized enterprises (SMEs). With a deadline of only three years to meet water pollution targets, many of these companies will not be able to raise the capital expenditures needed to upgrade their equipment. This deadline drops to two years for those companies that reside in a water problem area, where 80% of China's yarn and textiles are currently produced.
2. China's environmental policy has placed textiles on a list of industries that must develop "circular economies." In this model, the industry focuses on reusing, remanufacturing, and closing the loop completely

so that little is lost in terms of resources. This represents not only increased costs but an entirely new paradigm for production and how goods are sourced and produced. When coupled with daunting capital expenditure requirements, many companies are facing higher costs and, in some cases, consolidation with other companies to share costs or closure if the company cannot take on the additional burden to meet the requirements.

3. Public reputation may suffer if litigation by NGOs progresses after a published complaint or lack of compliance. The result could affect brand awareness for end consumers and impact the entire supply chain and profit structure as customers abandon the brand in favor of greener, more sustainable goods.

2.6.5 Challenge

China's new environmental policy represents a major shift in pollution mitigation and control. There are, however, proactive steps that textile manufacturers and importers can take to achieve compliance:

- Understand the Environmental Protection Law: a key step for all companies should be to understand the Environmental Protection Law and all the changes that occur from year to year, and to be alert to further changes as they occur. This applies not only to national law but also to local municipal and regional differences. The Environmental Protection Tax Act of 2018 and the Water Pollution Prevention and Control Act, as well as other regulations adopted in the past four years, allow for regional and local differences that could lead to higher typicals than those required by national law. Understanding the law will reduce the chance that a company will make an honest but costly mistake.
- Assess the company's financial position: Since most textile companies in China are SMEs, a full understanding of what a company can accomplish financially before deadlines will help define its path. Offshoring, mergers, and strategic outsourcing through a compliant company outside of China could reduce the burden of a looming deadline and allow the company to wisely allocate scarce funds to the most critical aspects of the transition to compliance.
- Partner with and centralize abatement: As one of the most water-intensive industries, textile companies may find some help by locating within industrial parks with a centralized water treatment plant. While not a panacea, this allows the company to operate within an area designed to address pollution on a scale with large production facilities and prevents the burden from falling on a single entity. It is more controllable and more cost-effective.

2.6.6 The New Silk Road (BRI)

New Silk Road is the expression coined by the Italian press to describe the Belt and Road Initiative (BRI), an ambitious program of the Chinese government that aims to finance, with over 1,000 billion dollars, various infrastructure investments in almost every corner of the planet: Africa, Europe, India, Russia, and Indonesia. The initiative, strongly backed by Xi Jinping, President of the People's Republic of China, was launched in 2013.

From a concrete point of view, the Belt and Road Initiative is a set of projects paid for by the Beijing government and aimed at building or upgrading commercial infrastructure - roads, ports, bridges, railways,

airports - and facilities for the production and distribution of energy and communication systems. All this to facilitate and give further impetus to trade and commercial relations between Chinese companies and the rest of the world: a sort of global plan (in the true sense of the word) of trade that - according to the World Bank (WB, World Bank) - could reach one-third of all world trade and involve 60% of the planet's population.

A plan that, without fanfare, has nonetheless been in the works for some time, as noted in a Center for Strategic and International Studies (CSIS) report published in February, according to which by the end of 2018 the Chinese government had already financed 173 major BRI-related projects in 45 countries.

Such as the acquisition in 2016 by the Chinese company Cosco of 51% of the company that manages the Greek port of Piraeus: in fact, this means that for almost three years one of the most important ports in the Mediterranean has been controlled by a company that reports directly to the government in Beijing.[92]

Another example is the 60 billion dollars in non-repayable financing or at super-facilitated rates guaranteed by Xi Jinping himself last year to the 50 African heads of state meeting on the occasion of the third Forum on China-Africa Cooperation: just for the sake of comparison, the Italian economic maneuver for 2019 is worth around 42 million dollars.

Describing the BRI in detail is almost impossible. As far as we can see, Beijing does little to ensure the transparency of the initiative, starting with the official website for the initiative, which is much more "marketing" than informational. In summary, the Belt and Road Initiative would see six major trade corridors unfold from China:

-the one with Pakistan (CPEC);

-the one that passes through India, Bangladesh, and Myanmar (BCIMEC);

-the one linking Iran, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Turkmenistan, and Uzbekistan (CWAEC);

-the one involving Cambodia, Laos, Malaysia, Thailand, Myanmar, and Vietnam (CICPEC);

-connecting Beijing with Russia and Mongolia (CMREC);

-that which guarantees outlets in Europe (NELB).

In Beijing's idea, the BRI should also pass through our country, through the financing of major road and rail works, with the strengthening of connections with China by sea and air, and with the injection of Chinese capital in key sectors such as energy.

In the sights of the Chinese, there would be the port of Trieste, cooperation in the energy sector between Terna and the State Grid Corporation of China, and unspecified collaborations between public and private companies in the East and large European projects such as the TAV.

2.7 USA

2.7.1 Green new deal proposal

The most complete version of the project is entrusted to 14 pages released in early February in the form of a congressional resolution by New York Congresswoman Alexandria Ocasio-Cortez, leader of the

[92] Trades effect BRI, https://openknowledge.worldbank.org/handle/10986/31138

New Democrats, and her colleague-senator Ed Markey. The goals have been put in black and white: to trigger without delay a transition of the United States to a 100% renewable energy use, with zero greenhouse gas emissions, to be completed within ten years. This would involve massive public investments, from electric vehicles to new high-speed rail networks. The plan also adopts the need, already part of previous strategies including those of the Obama administration, to measure the social cost of carbon dioxide, i.e. the price paid for the impact of the emission of each extra ton of CO2 (environmental, health, etc.) to assess the goodness and efficiency of bets aimed at curbing it. Pro-environmental investments would have the effect of creating millions of qualified jobs, which would benefit disadvantaged and vulnerable communities first and foremost.

At the heart of the plan is 100% renewable energy, an ambitious target compared to the starting point: today these sources count for at most one-fifth of the total, behind natural gas (32%), coal (still 31%), and nuclear (20%). By 2050, according to current trends, renewables will continue to grow but will cover only 31% of total needs.[93]

The emergence of a so-called new "smart grid," an efficient, waste-free, and affordable electrical grid, is a design that has existed for some time but has itself been elusive to date, with little funding allocated by Congress to replace aging transmission systems prone to damage. The government currently invests about 36 billion a year to upgrade this infrastructure, with no ambition to get to a true new national grid by 2030.

Existing estimates of the funding needed to reinvent electricity distribution along modern and innovative lines call for hundreds of billions of dollars over the next two decades.

Making every building in the country more energy efficient is also no small feat. So far, only pilot projects have been launched to "rehabilitate" buildings from an energy point of view. Obama's 2009 economic stimulus plan, for example, allocated a one-off sum of almost 8 billion to renovate federal buildings and public housing, generating savings but stopping at partial experiments.

Revolutionizing transportation and its infrastructure to achieve zero emissions is an equally ambitious project. One of the main dreams of a new high-speed railroad in California between San Francisco and Los Angeles has just been scaled back by the state's progressive new governor, Gavin Newsom, due to costs deemed prohibitive. The project was limited to connecting three central areas of the state to put to good use a federal loan already obtained for the 3.5 billion rail project.

Agriculture, in turn, is at the center of important turnaround targets: industrial-scale livestock production generates serious greenhouse emissions, with beef production responsible for 41 percent. In total, livestock farming foots the bill for 14.5 percent of global emissions.[94]

2.7.2 New President Biden's plans

Joe Biden's climate plans are beginning to take shape. On March 31, the U.S. president outlined his infrastructure plan in a speech in Pittsburgh. A $2 trillion plan that is part of the larger post-Covid recovery

[93] Congressional Record, https://www.govinfo.gov/content/pkg/CREC-2021-06-14/pdf/CREC-2021-06-14.pdf

[94] Richard Twine, Emissions from Animal Agriculture, 16.5% Is the New Minimum Figure, MDPI, 2021

program, dubbed 'Build Back Better'. As he promised on the campaign trail, Biden is integrating climate policies within other policy packages. Climate, emissions, and ecological transition are becoming cross-cutting themes that will inform much of the new presidency's work.

Biden's vision for the green transition is improving infrastructure to create jobs and combat climate change. The goal is to "finally address the climate crisis as a nation,"[95] Biden says. The plan has many chapters and contains investments in clean energy, enhancing electric mobility, retrofitting buildings with an eye toward climate change and energy efficiency, among other items. There is an effort to make the power grid more resilient. But also the part on the real infrastructure takes into account the climate crisis: their restoration must be done to make them better able to withstand extreme weather events, continues the president. He adds that the plan will allow for "transformative advances in our ability to combat climate change". Biden does not miss the opportunity to emphasize that he is keeping all the commitments he made on the campaign trail. Including the issues dearest to the most radical wing of the Democrats, who have prodded the president from the left to raise climate ambition and tie it to precise social justice policies. Biden's plan, the statement continues, "prioritizes addressing longstanding and persistent racial injustice. The plan targets 40 percent of the benefits of clean infrastructure and climate investments to disadvantaged communities. In addition, the plan invests in rural communities and communities affected by the market-based transition to clean energy."

A total of $621 billion has been made available to revamp America's transportation infrastructure. And trigger a profound change in the way Americans get around. A total of 115 billion dollars will be used to modernize highways, roads, and bridges. Some of the money will be used for solutions that improve air quality, reduce greenhouse gas emissions, and decrease congestion on arterial roads. But most importantly, every dollar spent on infrastructure will also be used to "prevent, reduce and reign in the impacts of the climate crisis," as extreme weather events and other climate disasters caused more than $100 billion in damage in 2020 alone. A higher figure Biden allocates to electric mobility with the injection of $ 174 billion to "win the EV market", the intent is to stimulate the industry. Biden's plan aims to allow automakers to stimulate domestic supply chains from raw materials to components, reorganize factories to compete globally, and support American workers in the production of batteries and electric vehicles. By 2030, 500 thousand electric car charging points will be installed, thanks in part to grants and incentives. And more: electrify at least 20 percent of the school bus fleet and use central government procurement to electrify the federal fleet, including the U.S. Postal Service.

Under the infrastructure chapter, Biden's plan also includes steps to restore some ecosystems that are particularly valuable in preventing and combating climate disasters. Biden is asking Congress to invest in fire protection, coastal resilience to sea-level rise and hurricanes, support for agricultural resource management, and climate-smart technologies, and protection and restoration of key land and water resources such as the Florida Everglades and the Great Lakes region. There is also no shortage of funding for the drought-related

[95] Joe Biden speech 31 March 2021

crisis on the country's west coast: here, investments go into water efficiency and dam safety programs. Giving disadvantaged and native communities a voice as well.

To get the housing stock back on track, Biden is putting more than $210 billion on the table. The goal: build, preserve and redevelop more than a million housing units to make them affordable, resilient, accessible, energy-efficient, and electrified. How? "Through targeted tax credits, formula financing, grants, and

project-based rental assistance,"[96] so that affordable housing can also be offered for rent "to disadvantaged communities nationwide, including rural and tribal areas."

Another $100 billion goes to restoring school construction. The priority is to improve air quality and ventilation (Covid-19 is still a reality), but there is also a focus on increasing the energy efficiency of buildings. Similar interventions for federal buildings as well.

It is not enough to Therigger the ecological transition that is needed: this is the reaction from many parts of the environmental world. Too little money has been put on the table. "We need more investment than we're currently talking about because of the size of the need, because of the economic crisis," said Keya Chatterjee, executive director of the U.S. Climate Action Network, an environmental advocacy group. "We need to come out of this with a reinvented society."[97] For radical Democrat Alexandria Ocasio-Cortez, who along with Bernie Sanders had proposed the Green New Deal by engaging in a challenge with Biden, the resources committed "are not enough." The plan puts 2,250 billion spread over 10 years. All this while "the COVID package was $1.9 trillion for this year alone, with some provisions lasting 2 years. It needs to be much bigger," the congresswoman wrote on Twitter. "President Biden's industry-friendly infrastructure plan squanders one of our last and best chances to stop the climate emergency," argues Brett Hartl, director of government affairs at the Center for Biological Diversity, instead. "Instead of a Marshall Plan approach that shifts our economy toward renewable energy, Biden's plan includes deceptive carbon capture subsidies, fantasizes that the free market will save us, and fails to take crucial and ambitious steps toward phasing out fossil fuels."[98]

2.7.3 Climate action plan

In 2014, the U.S. Environmental Protection Agency (EPA) released a plan proposing to cut emissions from power plants by 30% by 2030, building on 2005 data. It's a multifaceted and complex plan to dramatically limit one of the most invasive sources of CO2 and other greenhouse gas production, namely coal.[99]

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[96] American jobs plan, https://www.whitehouse.gov/briefing-room/statements releases/2021/03/31/fact-sheet-the-american-jobs-plan/
[97] Keya Chatterjee Twitter, 31/03/21
[98] Brett Hartl, Twitter, 31/03/21
[99] EIA, https://www.eia.gov/

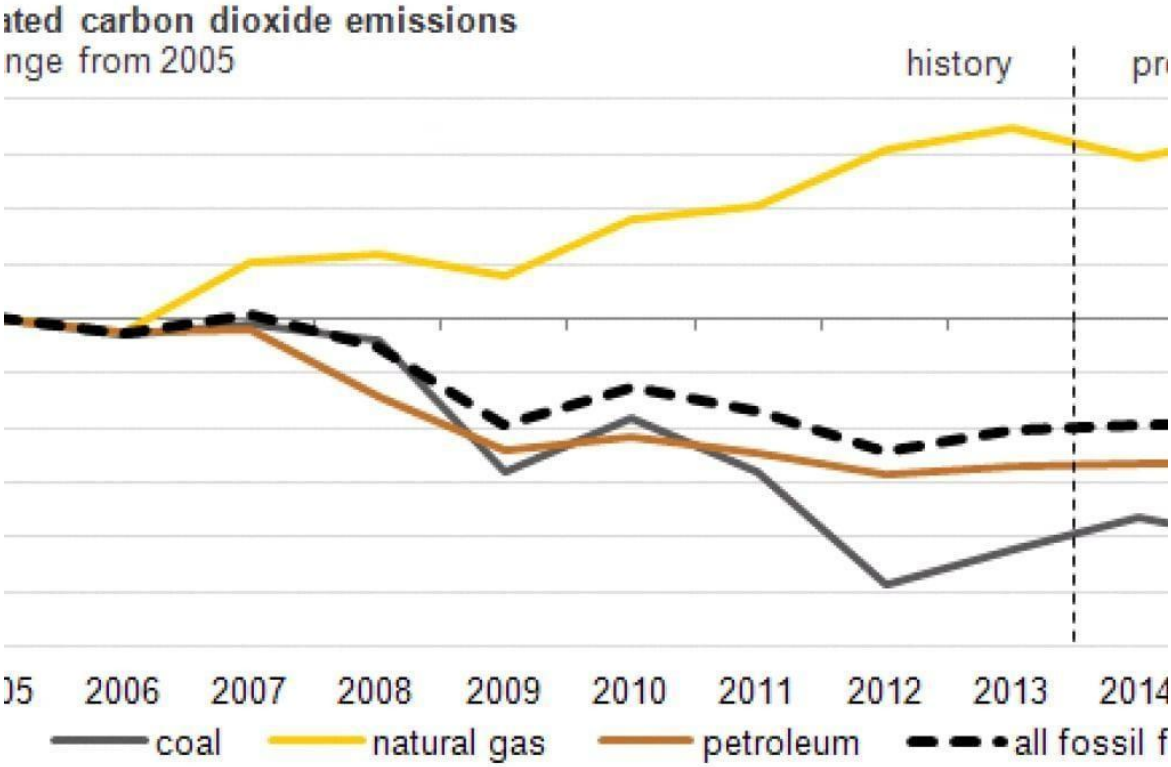

Figure 15 EIA, https://www.eia.gov/

The United States, thanks to impressive reserves, produces 31% of its electricity through this fossil source. Coal is a much worse pollutant than oil, natural gas, and of course alternative energies because every gram burned emits 1.83 grams of CO2 into the atmosphere, increasing global warming. Coal also has immediate and negative effects on human health, because all the steps of using coal can have a big impact. From mining to transportation, from preparation to combustion to ash generation and disposal, coal can especially affect the respiratory and cardiovascular systems. Add to that the environmental impact from mining, both deep and open pit, and the direct processing waste from mining; in the U.S. for example, there are at least 584 coal processing waste dumps, and some of the impact the health of residents. President Obama unveiled the plan to combat carbon emissions by saying, "In America, we don't have to choose between the health of our economy and the health of our children."[100]

The plan gave the states involved many methods to lower emissions, from increasing plant efficiency to producing through renewable sources to purchasing "polluter permits" from other, more virtuous industries. Many plants had problems because they were over 50 years old, but the installation of filters and scrubbers greatly lowered emissions of CO2 and other health-impairing gases.

It is also important to read this proposal in light of the moment in which it was made. Obama commissioned the EPA to produce the document during his second term when he could no longer be re-elected and such a move could not harm him. He had nothing to lose and did not have to campaign. Moreover, the president chose the Environmental Protection Agency because he had already tried, in 2010, to pass a similar bill in Congress. The interests of the very strong coal industry, which funds the campaigns of many congressmen, had prevented him from going that route. If the 2010 plan had passed, it would have been the

[100] Barak Obama speech 2/06/2014

first step towards recognizing the reality of climate change: the vast majority of Congressmen, for various reasons (mostly ideological and religious), say that the phenomenon does not exist, and if it does exist it is not man's fault or could even be beneficial to the United States.

For this reason, Obama preferred to go through the Environmental Protection Agency. The EPA, with presidential authority, has only the task of respecting a Supreme Court ruling that instructs it to comply with the Clean air act, taking into consideration some types of pollution such as CO2 pollution that had been ignored until a few years before.

2.7.4 Clean Power Plan

After the Climate Action Plan came the Clean Power Plan: Barak Obama called it "the biggest step America has ever taken in the fight against global climate change"; its opponents "a bad choice, which will have heavy economic repercussions on the country."[101]

In any case, the Clean Power Plan, the plan announced on August 3, 2015, by President Obama, calls for a 32% reduction in carbon monoxide emissions from power plants by 2030 compared to 2005 levels. This was undoubtedly an important signal, a reversal of American policy on the issue of environmental protection, particularly greenhouse gas emissions. It should be noted, however, that the 25% cut in emissions has been postponed from 2020 to 2022.

The plan is a "green turn" in U.S. policy, and in addition to leading to a reduction in emissions provides a good boost to the renewable energy sector. The green plan of the U.S. president consists of a set of regulations issued by the Environmental Protection Agency (EPA), the government agency that deals with environmental protection. Each state must reach a specific emissions reduction target, calculated ad hoc, based on parameters that differ from one state to another, and by 2016 had to submit a preliminary energy plan.

Individual states are free to adopt their strategies to meet the targets. If, for example, they do not have the possibility of limiting the emissions produced according to what is established by the Clean Power Plan, they can rely on emissions trading, a mechanism to reduce pollution already provided for by the Kyoto Protocol, which allows the defaulting state to pay another state to dispose of excess emissions allowances in its place, this, however, is a mechanism that is not entirely transparent and whose effectiveness has often been disputed.

Experts estimate the effects of the plan in 87 million tons of coal emissions less and a 90% decrease in premature deaths related to carbon pollution, 90 thousand fewer cases of asthma per year, and an annual decrease in hospitalizations of 1700. Also according to estimates, each family should have recovered 85 dollars per year on their electricity and gas bills and, at the federal level, 300 thousand work and school days otherwise lost due to illness should be recovered.

A large part of public opinion has welcomed the Clean Power Plan, but as expected there has been no

[101] Climate change and president Obama's action plan, https://obamawhitehouse.archives.gov/president-obama-climate-action-plan

shortage of criticism. For example, according to Scott Segal, director of the Electric Reliability Coordinating Council in Washington DC, Obama's $8.4 billion plan has condemned some coal-fired power plants to closure because they are unable to find economically sustainable solutions to reduce emissions.[102]

2.7.5 California Transparency in Supply Chains Act

The manufacturing industry was the first to take a hard, scientific look at quality. Manufacturers are concerned with both product quality and the quality of the manufacturing process itself. Manufacturers use continuous process improvement standards and methodologies to improve both processes and product quality. They consider quality in terms of measurements and statistics. Quality is compliance with the best-known standards, processes, and specifications.

In enacting the Transparency in Supply Chains Act, the California legislature that slavery and human trafficking exist in the State of California and every country, including the United States; and that these crimes are often hidden from view and are difficult to detect and track. The Legislature also found that consumers and businesses are inadvertently promoting and sanctioning these crimes through the purchase of goods and products that have been tainted in the supply chain, and that, in the absence of publicly available information, consumers are at a disadvantage in being able to distinguish companies on the merits of their efforts to provide products free from the taint of slavery and trafficking. In passing the Transparency in Supply Chains Act, the Legislature declared the intent of the State of California to ensure that large retailers and manufacturers provide consumers with information about their efforts to eradicate slavery and human trafficking from their supply chains, educate consumers on how to purchase goods produced by companies that responsibly manage their supply chains, and thereby improve the lives of victims of slavery and human trafficking. To provide consumers with this critical information and allow them to make more informed purchasing decisions, the legislature has made it mandatory for certain companies to publish information.

A business owner should be committed to ensuring that his company and the companies he works with are free from forced labor. This means he should take a stand on some key measures as follows:

- Work with a broad and diverse chain of stakeholders and business partners and expect them to adhere to ethical business practices consistent with our own.
- As a responsible corporate citizen, it should seek to ensure that quality and safety standards are maintained throughout its supply chain by well-treated and appropriately compensated workers in compliance with all applicable laws.
- Maintain internal accountability standards for our suppliers and evaluate on an annual basis using internal company practices and third-party resources, including on-site inspections (both scheduled and unannounced).
- Also require its suppliers to certify their compliance with all applicable laws.
- Train your employees involved in our supply chain on these issues and we will discontinue business with any supplier who has violated this policy.

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[102] Climate change and president Obama's action plan, https://obamawhitehouse.archives.gov/president-obama-climate-action-plan

- Believe in sharing these measures as a way to honor the efforts of this act and your commitment to a product free from forced labor.

2.7.6 Dodd-Frank Act Section 1502

Dodd-Frank Act Section 1502, part of the U.S. government's Dodd-Frank Wall Street Reform and Consumer Protection Act, signed into law in July 2010, requires publicly traded companies to ensure that the raw materials used in the production of their products are not linked to the conflict in the Congo by tracking and monitoring their mining supply chains.

Dodd-Frank Act Section 1502 aims to make transparent the financial interests that support armed groups in the DRC area. By requiring companies that use conflict minerals in their products to disclose the source of those minerals, the Act aims to deter companies from continuing to do business in support of regional conflicts.

In August 2012, the Securities and Exchange Commission (SEC) published its Conflict Minerals Rule along with guidelines for companies to report on the source of the conflict minerals in question: tin, tungsten, tantalum, and gold.

Dodd-Frank Act Section 1502 applies to all Securities and Exchange Commission "issuers" (including foreign issuers) who manufacture or contract for the manufacture of products in which conflict minerals are necessary for the "functionality or production" of the product. The industries most affected are electronics and communications, aerospace, automotive, jewelry and apparel, and industrial products. An issuer that only services, maintains, or repairs a product containing conflict minerals is not affected. Points to consider in determining whether conflict minerals are necessary for functionality or production are as follows:

- Whether it is intentionally added to the product or any component of the product
- Whether it is necessary for the generally intended function, use, or purpose of the product
- Whether it is incorporated for ornamentation, decoration, or embellishment.

The SEC estimates that approximately 6,000 issuers will be directly affected and many more will be indirectly affected, including issuing and non-issuing suppliers with initial compliance costs estimated at between $3 billion and $4 billion and subsequent annual costs in the range of $200 million and $600 million. The compliance process can be broken down into the following steps:[103]

1. An issuer must determine whether its manufactured products contain conflict minerals that subject it to the requirements of Dodd-Frank Act Section 1502;
2. An issuer must determine whether the required conflict minerals originate in covered countries;
3. An issuer with required conflict minerals from covered countries that are not from recycled or scrap sources must perform due diligence and potentially provide a conflict minerals report.

[103] SEC Adopts Final Rules for the Disclosure of Payments by Resource Extraction Issuers, https://www.sec.gov/news/press-release/2020-318

2.8 Japan

2.8.1 Leading-edge but stagnant laws

Mass production and consumption of goods have been the driving forces behind the Japanese economy in recent decades. In recent years, however, Japanese society has encountered numerous environmental constraints: increasingly scarce landfills, concerns about toxic waste disposal, and problems with the environment. Public concern about environmental quality and waste management practices has also been raised by several high-profile controversies. For example, anxiety about dioxin and other hazardous emissions from waste incinerators, which are the primary method of municipal solid waste disposal, led to the passage of the Special Measures Against Dioxins Act in 1999. This legislation called for a 90 percent reduction in dioxin emissions by 2003.[104] The issue of waste disposal became increasingly important on Japan's political agenda in the mid-to-late 1990s and culminated in the adoption of new laws aimed at safer and more effective waste management. Central to the Japanese approach is the use of extended producer responsibility (EPR) in the form of producer "take-back" legislation. The dual goals of EPR are to provide an incentive for manufacturers to incorporate environmental considerations into product design, and to shift responsibility for end-of-life products (physically or financially, or both) upstream of the manufacturer and away from municipalities.

During the past decade, take-back legislation has been widely incorporated into Japanese environmental regulations and those of other jurisdictions, particularly the EU. Here, we provide an overview of the operation and effectiveness of Japanese EPR laws related to manufactured goods (e.g., computers, home appliances, and automobiles) and present some lessons learned. In 2001, Japan adopted a new legal framework to promote social and technological changes toward the creation of a healthy materials cycle society in which resources are used more effectively by following the "3Rs" (reduce, reuse, recycle) principle. Three basic laws establish the legal structure, responsibilities of entities and industries, and projects covered by the new legal framework. In addition, the legal framework includes five laws specifically targeting sectors and products. These are designed per the characteristics of products, industry structure, market, and recovery infrastructure, and are based on the principle of EPR. Citizens, businesses, municipalities, and the national government each bear a portion of the burden and have clearly defined responsibilities. For example, under the household appliance Recycling Law (HARL), retailers collect end-of-life products, consumers pay mandatory recycling and transportation fees, and manufacturers recycle collected products. Most EPR laws in Japan require consumers to pay a portion of the required recycling and transportation fees. The recycling fee is $23-44 (at the exchange rate of $1 = ¥110). Additional fees include a transportation fee of $4-18 for appliances, $29-38 for computers and monitors, and $55-164 for automobiles[105].

Recycling costs are collected at the time of purchase for new computers and automobiles, during the

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[104] Ministry of the Environment. Measures for Dioxin Reduction (in Japanese); www.env.go.jp/chemi/dioxin/ index.html.

[105] Koshiba, K. The Recycling of End-of-Life Vehicles in Japan. Japan for Sustainability Newsl. 2006, 50 (Oct); www. japanfs.org/en/newsletter/200610-1.html.

regular inspection for automobiles sold before the law, and at disposal for appliances.

One way to measure the success of Japan's EPR policy is to compare actual recovery rates with the numerical targets imposed by law. Under Japan's EPR laws, numerical targets have been set for the recovery rates of household appliances, food waste, computers, rechargeable batteries, construction waste, and end-of-life vehicles (ELVs). Some laws establish a timetable for meeting the targets (food waste, construction waste, and end-of-life vehicles), while others do not have an established timetable but are subject to periodic review (appliances, computers, and batteries). Recovery rate is broadly defined as the mass recycled (including reuse and energy recovery) divided by the collected mass of products. Specific definitions of recovery rate vary from product to product. Data show that actual recovery rates have met or exceeded regulatory standards or targets for most products. In some cases, such as for appliances, food waste, and computers, recycling rates far exceed the mandated standards and targets. The reasons for this differ from product to product. Standards for appliances were set in the late 1980s and early 1990s based on metal composition, recovery efficiency, and product durability, and incorporated the recovery efficiencies and recycling rates for plastics from an earlier and less technically advanced era. As a result, the standards for appliance recycling are lower than what can be achieved currently and therefore are easily met.

Recovery rates for manufactured goods are for goods that have been collected and not for all end-of-life products. Any evaluation of Japan's EPR policies will need to pay close attention to collection efficiencies for manufactured goods. The number of household computers collected through EPR-based recycling pathways is estimated to be <50% of all end-of-life computers generated in the household sector in the fiscal year 2005 (FY '05), although accurate estimates are difficult to obtain.[106] The remainder flowed into Japan's burgeoning second-hand computer market, were delivered to third-party recyclers, or were disposed of as e-waste both in Japan and abroad. Because these computers were likely purchased before October 2003, consumer involvement in recycling is limited to the voluntary payment of end-of-life recycling fees. Thus, it is not surprising that only a small fraction of these computers are taken back by computer companies. For all purchases made after that date, the cost of recycling is built into the purchase price and consumers do not pay an end-of-life recycling fee. As a result, the proportion of computers put into the recycling loop will likely increase because consumers will no longer absorb the costs of proper disposal voluntarily. The importation of end-of-life computers, including those from Japan, has so far been a significant cause of environmental health impacts in developing countries, particularly in India[107]. Computer manufacturers around the world, including those in Japan, have been pressured by non-governmental organizations and consumer groups to adopt take-back regulations. This made it more likely that Japanese laws, over time, would result in greater collection efficiency.

Under HARL, payment of post-use recycling fees and other collection inefficiencies may have resulted

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[106] PC3R Promotion Center. Recovery Results of End-of-Life Computers (in Japanese); www.pc3r.jp/topics/070411. html

[107] Smith, T.; Sonnenfeld, D. A.; Pellow, D. N. Challenging the Chip: Labor Rights and Environmental Justice in the Glob- al Electronics Industry; Temple University Press: Philadelphia, PA, 2006.

in so-called leakage. It is estimated that only 50 percent of end-of-life appliances are incorporated into the recycling loop, and about 10 million units go uncounted each year. This is due in part to the fact that some retailers at designated collection points may charge consumers a reduced recycling fee and sell the used goods to brokers for export and processing overseas[108]. Another concern related to product loss is the illegal (curbside) disposal of goods, such as appliances, for which consumers pay an end-of-life recycling fee under EPR laws. Approximately 2% of end-of-life appliances (~172,000 units) were illegally disposed of in 2004; this was 25% more than in 2001 when HARL went into effect.[109] The law has no mechanisms to reduce curbside appliance disposal, and the onus is on municipalities to strengthen monitoring and prevention. For all the reasons related to the leaks mentioned above, the Appliance Act was revised in 2006.

The ELV recycling law is designed so that consumers' reluctance to pay the recycling fee does not lead to illegal dumping. Consumers pay a fee at the time they purchase a new car or, for cars sold before the law went into effect, at the time of the mandatory periodic inspection. The fee is administered by a third party, the Japan Automobile Recycling Promotion Center (JARC). An electronic manifest system has been introduced to track how an end-of-life vehicle is processed to ensure that end-of-life vehicles are recycled properly. Some are concerned that enforcement may lead to an increase in the export of end-of-life vehicles, which is still allowed under the law. Japan is a large exporter of used vehicles, annual exports in the range of one million cars, primarily to countries that use the right-hand drive. Large-scale export of roadworthy vehicles is facilitated in part by Japan's rigorous car inspection systems. Inspections, which cost $1000-2000, are required every 2 years for 3-year-old cars. However, there is little indication that ELV regulations have caused an increase in exports of cars in working conditions.

ELV laws may have had a significant impact on the export of vehicles that must be sold as scrap. The one-time cost of disposing of end-of-life vehicles ($83-128) goes only to domestic recycling processes and is turned back over to a consumer by JARC if the end-of-life vehicle is not recycled domestically. Before the EV Recycling Act, the number of EVs generated and exported annually was estimated at 5 million and 1 million, respectively.[110] Although it is difficult to obtain hard data on the export of end-of-life vehicles, the current high global demand for scrap metals and the reimbursement of disposal costs to consumers may have increased the incentive to export end-of-life vehicles that are no longer roadworthy. In FY 2005, only 3.05 million end-of-life vehicles were collected following the law; this is substantially less than the 4 million expected.[111] The difference appears to be due to a loophole in the End-of-Life Vehicle Recycling Act that facilitates exports. An owner can de-register the car without paying the recycling fee and turn the car over to

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[108] National Institute of Environmental Studies. An Evaluation of Actual Effectiveness of the Recycling Law for Electrical Home Appliances, Report No. 191-2006 (in Japanese)

[109] Ministry of the Environment. Trend of Number of Illegal Disposals of Designated Home Appliances (in Japanese); www.env.go.jp/press/file_view. php?serial=7981&hou_id=7057.

[110] Ministry of Economy, Trade, and Industry. Flow of Recycling End-of-Life Vehicles and the Current Recycling Rate; www.meti.go.jp/policy/recycle/main/english/ statistics/tokei04_e.html#41

[111] Japan External Trade Organization, Japanese Economy Division. JETRO Japan Economic Report, June–July 2006, Car Recycling Business in Japan; www.jetro. go.jp/en/market/trend/industrial/pdf/jer0607-2e.pdf.

illegal recyclers. Because government agencies do not keep track of canceled ELVs, owners can abandon their cars without incurring recycling fees. This "million missing cars" problem is now widely recognized, and it remains to be seen how regulators will respond to this problem.[112]

Although the processes for collecting artifacts have had mixed success, recycling of collected goods has been successful. A key reason for recycling's early successes is industry investment in both research and development (R&D) and the creation of dedicated infrastructure to improve product recovery. For example, home appliance manufacturers began operating large-scale recycling facilities throughout Japan before HARL went into effect. Computer manufacturers have established recycling facilities where end-of-life computers are disassembled and separated into usable parts and materials. Vehicle manufacturers have invested in the R&D of automotive shredder residue (ASR) recycling technologies, dismantling processes, and applications of recycled materials. Technological innovation across the product life cycle is increasing recycling rates. These advances could give Japan a competitive advantage if more countries and jurisdictions require recycling technologies.

It is useful to compare Japan's successes and failures with those of other jurisdictions that have adopted EPR legislation. In 2002, the EU adopted the Waste Electrical and Electronic Equipment (WEEE) Directive, which is more comprehensive than HARL. The WEEE Directive covers 81 products in 10 sectors and covers both businesses and consumers. Unlike HARL, the WEEE Directive does not include a take-back requirement for consumers, and consumers do not pay a fee for post-use disposal. Although the collected product recovery rates are similar for the WEEE Directive and HARL, it is estimated that the collection rates for EU law are significantly lower than the 50% collection rates for HARL[113]. The EU is also implementing new regulations that create incentives for manufacturers to engage in more designs for disassembly, reuse, and recycling. EU manufacturers that follow specific Design for the Environment (DfE) guidelines and receive a product certification label. In Japan, there are no explicit guidelines on DfE, and manufacturers incorporate DfE as part of their plan to meet specified recovery targets.

Although disposal costs vary among EU nations, estimated collection and recycling costs are higher in Japan than in the EU, in part due to higher capital expenditures and costs associated with technology development. However, some evidence suggests that EPR laws are reducing disposal costs in Japan. Consider, for example, the shift in responsibility for waste management from municipalities to the private sector under HARL. The average cost of treatment of household appliances by the Tokyo metropolitan government before the implementation of the law was estimated to be ¥6200 ($56) for television to ¥15,800 ($144) for an air conditioner. After the law was implemented, the recycling costs of household appliances are approximately equal to the recycling fees paid by consumers. The average recycling cost has been estimated to be $25-27 for

[112] Onishi, T. Million End-of-Life Vehicles Vanished (in Jap- anese). Nikkei Bus. 2006,

[113] Jofre, S.; Morioka, T. Waste Management of Electric and Electronic Equipment: Comparative Analysis of End-of- Life Strategies. J. Mater. Cycles Waste Manage. 2005, 7, 24–32.

television and $52 for an air conditioner.[114]

An important feature of Japan's EPR laws is that they are based on the principle of shared responsibility, in which responsibility for the take-back and recovery of end-of-life products for different stakeholders is made explicit. When combined with a mandatory take-back policy, the explicit articulation of responsibilities helps reveal inefficiencies in collection and recycling that might otherwise remain hidden. Japanese laws also recognize that different products face different conditions after the market and that legislation must be tailored and adapted over time to changing markets. This is revealed in several laws that are being revised after the early years of the EPR experience. Japan is advancing innovation in environmental technologies. Areas of technological innovation include the development of "building-block"
processes, such as new techniques for separating materials, and the operation of societal pilot systems with complex resource recovery mechanisms. However, illegal disposals and increased export of end-of-life products have resulted in collection efficiencies of about 50% for manufactured goods. In addition, Japan's EPR laws have focused solely on closing the material loop and not on other considerations, such as reducing energy use and emissions during the life cycle. It remains to be seen how subsequent revisions to Japanese EPR legislation will address these challenges.

[114] Association of Electric Home Appliances. Annual Report of Home Appliance Recycling 2004 (in Japanese); www. aeha.or.jp/05/images/kadennenji.pdf.

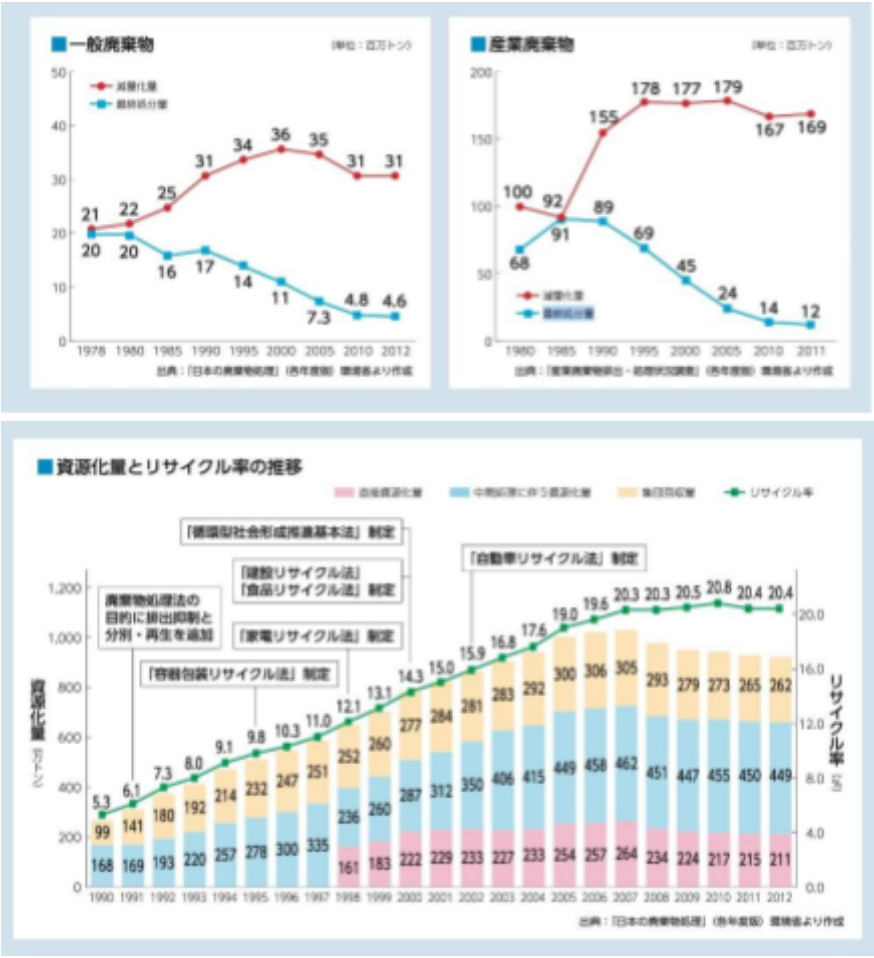

Figure 16 Ministry of the Environment "the Waste Disposal in Japan

2.9 CHALLENGE

2.9.1 Promoting CSR in a world of fast fashion

Perhaps more than any other field of art and industry, fashion is inextricably intertwined with time, finding its counterpoint in current, fast-moving trends and its inspiration in emerging styles. With its rapid production times and ability to capture the latest and hottest trends, the fast fashion model of production, distribution, and marketing has thrived over the past decade. From a manufacturing perspective advancements in textile factories to 3D printing (or additive manufacturing), technological changes have revolutionized production methods, allowing manufacturers to create garments faster and faster. Aside from manufacturing advances in textile factories, 3D technology has the potential to make time an increasingly negligible element of the production cycle. In addition, the democratization of fashion, spurred by cheaper garments allowing companies to market to the masses, contributes to throwaway culture and insatiable consumer demand. Additionally, the prevalence of social media fuels the virtually instantaneous movement of trends within communities and networks around the world. From the inherent carbon footprint of a world-spanning supply chain to dependence on massive amounts of natural resources, the societal and environmental impact of these trends has become increasingly clear. Yet, in a world obsessed with image and social connectivity and driven

by the ever-changing whims of consumers, there are no quick fixes to make the fashion industry more sustainable.

This section examines the limitations of the law in meeting these challenges. The law often offers only limited protection to intellectual property in the fashion industry, which can encourage fast fashion companies to ignore intellectual property law. Large, well-known fashion brands, such as Gucci, Adidas, and Puma, have the influence and resources to challenge IP infringement, and in fact, such brands have challenged alleged infringements by fast fashion companies such as Foreover21.

However, the opportunity cost of such costly litigation may ultimately result in higher prices on the shelves and lower wages in the industry. In addition, new and emerging designers may initially struggle to gain visibility among mass-market fast fashion collections, and if their designs are indeed misappropriated by fast fashion companies, new and emerging designers often do not have the opportunity to gain visibility, and being new and emerging designers often lack the resources to litigate intellectual property theft. In short, the tendency of fast fashion companies to ape traditional designers poses real threats to the integrity, value, and viability of other designers. This legal loophole not only allows for the unjustified copying of designs but also tacitly promotes the fast fashion business model's wasteful approach to natural resources and its reliance on carbon-intensive supply chains and production methods. In addition, the ability of social media to spread new fashions globally almost instantly, combined with rising levels of disposable income (particularly in fast-growing developing countries) drives the insatiable consumer demand for low-cost styles. This, in turn, further fuels the fast fashion industry's substantial carbon footprint. An extensive network of national laws, international standards, and industry best practices govern working conditions. At the international level, the International Labor Organization provides a forum to promote appropriate standards, policies, and programs to protect workers' rights. In addition, the G7 has formulated due diligence standards for the textile industry to help improve working conditions and strengthen workers' rights in the global textile supply chain.

Nonetheless, many difficult conditions persist. The April 24, 2013 collapse of the eight-story Rana Plaza building in Savar Upazila in Greater Dhaka, Bangladesh, epitomizes the devastating impact of poor working conditions in the garment industry. Ignoring warnings the day before the collapse, factory managers ordered workers to report to work or their pay would be withheld, even as a bank and stores on the building's lower floors were closed in response to concerns about the building's integrity. The collapse killed 1134 people and injured about 2,500 others.[115]

In response to concerns about labor conditions and labor standards in supply chains, there is a growing emphasis on supply chain transparency and traceability of raw materials used in producing apparel. While various legal provisions, such as Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act in the United States, the California Transparency in Supply Chains Act of 2010, and the Modern Slavery Act 2015 in the United Kingdom, all require disclosure of supply chain details, other forms

[115] Ansary, Mehedi Ahmed, and Uttama Barua. 2015. Workplace safety compliance of RMG industry in Bangladesh: Structural assessment of RMG factory buildings. International Journal of Disaster Risk Reduction 14: 424–37.

of so-called "soft law" such as voluntary codes guide or encourage companies to adhere to higher typicals in their supply chains. Indeed, de Brito et al. (2008) show that companies may not only be compelled by legal requirements but may also engage in more ethical behavior through the pursuit of competitive advantage or the pursuit of corporate social responsibility policies; however, the authors also acknowledge that companies face much ambiguity in determining the demands of various stakeholders.[116] In addition, many "soft law" guidelines are limited, as they often rely on voluntary compliance or lack effective enforcement mechanisms. However, through such initiatives that promote sustainability and corporate social responsibility, many companies are increasingly choosing to adopt policies and practices that intend to respect the social, environmental, and ecological at both the local and global economic levels. However, why do some companies prioritize sustainability while others do not?

Given the variety of individuals and companies involved in the fashion industry, it is difficult to generalize about the personalities of these entities; however, collectively, they exert an enormous influence on society and the environment. Companies such as Benetton have been innovators in promoting social issues, while Vivienne Westwood and Stella McCartney have become nearly synonymous with sustainable fashion and social responsibility. Despite these well-known champions of sustainability, the industry, in general, exerts a substantial negative impact on the environment and society. The question arises: why do so many fashion companies have such a detrimental impact on the environment while some other fashion companies are fighting for sustainability?

The answer most likely lies in the dichotomy between the low prices demanded by consumers and the ethical concerns of the public, along with different corporate personality models. In addition, prevailing corporate personality concepts may force fashion companies to maximize short-term corporate profits over other considerations. To explain, economists and scholars have long focused on the rights and duties of shareholders in an attempt to explain the purpose of corporations, with the emergence of two distinct views of corporate personhood. The dominant view in Anglo-American law, which focuses on shareholder value and shareholder supremacy over other considerations, has driven short-term profits at the expense of other stakeholders, thus accelerating global warming and sea-level rise in recent decades. In contrast, more enlightened views of the purpose of companies emphasize the importance of a wide variety of stakeholders, allowing companies to weigh long-term considerations when making decisions. Tracing its origins to the pioneering research of Berle and Means (1932) as well as Michael Jensen and William Meckling's seminal work "Theory of the Firm: Managerial Behavior, Agency Costs, and the Structure of Ownership"[117], the theory of shareholder value is embodied by Friedman (1962) in his oft-quoted statement: "There is one and only one social responsibility of business - to use its resources and engage in activities designed to increase its

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[116] de Brito, M., Valentin Carbone, and Corinne Meunier Blanquart. 2008. Towards a sustainable fashion retail supply chain in Europe: Organisation and performance. International Journal of Production Economics 114: 534–53.

[117] Jensen, Michael C., andWilliam H. Meckling. 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. Journal of Financial Economics 3: 305–60.

profits as long as it stays within the rules of the game, i.e., engage in open and free competition, without deception or fraud."[118]

Under such a construction, the interests of shareholders take precedence over all other stakeholders, which include employees, customers, and the communities in which the company operates. Scholars espousing such a rigid view of corporations point to seminal U.S. Supreme Court cases such as Dodge v. Ford, Schlensky v. Wrigley, and Revlon, Inc. v. Forbes Holdings as authority for the argument, corporations must focus on maximizing shareholder value, which often means ignoring other stakeholders who influence the long-term impact of the company. Companies pursue short-term profits at the expense of long-term stability, including impact on local communities, labor, the environment, and other stakeholders. In contrast to this rather myopic view of corporations, many other scholars[119] have convincingly shown the shareholder maximization model has "shaky foundations" and have argued that the case-law cited in favor of the shareholder value theory is not as clearly supported as often assumed in the prevailing academic literature nor do corporate bylaws or legal decisions require corporations to strictly follow the shareholder maximization model.[120] Furthermore, it is absurd to argue that corporations best serve society by simply ignoring anything but corporate profits.

Furthermore, as legal entities, corporations enjoy a range of rights and privileges, and it is only fair and appropriate that they also have at least moral and ethical obligations to consider the impact of their actions on their various stakeholders in addition to shareholders. While society requires a set of ethical behaviors from individuals, the basic legal structure of corporations removes personal responsibility from decision-makers and typically limits the liability of the corporation to the capital it holds. Unlike individuals who may be liable for wrongful conduct, the corporate form isolates individuals who make decisions that lead to wrongful conduct from the corporation, with liability for wrongful acts largely limited to the corporate level, rather than the actual decision-makers who devised, implemented, or took the actions that caused the harmful result. The process of decision-making, control, and accountability may encourage managers, who may be protected by allowances incorporate statutes, to engage in "excessive levels of risk-taking" that they can avoid as individuals. Herein lies the so-called agency problem, which denotes how the board makes decisions for the corporation and exercises control with limited oversight by its shareholders who are dispersed and meet only periodically. In addition, the law often shields corporate boards from liability for their decisions through the business judgment rule, a concept that U.S. courts developed but that now exists in various forms in other jurisdictions, including the United Kingdom, Canada, and much of the common law world.

Accordingly, courts will routinely ignore shareholder challenges if the board can identify a business

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118 Friedman, Milton. 1962. Capitalism and Freedom. Chicago: University of Chicago Press, pp. 124–33.
119 Rotman, Leonard I. 2010. Debunking the 'End of History' Thesis for Corporate Law. Boston College International & Comparative Law Review 33: 219–72.
120 Sneirson, Judd F. 2011. The Sustainable Corporation and Shareholder Profits. Wake Forest Law Review 46: 541.

purpose for a decision in which the board acted in the best interests of the company and in good faith with the due care of a reasonably prudent person. Absent from this analysis is the impact of decisions on the environment, the local community, consumers, the public, employers, supply chain workers, and a host of other stakeholders. Thus, many scholars have argued that the business judgment rule can often weigh in favor of directors at the expense of other stakeholders[121]. However, a more enlightened view of shareholder value theory recognizes a broader range of stakeholders, and doing so can improve shareholder value. Moreover, a mechanical application of the business judgment rule ignores the broader social impact that business decisions have and the harmful impact they can have if executed without due consideration of the broader consequences of the decision. Similarly, directors in the United Kingdom have a duty to manage the company in the interests of shareholders, as upheld in Percival v. Wright (1902)[122] and codified in the Companies Act 2006. In contrast to U.S. law, however, Parliament specifically introduced the concept of "enlightened shareholder value" in the Companies Act 2006, which requires directors to consider the collective best interests of shareholders in the context of other stakeholders, including employees and the environment.

Despite criticism that these UK reforms fall short of expectations, the emphasis on enlightened shareholder value introduces the imperative that companies consider other stakeholders when setting policy and making decisions. In contrast to an extreme interpretation of shareholder value theory that seeks to maximize shareholder wealth without considering other stakeholders, the concept of corporate social responsibility (CSR) encourages companies to develop sustainable policies and make decisions with due regard for the environment and society, taking into consideration a much broader range of stakeholders than simply the company's shareholders. While CSR standards are often voluntary, they can help change behavior by raising awareness and generating consumer pressure on other companies to follow the higher ethical standards of major competitors. Essentially, CSR not only makes ethical sense, but it is also often good business. Notably, the top 20 companies in the world by revenue have all adopted some form of CSR reporting, and as mentioned above, well-known designers such as Vivienne Westwood and Stella McCartney have helped lead the way to responsible policies in the fashion industry. However, it must be recognized that CSR does not have the force of mandatory law and may even in some circumstances inhibit mandatory law that contains higher standards when companies adopt voluntary CSR initiatives.

At the opposite end of the fast fashion production model, Kate Fletcher (2007) founded the slow fashion movement inspired by the "slow food" movement, which emphasizes responsibility in food production and consumption. Companies that emphasize more sustainable practices make up the slow fashion movement, emphasizing craftsmanship, good management, and product quality. Therefore, they naturally promote sustainability through more ethical sourcing and production techniques, as well as the use of organic, recycled, or more durable materials. Additionally, the labor involved in the production of these garments receives higher wages and greater protection than their counterparts in the fast fashion industry supply chain.

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[121] Gevurtz, Franklin A. 2011. The Globalization of Corporate Law: The End of History or a Never-Ending Story. Washington Law Review 86: 518.

[122] Percival v. Wright, [1902] 2 Ch. 421.

While the finished garments may cost more, they last longer and incorporate more timeless styles that don't go "out of style." Through an increased emphasis on the connection between raw materials, designers, artisans, retailers, and consumers, companies in the slow fashion movement promote sustainability in sourcing, production, and consumption. However, the slow fashion movement faces an uphill battle with cheap and mass-marketed designs in a world of growing consumer appetite. Therefore, government policies, reorientation of supply chains, and increased consumer knowledge and engagement are all needed to level the playing field between fast and slow fashion. In response to the types of concerns discussed above, several organizations seek to increase public awareness, point out the negative impact of sourcing and production methods, and provide records of ethically and sustainably sourced and produced raw materials.

Specifically, the Fair Trade Foundation promotes social, economic, and environmental standards for a range of agricultural products and raw materials, including bananas, coffee, tea, chocolate, cut flowers, gold, wine, and cotton. It also promotes other activities to improve workers' rights, promote fair wages, and develop communities in the regions that supply these products[123]. For fashion items, fair trade cotton labeling programs such as the Fair Trade Foundation's can provide consumers with greater assurance that sourcing and production methods allow for better and more stable incomes. In addition to fair trade sourcing and production, organic cotton labeling provides consumers with assurance that cotton has been produced in a way that has less impact on the environment, limiting the use of pesticides and fertilizers and using unmodified plants.

The Global Organic Textile Standard (GOTS) provides a global means of identifying and promoting organic textiles, including raw materials, manufacturing processes, and product labeling. Focusing on the entire textile supply chain, GOTS provides end-users with assurance through independent certification that textile products have been sourced and manufactured following relevant social and ethical criteria.[124]

Founded in 1998, the UK-based Ethical Trading Initiative works with its member organizations, including companies, trade unions, and NGOs, to promote international labor rights by fostering employee freedom and safe work environments, eradicating child labor, ensuring payment of living wages, reducing excessive work hours and mistreatment, eliminating discrimination, and encouraging regular and legal labor relations. About the fashion industry, in particular, ETI has promoted initiatives to improve working conditions in garment production. Aside from these initiatives, the previous discussion of corporate personhood illustrates the importance of companies incorporating sustainability into their sourcing, production, and interaction with consumers.

However, consumer interest in sustainable fashion has not necessarily translated into changes in consumer behavior. For example, Sudbury and Böltner (2011) showed that consumers may choose lower prices over higher sustainability standards, even when those consumers have a higher awareness of ethical

[123] Fairtrade Foundation. 2019. Available online: http://www.fairtrade.org.uk
[124] Global Organic Textile Standard. 2018. Ecology & Social Responsibility. General Description. https://www.global-standard.org/the-standard/general-description.html

fashion[125]. Therefore, slow fashion companies must more effectively convey to consumers the cost of cheapfashion versus fast fashion. In addition, they must continue to emphasize the responsible practices and sustainability contributions of slow fashion, thereby helping to guide consumer knowledge toward a reorientation from fast fashion to more sustainable types of design, sourcing, production, and marketing. In addition, government policies, industry bodies, and other stakeholders need to work with the industry to highlight the benefits of slow fashion, while they should discourage the excesses of fast fashion.

The global fashion industry faces several challenges in terms of sustainability and social responsibility. In particular, the fast-fashion model generates a significant carbon footprint and raises many social and environmental concerns. Given that the law currently provides only limited rights protection in the fashion industry and is often ineffective in improving corporate behavior, corporate social responsibility and sustainability initiatives can help combat inequality in the fashion industry and improve standards and conduct. Therefore, legal reforms and increased support for companies pursuing more sustainable practices are necessary to redirect the fashion industry and consumers away from the fast fashion model and toward more sustainable sourcing, production, distribution, marketing, and consumption practices. Companies that adopt such slow fashion practices should provide a model for the future of the global fashion industry.

[125] Sudbury, Lynn, and Sebastian Böltner. 2011. Fashion Marketing and the Ethical Movement Versus Individualist Consumption: Analysing the Attitude Behaviour Gap. E - European Advances in Consumer Research. Edited by Alan Bradshaw, Chris Hackley and Pauline Maclaran. Duluth: Association for Consumer Research, vol. 9, pp. 163–68.

3. Case studies

3.1 Blockchain technology and its application in the fashion world

The blockchain is the technology behind bitcoin and other virtual currencies. It is a distributed transaction ledger on the network. Each node, identified by cryptographic keys, stores the entire transaction log locally and announces to the network the transactions it has made so that each node can record them through a sophisticated coordination mechanism.[126]

In particular, the transactions are stored in blocks. Each block is connected to the previous one by storing inside it the ash of the chain of blocks that precede it. In this way, if a transaction is modified, the hash of the **block t** that contains it is modified accordingly. At this point, the ash stored by **block t+1** will differ from that calculated for the chain of blocks which precedes it, making the chain from **block t** onwards lose its validity. This validation mechanism guarantees the immutability of the data contained in the blockchain.

Alongside the property of data immutability, a further peculiarity of the blockchain is that it is conceived as an open community in which the entry of a new known is not subordinated to any central authority. This allows for maximum freedom in joining the network and complete anonymity of the nodes (network IP address aside). However, the absence of a central authority makes it necessary to have a distributed coordination mechanism to uniquely sequence transactions and avoid, for example, that the same bitcoin is spent twice.

The announcement of a new transaction is not received at the same time by all the remaining nodes in the network due to the slowness of the network. To remedy this problem, the protocol provides that each node accumulates a certain number of transactions in a block that is announced to the entire network after the solution of a complex mathematical problem called the nonce. This expedient creates a competition that imposes on the network the blocks validated by those who have more computing power. From this process emerges a sequentiality relation between blocks that are shared by all the nodes of the network. Moreover, each generated and eventually validated block contains a transaction that assigns a small reward in virtual currency to the node. This mechanism, called **mining**, transforms computation (essentially electrical energy) into a new virtual currency that enters the system.

Unfortunately, the validation mechanism (called **proof of work**) involves a large expenditure of energy, making the system unsustainable from an ecological point of view. Currently, the total estimated electricity consumption is 73.12 TWh (equal to the consumption of a nation like Austria) and CO2 emissions are 34.73 million tons (equal to the pollution produced by Denmark).[127]

In this perspective, other consensus mechanisms have been proposed to sequence valid blocks uniquely concerning the network. The best known is the **proof of stake**: initially proposed within the Ethereum technology, it is used within a more sophisticated algorithm, called BA*, within the Algorand

[126] Nakamoto, S. (2008), Bitcoin: A peer-to-peer electronic cash system.

[127] Digiconomist (2019), Bitcoin Energy Consumption Index, in https://digiconomist. net/bitcoin-energy-consumption

cryptocurrency.

3.1.1 Product traceability at all levels

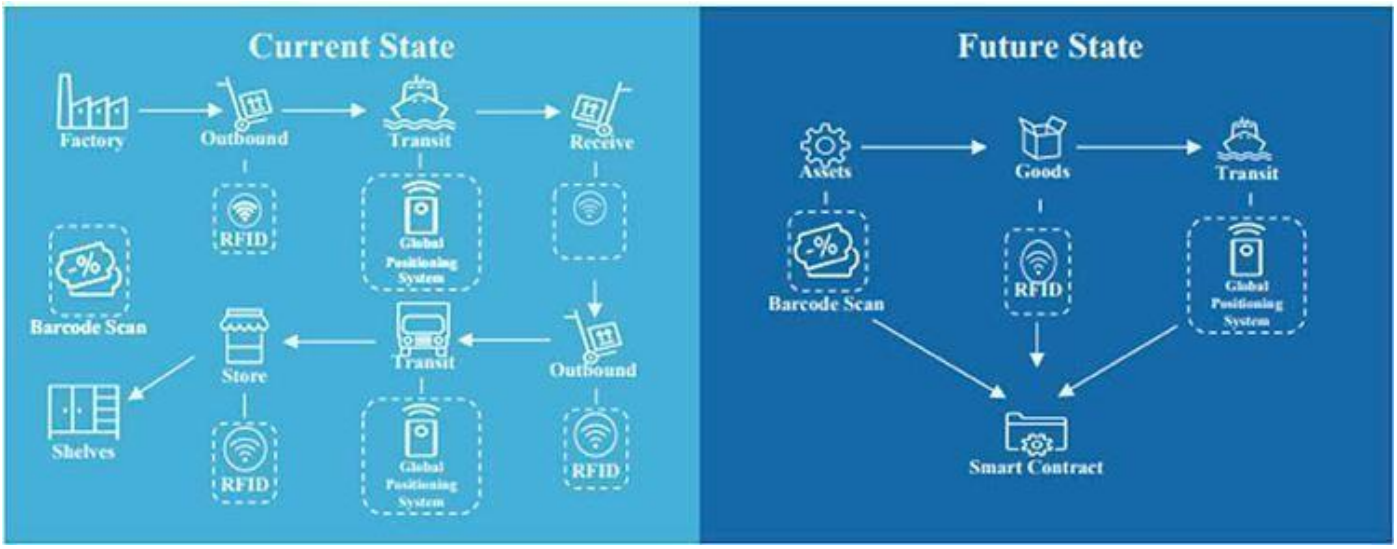

Figure 17 Chamber of Digital Commerce

A first approach, to guarantee the origin of a product from a certain producer, is to provide the product with codes through which the client can verify the genuineness of the product.

Unfortunately, this technique is easily circumvented if one obtains valid codes and these are associated with the counterfeit item. On the contrary, a fully traced commercial chain, including the eventual purchase by the final consumer, should ensure the genuineness of the product.

However, the retailer might keep, in addition to genuine products, counterfeit copies, assign to the latter the codes of the former, register the sale only for the former after selling all the counterfeit copies for each particular model-size-color combination. From this point of view, the only possibility of success lies in actively involving the consumer by having him complete the transaction, perhaps based on a specific agreement between manufacturer and retailer (called upon to prove the sale) or in the perspective of an immediate economic return (something easily obtainable if one reason in terms of tokens or electronic currency).

Much more complex is ensuring that the product purchased is not only authentic but also the result of a production chain with certain requirements. This requires tracking processing from the raw material, associating individual items in invoicing, and transport documents with transactions on the blockchain. This level of transparency (and bureaucratization) can only be possible by ensuring special incentives (e.g., much lower than usual tax regimes) and a much higher than normal level of control. In practice, there would be a burden that would fall both on companies, as management costs, and on the state, which would have to provide the means to carry out a high number of controls and would see a lower tax revenue.

Should these costs, aimed at guaranteeing the existence of a quality production chain, fall on the final consumer or the community? This is a question that goes beyond economics and fiscal policy and should be

seen from a cultural standpoint, to push the economic system to maintain a high level of quality that is **ecologically sustainable**: a winning model in the long term.

Of an entirely different scope is the verification of foreign production. From this point of view, it would be possible to guarantee traceability from customs. In this way, the consumer would know how much of the garment was produced abroad and how much was processed in his own country but would not indicate where it came from. The producer could, in part to his advantage, establish a system of traceability even abroad. Fundamental would be the traceability starting from the raw material and the creation of independent commissions of verification that the states where the processing takes place should allow and, hopefully, favor. Here too, the costs are high and it is not clear who should pay them. These are issues that can come down to the level of international trade agreements. The first step in this direction could be bilateral agreements and pilot projects to establish ethically sustainable supply chains.

3.1.2 Certification and risks

Unfortunately, it is now possible to make consumers believe that they have purchased an original garment as part of a scam against them.

Consider that through Operation Spider Web In January 2020, after 6 months of investigation, a scam was unmasked: a B2B e-commerce system through which wholesalers and traders could buy counterfeit goods of well-known brands, equipped with QR codes. The final consumer, framing it with his cell phone, was sent back to a generic site where the quality of the product was certified. The garments came from abroad (Turkey, Bulgaria, and the Czech Republic), arrived in Italy through international couriers, and were then resold and distributed to sellers throughout the country. The action of the Guardia di Finanza allowed to seize about 15,000 items of clothing, which would have earned over 4,500,000 euros, and to report 35 subjects, owners of businesses linked to the illegal activity, for having introduced into the national territory and marketed counterfeit products.[128] One of the main issues related to the technology considered here lies in the veracity of the data entered into the database and made unchangeable by the blockchain. Who guarantees us that that batch of raw material is actually what it says it is? From a survey by Fashion Revolution carried out on 200 international brands, it appears that only 35% release a list of their first-level subcontractors and that only 19% go further. Even more opaque is the situation regarding raw materials: the list of suppliers is published by only 5% of the brands analyzed.[129]

The solution to this problem has been found in the use of interaction between certified subject and certification body, starting a certification process of the semi-finished product to be delivered to the next stage of processing. The dynamics consist in associating to the lot to be delivered the appropriate certifications and

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[128] Corriere adriatico (2020), Ancona, griffe a prezzi stracciati, ma sono tutte contraffatte: organizzazione di "falsari" sgominata dalla Finanza,www.corriereadriatico.it/ancona/ancona_griffe_internet_prezzi_stracciati_contraffatti_organizzazione_falsari_abbigliamento_finanza_ultime_notizie-5015348

[129] Fashion Revolution (2019), Fashion Trasparency Index 2019, in https://issuu.com/fashionrevolution/docs/fashion_transparency_index_2019

waiting for the verification by the body in charge, with limits that can sometimes be identified in a too formal approach and in too long times of certification release.
Moreover, it should be kept in mind that the Chamber of Commerce is the body in charge of the Certification of Origin, while for the Certification of Preferential Origin there is not yet a certifier (a possible candidate could be the Customs Agency).

Other possible solutions consist of non-profit initiatives linked to independent bodies that use innovative consulting services and are often financed by the brands most sensitive to these issues.

3.1.3 Provenance

Figure 18 Provenance website

Experiences of blockchain applications include those implemented on the Provenance (London) platform. For example, regarding the fashion sector, in collaboration with Martine Jarlgaard, the blockchain application of this company has allowed providing verified information and therefore to create conditions of transparency of the value chain about materials, people, and processes.

Specifically, Provenance's website highlights, "we tracked sustainable alpaca fleece from shearing in the farm, through to spinning, knitting, and finishing in the Martine Jarlgaard's London studio."[130] In particular, the entire production cycle (including photos and the name of the alpaca involved in the realization of the yarn) can be viewed by the final consumer through smartphones and QR codes on the product label.

3.1.4 Virgo

Figure19 Virgo website

Another interesting example is that of Virgo: a platform based on different technologies, including

[130] Provenance (2017), Increasing transparency in fashion with blockchain, https://www.provenance.org/case-studies/martine-jarlgaard

blockchain, and dedicated to luxury and fashion, which is designed to certify the authenticity of goods and trace their value chain.[131]

The platform, created by Temera, PwC, Luxochain, and Var Group, was presented in 2019, for the Milan Fashion Global Summit. In the words of Francesca Moriani, CEO of Var Group: "With Virgo we want to guarantee a clear and flexible process, where raw materials and production lots will be certified, allowing to enhance the principles of sustainability, environmental, ethical and social responsibility."[132]

More in detail, Virgo allows the self-certification of every single batch by producers, using different technologies (e.g. RFID, UHF, and NFC) and using the blockchain to securely record data. Thus, it allows companies and customers to monitor the life cycle of the product. In particular, the final consumer, using his smartphone to read the QR code associated with the garment, will be able to know who packed the product, where the yarn comes from, with what chemicals it was treated, how much CO2 was emitted to make it. In principle and in an indirect way, this will also help to understand if the production has involved exploited labor or mistreatment of animals.

3.1.5 Italian Ministry of Economic Development

Figure 20Ministero dello sviluppo economico

In 2019, the Italian Ministry of Economic Development and IBM launched a pilot project called "The blockchain for the traceability of Made in Italy", for a feasibility study and proof of concept of a production chain certified via blockchain.[133]

For an effective development, a specific use case was considered, with identification of the actors involved in it and their interactions. The case concerns a company that asks a producer for a batch of raw material that must be certified as organic.

The certifying authority must validate or not the batch of raw material and the attached certification before they are sent to the producer. The latter will carry out the processing and then ship the finished product

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131 Morgantini, F. (2019), La Blockchain a servizio del lusso, Forbes Italia, https://forbes.it/2019/10/23/blockchain-lusso-virgo-certificare-autenticita-fashion/

132 Var Group (2019), Nasce Virgo, la piattaforma di sustainability, reputation & authenticity, in https://www.vargroup.it/comunicati-stampa/nasce-virgo-la-piattaforma-di-sustainability-reputation-authenticity/

133 Italy, https://www.mise.gov.it/index.php/it/ blockchain/ blockchain-per-il-made-in-italy

to the company that will sell it to the final consumer.

Going into the details of the pilot project, it is worth noting that the blockchain is only concerned with formally storing and validating, via smart contracts, the transactions between users. The rest of the system revolves around a backend that takes care of orchestrating the flow of data between individual users, the database that stores user data, and the blockchain. The development of the system is conceived as an open architecture to the ERPs of the individual actors that will dialogue with the blockchain through standardized protocols. Finally, contrary to the original spirit of the blockchain, access to the registry will be regulated and will not be anonymous.

3.2 Not only CO2 reduction but also attention to chemicals: Puma eco-leader in the field of sportswear

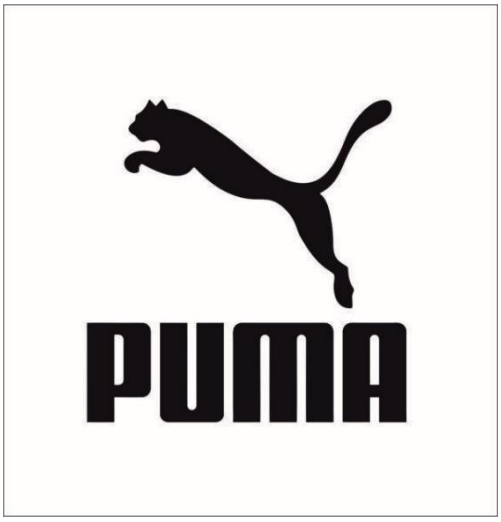

Figure 2 Puma website

3.2.1 Company Introduction

In 1924, in Herzogenaurach, Germany, brothers Adolf and Rudolf Dassler founded the Gebrüder Dassler Schuhfabrik, a company producing and selling shoes. Over the years, the company was very successful; in fact, the majority of German athletes at the 1928 and 1936 Olympics wore their shoes. In addition to them, many of the best athletes, such as Jesse Owens, wore the Dassler brothers' shoes, winning many Olympic medals. In 1948, after a discussion, the two brothers decided to separate and Rudolf continued the business by creating Puma. In 1979, the company's logo was revolutionized and the logo that is still in effect today was born. Puma then enters into collaboration with Jil Sander, a famous designer, and in 1998 they create the first leisure footwear: the Puma King, characterized by the authenticity and credibility of the brand and the classic and fashionable style of the designer. In 2015 Rihanna becomes the global ambassador for women's workouts influencing collections and products by becoming the Puma Women's creative director. 2017 is a record year for Puma, as for the first time in history it manages to record more than 4 billion euros in sales. Over the years, many famous sportsmen have worn Puma products, such as Usain Bolt, Serena

Williams, and Pelé. Today, Puma is the world's third-largest company in the sportswear and footwear sector.[134]

3.2.2 Analysis of the best practices of the company

Protecting the environment and the planet is very important to Puma as climate change can have serious repercussions on its operation and performance.

Puma applies different CSR practices to try to reduce the negative impact it has on the environment by acting in the following areas: reduction of CO2 emissions, reduction and more efficient use of water, use of innovative materials, and reduction of the use of harmful chemicals. To try and reduce water and energy consumption, CO2 emissions, the use of chemicals, combat animal cruelty, and improve the quality of life of the inhabitants of the planet, Puma has decided to find alternative materials or substitutes to those still used in the production of clothing. To comply with their sustainable strategy "**10FOR20**", the company has decided to use organic or recycled cotton and recycled polyester or guaranteed by the bluesig and Oeko-Tex® certifications, whose purpose is to verify that the production chain is as sustainable as the materials used. In addition, Puma also enjoys the Responsible Down Standard certification to ensure that feathers are harvested and processed sustainably and without mistreating the geese and ducks. In 2018, Puma used 10,370 tons of BCI-certified organic cotton and managed to use 3% to 20% less water in the different plantations depending on where they are located. On average, 10 cubic meters of water are used for one kilogram of cotton, and by using organic cotton the saving of even just 3% of water corresponds to 3.1 million cubic meters of water, which is equal to the amount needed to fill about 15 million bathtubs. As you can see from the table below, the goal was to have the percentages of environmentally sustainable materials used for production by 2020 very high, about 90%.

Table Puma, 2018, p. 75

Material	New 2020 Target	Previous 2020 Target	2018	2017	2016	2015
BCI and / or organic Cotton*	90	50	50	40	19	3
bluesign®, Oeko-Tex® and / or recycled Polyester**	90	50	86 (bluesign® 61)	47	24	15
LWG Medal-rated leather	90	90	> 99	99	94	99
FSC certified and / or recycled Paper & cardboard	90	90	92	95	78	85
RDS-certified down feathers	90	-	-	-	-	-
Better PU (Polyurethane)	500k pieces	Pilot	First production	Pilot	-	-

* In 2018, we added organic cotton to BCI cotton
** In 2018, we added Oeko-Tex® and recycled polyester to bluesign®

The waste created in the various stages of production does a lot of damage to the environment as it fills more and more landfills and emits methane and greenhouse gases. For these reasons, Puma is committed to innovating and discovering new methods to be able to reuse the waste they generate, to be able to decrease

[134] Puma. (2019). About Puma. https://about.puma.com/en/this-is-puma/history

the negative effect that waste has on the environment. For example, they make the waste generated from the creation of shoe soles melt to be able to reuse it for the creation of other soles or to be able to use it as packaging components. In 2018, Puma put into practice measures to reduce the use of plastic by optimizing its use. In addition, Puma is committed to reducing CO2 emissions by managing its offices, stores, and warehouses more efficiently by making important changes to its production chain. Puma has set itself a 3% margin of improvement, meaning that CO2 emissions will decrease by 3% in sales. As can be seen in the table below, in 2018 the area where the largest amount of CO2 emissions are released is from production with 126,590 tons. The total CO2 emissions in sales in 2018 were 58.6 tons per million. This figure compared to previous years has decreased, which means that the actions taken by Puma are working and are therefore effective.

Table 6 Puma, 2018, p. 77

T.11 **CO_2e EMISSIONS BREAKDOWN BY SOURCE** [1-7]

CO_2e Emissions (Absolute Figures)	2018	2017	2016	2015	Variation 2018 / 2017 (in %)	Variation 2018 / 2015 (in %)
Scope 1 - Direct CO_2e emissions fossil fuels (T)	**6,918**	7,678	6,854	7,296	-9.9	-5.2
Car Fleet (T)	4,073	4,134	3,746	4,087	-1.5	-0.4
Heating (T)	2,845	3,545	3,107	3,209	-19.7	-11.3
Scope 2 - Indirect CO_2e emissions electricity & steam (T)	**43,366**	40,029	37,300	35,591	8.3	21.8
Electricity (T)	42,145	38,914	36,046	34,445	8.3	22.4
Steam (T)	1,221	1,115	1,254	1,146	9.5	6.6
Scope 3 - Other indirect CO_2e emissions (T)	**222,315**	208,525	196,896	192,305	6.6	15.6
Business Travel Transportation (T)	15,582	14,394	12,167	10,191	8.3	52.9
B2B Goods Transport (T)	74,182	64,076	48,484	57,085	15.8	29.9
B2C Goods Transport (T)	5,961	6,994	16,223	6,321	-14.8	-5.7
Manufacturing in Tier 1 Suppliers (T)	126,590	123,061	120,023	118,708	2.9	6.6
TOTAL SCOPE 1-3 (T)	**272,599**	256,232	241,049	235,192	6.4	15.9
Annual sales PUMA (in € million)	4,648.3	4,135.9	3,626.7	3,387.4	12.4	37.2
TOTAL CO_2e EMISSIONS RELATIVE TO SALES (in tons CO_2e per € million sales per year)	58.6	62.0	66.5	69.4	-5.3	-15.5

1. PUMA uses own methodology for CO_2 accounting, with reference to the GHG protocol.
2. The consolidation scope follows the operational control approach, including PUMA-owned or operated offices, warehouses, stores and own industrial sites (Argentina).
3. Outsourced Tier 1 productions accounted in the scope 3 emissions, covering CO_2 emissions from all three divisions (Accessories, Apparel, and Footwear).
4. Due to the Kering spin-off we reviewed the scope in our sustainability reporting tool. From this year on, we will apply the "min. 90% rule" for data collection from PUMA entities, covering min. 90% of PUMA's FTE employees worldwide. The residual will be extrapolated.
5. PUMA applies the market-based approach for scope 2, using emission factors by ADEME. In addition to the market-based approach, the location-based approach is used in the CDP questionnaire. Scope 3 emissions factors are based on additional company and industry-specific emission factors.
6. Data includes extrapolations or estimations where no real data could be provided.
7. Methodological changes over the last three years influence results.

To achieve efficient water and energy management Puma has partnered with the World Bank's International Finance Corporation, from which two water and energy management programs have been developed and applied to 11 of the most important factories located in Vietnam and Bangladesh. These programs aim to highlight possible improvements to be made in the least expensive way possible. From 2015 to 2018, Puma was able to use 33% less water for shoe production and 38% less for apparel production. Throughout the production chain, water is used at different stages, as a solvent for the use of chemicals and the dyeing process. However, these steps generate a significant amount of contaminated water waste, which to reuse or release into the environment must be tested to verify that it no longer contains chemicals or colors. To do this, Puma has aligned itself with Zero Discharge of Hazardous Chemicals Foundation guidelines.

Because hazardous chemicals can harm the environment and people's health, Puma introduced and adopted the AFIRM Group's Restricted Substances List (RSL) and the ZDHC's Manufacturing Restricted Substances List (MRSL) as strategies for chemical use and control. RSL and MRSL are the leaders in their industry for chemical and substance management, allowing Puma to only use substances that are not harmful to the environment and compare with other companies in the industry on what chemicals to use. In 2018 as shown in the table below, Puma met the conditions of RSL and MRSL and used only non-harmful chemicals 98% of the time.

Table 7 Puma, 2018, p. 80

T.13 **RESTRICTED SUBSTANCES LIST TESTS STATISTICS 2015-2018**

	2018		2017		2016		2015		Variation 2018 / 2017		Variation 2018 / 2015	
Product Division	No. of Test Reports	Compliance Rate (in %)	No. of Test Reports	Compliance Rate (in %)	No. of Test Reports	Compliance Rate (in %)	No. of Test Reports	Compliance Rate (in %)	No. of Test Reports (in %)	Compliance Rate (in %)	No. of Test Reports	Compliance Rate (in %)
Footwear	3,512	98.4	2,707	97.9	1,781	96.0	1,150	92.1	30	0.5	205	6.3
Apparel	988	98.0	925	99.1	500	98.0	480	93.1	7	-1.1	106	4.9
Accessories	764	97.1	753	96.0	677	94.1	624	92.0	1	1.1	22	5.1
Others*	54	100	44	95.5	78	93.6	82	93.9	23	4.5	-34	6.1
Total	**5,318**	**98.1**	4,429	97.8	3,028	95.8	2,336	92.3	20	0.3	128	5.8

* Packaging and labeling materials

In 2011, Puma said it wanted to eliminate all harmful and damaging chemicals from its manufacturing and supply chain. To do so, it co-created an initiative called Zero Discharge of Hazardous Chemicals Foundation. That same year, Puma became the first company to publicly commit to eliminating these substances with Greenpeace. Today, all of Puma's products are PCF-free as it is a very harmful and contaminating substance for the environment and workers.

Puma also pays attention to the sustainability of its infrastructure; in fact, it uses solar panel installations to generate renewable energy at its headquarters in Germany and the United States, and where it cannot produce renewable energy itself, it buys and uses only energy from renewable sources. To promote the use of electric vehicles, recharging stations have been installed in the parking lots to support corporate sustainability and reduce the negative impact that employees have on the environment.[135]

135 Puma. (2019). Sustainability. https://about.puma.com/en/sustainability

3.3 High attention to the sustainability of infrastructure and personnel: Patagonia and The North Face cases

Figure 22 Patagonia website

3.3.1 Company introduction: Patagonia

Yvon Chouinard, the founder of Patagonia, started his business in 1957 when he decided, after meeting Swiss climber John Salathé, to start producing better and stronger rock pitons. The pitons were sold for $1.50 and in the first years, the profits from this business were minimal. In 1965 Chouinard began a partnership with Tom Frost, an aeronautical engineer, and climber. The two decided to expand the market by improving and producing all useful climbing tools, and from this collaboration, Chouinard Equipment was born. Chouinard realizes that selling climbing apparel can increase the hitherto marginal profits of Chouinard Equipment, and so by 1972 they are also selling gloves, hats, rain caps, and bivouac bags. The founder of Patagonia decides it is best not to give the clothing line the name Chouinard, as he did not want the clothing line to be associated exclusively with climbing gear, and also did not want to dilute the image of Chouinard Equipment. Thus, in 1972, Patagonia was born. At the beginning of the eighties, Patagonia undertook a new revolution concerning the colors of the various garments using cheerful colors such as cobalt, French red, and aloe.[136]

3.3.2 Analysis of the best practices of the company

The company's mission is to use all the resources at its disposal to try to conserve and preserve the environment as it is undergoing very important and damaging changes to the entire ecosystem and planet. Patagonia believes a lot in CSR; it is active in many areas applying different practices. Regarding the reduction of environmental impact Patagonia acts on several fronts such as materials and resources used. One of the practices the company believes in is called "Worn Wear", which aims to create high-quality products that last and can be repaired, and if repair is not possible they can be recycled. This reduces the production of clothing and the resulting CO2 emissions, high water consumption, and production of waste.

Patagonia employs more than 45 full-time people dedicated to product repair and is the largest repair company in North America. In addition, the company's website explains to customers how to care for its products, such as how they should be washed and dried or how to repair them. Patagonia uses a variety of eco-

[136] Patagonia. (2019). Company history. https://eu.patagonia.com/ch/en/company-history.html

friendly fibers and materials in the production of its products, which must have the least possible impact on the environment. Among the ecological fibers used are hemp, organic cotton, nylon, wool, polyester, and recycled feathers, refibra TM lyocell, tencel® lyocell, and yulex. The hemp used for production does not have a "certificate of organicity", but the company guarantees that it has been grown organically using manure, fertilizer, and rainwater. The use of hemp, therefore, leads to a low impact on the environment also thanks to the fact that some properties of hemp improve the health of the soil as it provides basic nutrients that prevent soil erosion. Hemp can be used either individually, meaning that some garments are 100% hemp, or in combination with other fibers such as recycled polyester, spandex, and organic cotton.

Patagonia uses 100% organic cotton to create some fabrics because it is grown and processed in an environmentally sustainable way. To ensure that the cotton that is purchased is indeed 100% organic and meets the USDA's National Organic Program specifications, Patagonia requires that farms, cotton processors, and shippers hold a certification issued by an independent and accredited certification body. In addition to using organic cotton, Patagonia also uses regenerated cotton thanks to a partnership with the TAL Group, one of the largest garment manufacturers in the world, which since 2011 has been recovering cotton scraps and offcuts in its cutting and manufacturing plants in Malaysia and China. With the scraps of 16 cotton T-shirts, it is possible to create a regenerated cotton T-shirt. This recovery of cotton allows for a decrease in the use of water, energy, chemicals, and the reduction of waste and refuse, which allows for a reduction in the negative environmental impact generated by the production and processing of cotton. Patagonia tries to use as much recycled nylon as possible in its products, as it allows the company to be less dependent on oil, generate less waste, reduce toxic emissions from incinerators, and consequently the pollution of air, soil, and water. The nylon used by Patagonia comes mainly from post-industrial waste fibers and yarns collected from textile mills that are transformed into reusable nylon fiber.

Patagonia uses only 100% recycled goose and ducks down from used items that can no longer be sold as comforters and pillows, thus reducing waste, discards, mistreatment, and exploitation of animals. REFIBRA lyocell fiber is composed of two innovative solutions using recycled wood and cotton, reducing the impact on the environment. Wood pulp, the raw material used in REFIBRA lyocell, is renewable and comes from sustainably managed forests. Recycled cotton is added to the wood pulp, which enables the reduction of waste and scrap and also allows smaller quantities of wood pulp to be used, reducing the number of raw materials used, even if they are sustainable. The production process of this fiber allows to use 95% less water than the production of cotton fabrics and also does not pollute the environment.

To obtain recycled polyester fibers, Patagonia uses and recycles used soda bottles, unusable second-grade fabrics, and discarded garments. The use of recycled polyester allows the reduction of petroleum use and the reduction of negative impact on the environment. In 1993, Patagonia was the first company in the industry to use recycled plastic bottles in the production of fleece products. Wool production requires large amounts of land for sheep grazing and requires large expenditures of energy and water and requires the use of chemicals for the process of converting raw wool into high-quality fibers. All wool suppliers must have RWS certification, which guarantees animal welfare, responsible land management, and quality.

Patagonia, to reduce unnecessary resource use that has a great impact on the environment, tries to use only recycled wool from other discarded wool garments. In addition, to avoid the great waste of energy and resources that the process of dyeing wool requires, Patagonia selects and divides recycled wool garments by color and mixes them, thus managing to recolor this fiber. Another innovative fiber used by Patagonia is TENCEL lyocell obtained from the pulp of trees that are cultivated sustainably by companies that enjoy the certification offered by the Forest Stewardship Council (FSC). This fiber has many qualities including strength, which allows it to last a long time. In addition, no harmful or noxious chemicals are used in the manufacturing process of TENCEL lyocell, making this fiber sustainable and environmentally friendly.

Since 2000, Patagonia has been working with bluesignTM technologies to try to reduce resource consumption in its materials supply chain and to receive guidance on the best use of various chemicals. BluesignTM technologies monitor and approve that the use of chemicals, materials, processes, and products are not harmful to the environment. In 2007, Patagonia became a partner of the bluesign system, whose main goal is to improve environmental performance by acting in five areas of the production process, such as the reduction of CO2 emissions, the productivity of resources with low environmental impact, the reduction of water pollution, the protection of consumers and the protection and safety in the workplace.

Patagonia is looking for a replacement technology to DWR due to its harmful environmental impact as it requires the use of perfluorinated PFC. The dyes used to dye various garments are polluting, so Patagonia has begun using vegetable dyes from 96% renewable resources such as dried beetles, food waste, and silkworm logs to dye a collection called "Clean Color." The GORE-TEX® fabrics used by Patagonia have a low impact on the environment as they are high quality and very durable fabrics that guarantee a long life. This saves energy and resources that would not be achieved if the quality and resistance were lower, creating the need to produce more products.

PrimaLoft® Gold Insulation Eco padding boasts of being composed of 55% recycled fibers from post-consumer materials, which has less impact on the environment. In addition to the focus on materials, fibers, and technologies used to try to reduce its environmental impact as much as possible, Patagonia also pays attention to the use of resources in its corporate buildings and facilities.

Patagonia's headquarters consists of 7 buildings; the most recently constructed one dates back to 1997, but even then the company paid close attention to the origin of construction materials and waste management. In fact, for example, almost 100% of the waste from the construction was recycled and the steel used was 98.5% recycled. Even for the construction of the Service Center, Patagonia paid close attention to the construction process by using recycled materials and recycling waste. In addition, this building was constructed to save energy and to make it more environmentally sustainable; in fact, it saves between 30 and 35% of energy in a time frame of three to eight years. In 2006, the size of the Service Center was doubled, and all the efforts undertaken by Patagonia to reduce the impact of this expansion on the environment as much as possible were rewarded by obtaining the Gold level of the Leadership in Energy and Environmental Design (LEED) certification issued by the U.S. Green Building Council. As far as store buildings are concerned, Patagonia tries to use existing buildings as they require less energy and resources. On the other hand, if an existing building is

not available, Patagonia is committed to building a store that looks good but uses sustainable materials and tools and is as environmentally friendly as possible. In its various factories, such as those in California, Patagonia uses solar panels to produce energy, which reduces the need for power from the grid by about 14%, skylights that capture sunlight, or translucent smoke evacuators that reflect natural light into the building. LED bulbs are used for lights, and some buildings are equipped with motion sensors that save energy. In addition, boilers are used for the heating system, and ventilation systems with night cooling in the warehouse to avoid the use of air conditioning. Patagonia has placed two stone slabs in its parking lots that allow rainwater to filter into the ground and an infiltration basin that allows rainwater to be collected and filtered into the ground, which allows pollutants to separate before they end up in the city's storm drains and pollute groundwater. The open spaces outside the various facilities are composed mainly of native trees and shrubs that do not require huge amounts of water and allow less waste of this resource. The water used in the various facilities is used efficiently to reduce the environmental impact, for example, most of the toilets are dry allowing the saving of 3.5 liters of water per flush.

To reduce the environmental impact generated by its employees' means of transportation, Patagonia has developed the Drive-Less program, which offers a cash incentive to employees who commute to work by bicycle, skateboard, carpooling, or public transportation.

This allows an employee to earn up to $500 per year. In the first year of implementation of this program, 900 employees joined, saving one million kilometers traveled by car, which led to the reduction of CO2 emissions by 226 tons and the reduction of 97,000 liters of fuel. In 2012 Patagonia obtained the B Corporations certification, which is only granted when the company has an explicit environmental or social mission. The "B" stands for the benefit the company must demonstrate that it is committed to creating benefits for the environment, its employees, and the community. One percent of annual profits are donated to support environmental organizations around the world, paying between $2,500 and $15,000 to hundreds of organizations. Patagonia prefers to donate small amounts to be able to donate and support a multitude of organizations. From 1985 to 2017, Patagonia has contributed more than $89 million to more than 954 activities in support of the environment. In addition, Patagonia is active in a multiplicity of pro-environmental projects such as the goal of becoming a zero-waste company in all its branches.

3.3.3 Company introduction: The North Face

Figure 22 TNF website

In 1966, a hiking enthusiast opens a small climbing store in the North Beach neighborhood of San Francisco, United States. The small store is immediately successful and will be known as The North Face (TNF), a retailer of high-quality climbing equipment and backpacks. In 1968 the store is moved to Berkley, where it will also begin with the creation and production of its mountaineering equipment and clothing. During the 1960s, The North Face began sponsoring expeditions to remote and unexplored places which became a tradition for The North Face and gave birth to the company's mantra: "Never Stop Exploring". In 1977 The North Face implemented Gore-Tex, a synthetic fabric with high breathability and waterproof capabilities, into its products. In the early eighties, the company decided to introduce the production of extreme ski clothing to its business to take exploration to another level. By the end of these years, The North Face became the only supplier in the United States offering a high-quality collection of technical outerwear, ski clothing, sleeping bags, tents, and backpacks. In 1990s The North Face logo starts appearing in more and more expeditions, climbing walls, and high mountain trails. In 2010 The North Face launches Explore found, a financial support program to support non-profit organizations that are dedicated to trying to connect nature and people.[137]

3.3.4 Analysis of the best practices of the company

The North Face's mission is to create and develop responsible, environmentally sustainable products and business practices to preserve and protect the environment.

One of the many initiatives implemented by the company is called "The North Face Renewed" and consists of the creation of a new line of clothing using and recycling discarded clothing that would otherwise end up in landfills. These clothes, which are collected by TNF's partners, undergo a three-step process. The first is to inspect and wash the product, the second is to repair the products to bring them back to their original state, and the third and final process is to check the quality of this recycled product to see if it is still within the company's standards. TNF Renewed allows the company to decrease its impact on the environment by

[137] The North Face. (2019). Chi siamo.
https://www.thenorthface.ch/it_ch/innovation/discover/questionmadness

recycling the clothes they do not end up in landfills and less waste is generated, as approximately 85% of clothes end up in landfills each year.

To become more environmentally sustainable, TNF uses recycled materials such as recycled polyester as much as possible. The company is very committed to using recycled polyester as it has less impact on the environment since by reusing existing materials the company can reduce dependence on fossil fuel and can reduce water consumption and air pollution. Although TNF uses little cotton as a material for its products, when it does, it tries to use organic cotton as it has less impact than regular cotton. In addition, TNF is a member of the Better Cotton Initiative which consists of the promotion and control of sustainable cotton production to reduce the negative environmental impact and improve the conditions of farmers.

In 2013, TNF in collaboration with the non-profit organization Textile Exchange, which focuses on sustainability in the apparel and textile industry, and Control Union Certifications, an independent certification body specializing in agriculture and farm operations, created the Responsible Down Standard. TNF decided to gift ownership of the RDS to Textile Exchange so that other companies in the industry could also benefit from this certification. The RDS is in charge of verifying and controlling the origin of feathers, making sure that they do not come from abused animals and that the entire supply chain of feathers is traceable to reduce the negative impact on the environment that comes from the exploitation of feathers. Since 2016, all products made from feathers have been RDS certified. Also in the same year, 3,000 farms around the world received RDS certification, protecting more than 400 million geese and ducks. Also in 2016, more than 50 companies began using RDS-certified feathers in their products. In addition, in collaboration with Primaloft®, it introduced a synthetic alternative to feathers to try to reduce their use called ThermoBallTM. Other innovative materials used by TNF are GORE-TEX®, Polartec® Thermal Pro, Polartec® Eco which is a recycled material made up of 90% post-industrial waste and 10% consumer waste, TKA, WindWall™, and DryVent™.

To reduce waste and consequently reduce its negative impact on the environment, TNF decided to recycle and use PET bottles to create new fleece products. By using PET bottles and revolutionizing the dyeing process, TNF can consume 50% less water and chemicals and 25% less energy. The scraps generated from the production of these new products will be reused for their creation as with every 10 scraps of jackets produced, 4 new jackets can be produced. Another project of the company is called "Backyard" and represents the company's intention to create products using increasingly sustainable materials. One of the materials TNF is starting to use that falls under this project is wool produced in an environmentally sustainable way. In 2014, Fibershed created Climate Beneficial Wool, which involves encouraging farmers to adopt the new farming technique that draws carbon dioxide from the atmosphere to the soil to improve the health of the soil and the environment. Using these techniques, farmers will be able to eliminate 4'068 metric tons of CO2 emissions into the atmosphere, which is the equivalent of the annual emissions of 865 cars. TNF has introduced a collection produced with Climate BeneficialTM wool.

TNF offers a lifetime warranty on its products as it wants to promote the reduction of waste and its subsequent deposit in landfills, as well as the reduction of the need to replace products to reduce purchases to minimize environmental impact. This guarantee covers both the repair of products that are sent in by customers,

as well as products that have been damaged during transport or storage to increase their lifespan and reduce waste. The table below shows the volume of products that were repaired in 2015.

Table 8 North Face 2015

TITLE	TOTAL UNITS	% OF TOTAL	DEFINITIONS
TNF Repairs	71,760	37%	Repaired and returned to consumers
TNF Outlet	1,883	1%	Sent to TNF outlet store
Donation	50,440	26%	Donated
Crisis Relief	713	0.4%	Donated to specific crisis event
Scrap	0	0%	Waste
Downcycle	70,126	36%	Waste-to-energy incineration
Repurpose	450	0.2%	Reused in some way
OUTBOUND TOTAL	195,372	100%	

Often environmentally harmful chemicals containing PFCs are used to provide high quality and high-performance products such as waterproofing. TNF has decided to replace DWR chemicals with less environmentally harmful solutions. In addition, the company and its suppliers rely on the Restricted Substance List to decide and evaluate which chemicals to use that will protect and preserve the environment. The problem of the use of harmful chemicals involves most of the industry; for this reason, the Outdoor Industry Association's (OIA) Chemical Management Working Group (CMWG) was created, which allows the exchange of information between participating companies to find the best solutions to respect the environment.

TNF has also partnered with BluesignTM technologies, which helps the company decrease its environmental impact by improving efficiency in the use of water and energy, and by identifying harmful chemicals not to be used. The company encourages all its suppliers to participate in this program offered by Bluesign technologies, as it can provide very useful tips for optimizing the use of resources, materials, and chemicals. The table below shows the results obtained from the implementation of the Bluesign program from 2010 to 2015 in TNF's supply chain. In 2016, 38% of the fabrics used by TNF were approved according to bluesign® standards.

Table 9 North Face 2015

CATEGORY	2010-2015 SAVINGS	EQUIVALENT
WATER	310,507,006 GALLONS	>470 OLYMPIC SWIMMING POOLS
ENERGY	69,594,408 kWhs	>6,403 CARS OFF THE ROAD FOR A YEAR
CHEMICALS	8,742,596 LBS	>212 TANKER TRUCKS OF CHEMICALS

The "Clothes the Loop" initiative created by TNF aims to collect all discarded clothes of any brand that people can bring to the company's stores or outlets, thus decreasing the volume of waste in landfills and mitigating the environmental impact. To incentivize people to take part in the initiative, $10 off their next purchase over $100 is given. All garments collected are donated to the nonprofit Sole4Souls, which works to create sustainable jobs and distribute these clothes to people in need. Since the start of this initiative in 2013, more than 95,000 pounds of clothes have been recycled in stores across the United States.

TNF is very active on the climate and planet advocacy front; in fact, in 2009 it joined a coalition called Ceres Business For Innovative Climate And Energy Policy (BICEP) to advocate for progressive climate change policies. In addition, in 2015 it wrote an article titled "Washington Must Act On Climate Change" to urge strong actions to address carbon emissions. Additionally, TNF supports the Paris Climate Agreement and is a signatory for the Business Backs Low-Carbon USA declaration. Since 2007, to offset the impact of greenhouse gas emissions that it is still unable to eliminate, TNF through The Conservation Found has been purchasing and planting trees using their CO_2 absorption capacity to conserve and preserve the environment. From 2008 to 2016, TNF was able to offset 48,520 metric tons of CO_2 by planting approximately 37,000 trees. In 2012 and 2013, the U.S. Environmental Protection Agency recognized TNF's efforts in offsetting 100% of its CO_2 emissions by awarding it the Green Power Leadership Awards. Additionally, to promote the concept of climate change and to raise awareness of the issue among children, TNF is represented by professional athletes who travel to schools to talk about it.

TNF also pays particular attention to efficiency in the use of resources and the operation of its infrastructure to minimize environmental impact. Among all its Headquarters, TNF to produce energy has installed 4 wind turbines and more than 4'000 solar panels generating 10% of its energy needs, while for the remaining 90% it purchases energy from renewable sources. The buildings used were designed to take advantage of natural light as much as possible and are equipped with a LEED platinum system, which consists of a cooling system that uses 100% fresh air without the need to use coolers that can emit greenhouse gases.

The materials used to construct the building are also environmentally friendly; for example, 8 tons of wood that would otherwise have ended up in landfills were used, the wall insulation was made from 5,500 pairs of recycled jeans, the concrete panels contain 50% waste and more specifically fly ash, and the carpet squares can be replaced individually and were made from 20-30% recycled materials. To reduce water use, an irrigation system was created that saves up to 75% water and the gardens contain only native plants and grasses.

In 1989 TNF, in collaboration with Patagonia and other companies, founded the Conservation Alliance, an organization that funds and participates with other organizations in initiatives to protect the environment. In 1991 he helped found The Access Found, a national organization that aims to conserve the climbing environment and keep climbing areas open.

TNF is very committed to protecting wilderness such as that in Alaska, as many of its athletes go there to explore, and many of its products are designed for extreme environments, which with all the changes the planet is experiencing are increasingly at risk and consequently so are the company's activities. TNF is promoting through its website a petition to make the President of the United States, Congress and the entire population understand the importance of the preservation of these places. For the protection and preservation of the Bears Ears National Monument in Utah, the company has created a collection whose entire proceeds will be donated to the Bears Ears Inter-Tribal Coalition for the defense of the monument. The Explore Fund was created by the company to build community, pass on a passion for exploration to people, and educating them about the environment. Since 2010, TNF has contributed large sums of money to nonprofit organizations that are committed to community building and nature conservation in support of exploration.

3.5 The Swedish Jewel: Fjällräven

Figure 23 Fjällräven website

Fjällräven is a Swedish company that manufactures and sells both sports and leisure clothing and technical sports equipment. Fjällräven was founded in 1960 by Åke Nordin, who had a very clear idea in mind: he wanted to create a backpack that was very roomy but at the same time comfortable for his back. Between the sixties and seventies, Fjällräven will start to produce and sell also tents, sleeping bags, pants, and jackets. In the eighties and nineties, after having become a well-known and appreciated company in Sweden, Nordin decided to expand the market. Initially, he focused on expanding throughout Scandinavia and after that, he moved on to expand throughout Europe. Fjällräven means Arctic fox. As arctic foxes are very important animals to Nordin and are the symbol of the company, in 1994 following a sharp decline in the fox population, he decided to support a conservation and monitoring program for these animals.

Nordin's dream is to get more and more people interested in nature and walking in unspoiled places because he believes that if people are passionate about nature it is very likely that they will respect it and take better care of it. Therefore in 2005 Nordin launched the first Fjällräven Classic, a 110km trek for true nature lovers across northern Sweden and its remote and wild places. After experiencing a strong turnout for this trek, the founder decides to expand the Fjällräven Classic to the United States, Denmark, and Hong Kong as well. In 2014, Fjällräven becomes part of the Fenix Outdoor group.[138]

3.5.1 Analysis of the best practices of the company

For Fjällräven, CSR practices regarding sustainability are at the core of its business model; in fact, the company is active in several areas such as materials, design, production, and raw materials.

In producing its products, Fjällräven strives to use materials that ensure excellent quality and performance, but that Fjällräven tries to use materials to produce its products that provide excellent quality and performance, but at the same time have a low negative impact on the environment. To do this it has created a list called Preferred Materials And Fibres List, in which different materials are classified as very good, good, sufficient, and bad. In the category of very good materials are recycled wool, organic hemp, and Tencel®; in the materials considered good are recycled polyester, G-1000 Eco and traceable wool; in the category of sufficient are cotton, metal buttons, and polyamide, and finally in the category of materials considered bad and

[138] Fjällräven https://www.fjallraven.com/

never used by Fjällräven are fluorocarbons and polyvinyl chloride. Fluorocarbons are very harmful to the environment as they can adversely affect the reproductive system of mammals, can create liver and thyroid damage and can be carcinogenic. Workers are exposed to PFCs in the production phase and the environment in the washing and disposal of the finished product. In 2012 Fjällräven, therefore, decided to begin the process of eliminating PCFs from its value chain. In cooperation with the Swedish Chemicals Group, the Fjällräven Chemical Guideline was created, which contains a list of harmful and banned chemicals to help the company carefully select the least environmentally harmful chemicals to be used.

Among the materials used in the production of the various products are also materials derived from animals such as wool, leather, and feathers. As for feathers, since 2014 only those that are 100% traceable and do not come from abused animals are used. With its Down Promise, Fjällräven has applied high standards in its supply chain; in fact, all suppliers and sub-suppliers are checked periodically to make sure they meet the company's standards. Nowadays, the company's feather supply chain is one of the most transparent and traceable in the entire industry. Fjällräven is also striving to create a 100% transparent and traceable wool supply chain. The wool must therefore

The wool must come from farms where animals are not mistreated. The logo that is applied to most products is made from leather. However, the treatment and tanning of leather require large amounts of water and energy as well as chemicals, which have negative consequences for the environment. To address this problem, most of the tanneries Fjällräven works with having a Gold Standard certification issued by the Leather Working Group. This certification

This certification ensures that the tanneries are as environmentally friendly as possible but also transparent and traceable.

Eco-Shell, one of Fjällräven's most popular materials, is made from recycled polyester and does not contain PCF as the company wanted to create a more environmentally sustainable material. By using recycled polyester, Eco-Shel allows the company to consume the least amount of resources possible and provides greater simplicity for its future recycling to minimize its impact on the environment. G-1000 Eco is a material composed of recycled polyester, organic cotton, and Greenland wax. This material allows the company to have less impact on the environment as recycled polyester requires fewer resources, generates less waste, and pollutes less air, water, and soil.

In addition, organic cotton is much more sustainable than regular cotton since no chemicals are used for its cultivation and it requires less water. Corylon is a material that was developed to reinforce mountaineering jackets and pants and is made up of 94% recycled polyamide and 6% aramid. Being an almost 100% recycled material, it allows the company to have a lower environmental impact as recycled polyamide comes from the waste of second quality yarns, cuttings, and fabrics, meaning that less waste is generated and less waste goes to landfills.

HC-Lite, being composed of polyamide and organic cotton, is also an environmentally sustainable material and is useful for its wind resistance. In addition, Fjällräven uses Tencel Lyocell, a material made from the pulp of trees from sustainable plantations that allows the company to decrease its environmental impact.

The design process of various products is very important as it can determine the lifespan of the product and the environmental impact it can generate. Fjällräven has a very long, complex, and elaborate design process, as it wants to ensure that its products last, have good quality and usefulness, and are also easily repairable so that there is no constant replacement and that they have minimal impact on the environment.

The company's sustainable design philosophy consists of nine different processes. The first process, called design with your mind, is to develop designs that are thought through solely in terms of the use and utility they will have for the end customer. Based on this, the most appropriate materials and styles are researched to satisfy these activities. The second and third processes are one, the development of designs that are suitable for use in different activities, and the other, the simplicity of the product. All products are simple in that they promote efficiency in manufacturing processes and recycling. In the fourth, fifth, and sixth processes, it is ascertained that the materials chosen for the production of the product have a low environmental impact and that they perform well and last over time. To promote future recycling of products, only one or two materials are used in their production to facilitate recycling. If a product or combination of materials works, is efficient, practical, performs well, and cannot be improved, Fjällräven decides to keep it as it is, even if it may be a little dated. In the ninth and final process, all products are tested, improved, and finally retested to make sure they are of the best possible quality. In addition, tutorials can be found on the company's website that explains to customers how to repair damaged products.

Fjällräven has created a code of business conduct that must be adhered to by all employees, partners, and suppliers, as they want to ensure that they all operate in the same way and share the same ideas such as reducing environmental impact. In addition, the company is in close contact with all stakeholders in its value chain to make it as transparent and traceable as possible through regular audits and wants to ensure that there is compliance with the code of conduct it has developed.

Fjällräven is part of the Sustainable Apparel Coalition, which comprises more than 80 companies in the apparel and footwear industry and also non-profit organizations. Within this coalition, companies exchange information on their practices in terms of reducing their environmental and social impacts to make improvements in their actions. By 2025 the company would like to achieve climate neutrality, i.e. no emissions. Fjällräven, in collaboration with the University of Stockholm, supports the initiative called Save the Arctic Foxes, which aims to help and study the population of these Swedish animals so that they can become self-sufficient and survive climate change. The company finances the studies and expeditions carried out by the University of Stockholm to monitor the evolution of this population of foxes and to control their adaptation to climate change, in addition, that Fjällräven also finances the food that is provided to the foxes. The company offers products for sale, the proceeds of which will be donated to the Save the Arctic Foxes initiative. These products differ from the others in that they have, in addition to the company's logo, an inscription that says: Save the Arctic Foxes.

3.6 The Kering Group, an example of sustainability: the spearheads Gucci and Yves Saint-Laurent

Figure 24 Kering website

The Kering Group is one of the world leaders in the luxury sector. The parent company Kering s.a. has its registered office in Paris. It was founded in 1963 but the name Kering was only given in 2013 after being called PPR (Pinault-Printemps-Redoute) for years after founder Fraçois Pinault.

The group recently achieved its goal of becoming a pivotal brand associated only with the luxury sector by selling the PUMA and Volcom sports brands in 2018, thus becoming, in effect, one of the leading groups in the luxury market. Until 10 years ago, revenues from luxury brands held by Kering accounted for only 17% of the group's global sales. Today, Kering has a unique vision in its field, which has enabled a transformation of the group through the implementation of a business model based on agility, balance, and corporate responsibility, through which it has succeeded in stimulating the growth of its Maisons.[139] Kering possesses a dynamic workforce, characterized by significant diversity, which has 38,000 employees worldwide and achieves annual sales of €15.9 billion in 2019.

The Kering Group is strongly determined and committed to integrating sustainability into all of its activities and to championing a fashion and luxury supply chain under the banner of sustainable innovation. Sustainability is represented at all levels of management: there is a sustainability committee with approximately fifty people involved in the implementation of the company's own sustainability action plan.

According to Corporate Knights' Global 100, the Kering group is the second most virtuous company in the field of sustainable development. Moreover, it is the only luxury group included in the ranking and, in particular, excels in the "textiles, clothing and luxury goods" sector. In addition, for the seventh consecutive year, it is listed in the Dow Jones Sustainability Index (DJSI), one of the most significant indicators in the world regarding sustainability in companies. A fundamental aspect is represented by the responsible and sustainable production systems included in a context of circularity for all the raw materials used within the group, as expressed by the environmental standards aimed at promoting and encouraging a sustainable approach by all its suppliers of fabrics and leathers. Relevant in this regard is the respect that Kering ensures for animals throughout the supply chain, being the first in the luxury sector to develop standards for their welfare.[140] Thus, it has succeeded in improving the group's global industry practices and catalyzing collaboration with farmers.

For Kering, luxury and sustainability must go hand in hand and with respect for society and the environment, through a long-term strategy. Kering, now more than ever, is focused on its impact on the planet,

[139] Kering https://www.kering.com/it/

[140] Standard per il benessere animale del gruppo Kering, https://www.kering.com/en/news/kering-develops-standards-to-improve-animal-welfare-in-luxury-and-fashion

climate change, and the exploitation of natural resources. In 2017, the group unveiled its sustainability strategy with goals to be achieved by 2025. The set goal is to reduce its environmental impact by 40% along its entire value chain. This is only a "small" step towards the set goal of becoming a carbon-neutral group by 2050, achieving net-zero and offsetting the inevitable annual greenhouse gas emissions with initiatives to protect forests and biodiversity.

The group's sustainable strategy and business model is based on three pillars. The Care pillar is based on taking measures to reduce environmental impact through the use of innovative tools and processes, new practices, original methods, and rigorous standards aimed at preserving the planet and its natural resources. Kering invites Maisons to choose a sustainable design by making targeted choices about the origin of raw materials, manufacturing processes, and modes of transportation. The goal of this pillar is to reduce its environmental economic account by 40% by 2025, along the entire supply chain. In 2020, the group published its progress against its target and, based on the supplier index of sustainability, it appears that it has already managed to cover 88% of traceability and has implemented 68% of standards in sustainable raw material sourcing. [141]

The second pillar is based on collaboration (Collaborate) of sustainable development is aimed at contributing to the achievement of a high social and ethical performance to promote equality and diversity, becoming a reference in this sense for all its Stakeholders. The Group is convinced that quality collaboration with its stakeholders ensures better economic, environmental, ethical, and social performance, safeguarding its rich human resource base from social disparities and promoting diversity as a critical success factor. This type of collaboration is critical to the success of its 2025 strategy. Kering has launched the aforementioned Fashion Pact, bringing together the main players in fashion and textiles to discuss and take charge of collaboration to implement sustainable strategies that are now fundamental for the entire sector. the objective of the pillar is to put the individual at the center, rethinking relations with stakeholders and ensuring equity and responsibility in all components of the group's ecosystem.[142]

Create is the last, but not least, pillar of the group's sustainability strategy. Driven by the slogan "Empowering imagination", Kering promotes alternative and innovative solutions, to encourage change and influence the luxury sector with a model based on knowledge sharing through an open-source system. In this way, the group can choose innovative solutions and processes that lead to the adoption of sustainable practices. Through collaboration with innovative startups and universities, Kering develops new sourcing solutions as well as new raw materials. Innovation is mainly driven by biotechnology and circular economy principles such as recycling or inputs derived from organic waste.

3.6.1 Sustainable income statement: correlation with group results

The Environmental Profit and Loss (E P&L) is a pioneering tool, created by Kering, that measures the

[141] Kering Sustainability progress report 2017-2020, https://progress-report.kering.com/Kering Sustainability-Progress-Report-2017-2020.pdf

[142] Kering https://www.kering.com/it/

environmental impact of all activities along the entire value chain; it is a key element and great support to the group's sustainable strategy, which goes far beyond simple environmental reporting, providing clear and transparent communication that can be understood by all stakeholders. It covers every link in the chain: strictly group operations, warehouse operations, supply, and sales. An important innovation introduced by this tool is the conversion of collected data into monetary values, to quantify clearly and directly the use of resources and to identify progress with a universal indicator, such as money. Translating environmental results into business language is the key to the success of Kering's Environmental Profit & Loss Account: it facilitates comparisons between Maisons around the world and reflects, in real-time, the sustainability strategy pursued by Kering, preparing and forecasting the future for high-quality 2025.[143]

The E P&L identifies the areas in which it is most urgent to adopt more sustainable practices and the point in the value chain where it can help the group's companies to make everyday decisions and responsible sourcing choices quickly and, above all, be aware of the environmental impact they will have.

FIGURE 2: EP&L IMPACTS ACROSS SUPPLY CHAIN TIERS SPLIT BY IMPACT AREA

Figure 24 Kering Environmental Profit & Loss, 2018 group resul

From the graph above, it appears that the greatest environmental impact comes from the production of raw materials, which represent 63% of the income statement. In this regard, Kering immediately launched strict standards for all of its suppliers and raw materials just a few months after closing, the result of years of research

[143] Kering https://www.kering.com/it/

and collaboration with international players and NGOs, going beyond the sustainability standards imposed by international regulations and creating its own.[144]

Between 2017 and 2018 there was an increase of 54 million euros in the results of the environmental income statement: this is the result of growth in the group's turnover, which led to greater purchases and procurement of raw materials, which had direct consequences in terms of environmental impacts. In any case, the group has managed to reduce the impact of certain raw materials considered very polluting and unethical, such as metals, precious skins, and furs. There has been a reduction in the environmental impact of the group's operations, thanks to the use of renewable energy and energy efficiency programs in stores, offices, and warehouses. While it is true that there has been an overall increase in the environmental impact of production, it must be said that this has been dictated by a moment of the positive trend of most of the Maisons of the group; analyzing the impact based on a single good produced, there has been a reduction of 12% and this reflects the effectiveness of the efforts of a sustainable policy in its supply chains.[145]

In addition, the impact Kering has in terms of GHG emissions (purple sticker) throughout the value chain compared to other pollution components, which are typically distributed at the beginning of the supply chain where Kering is acting most vigorously to incorporate responsible sourcing approaches. To improve its greenhouse gas impact, Kering has decided, as of 2018, to offset its greenhouse gas emissions by actively participating in the United Nations REDD+ (Reducing Emissions from Deforestation) project, which conserves key forests to reduce the impact of the greenhouse effect and biodiversity. This is only a first step, which will surely mitigate the impact of greenhouse gases along the supply chain, likeKering, since 2015, has managed to reduce it by about 77%, aware however of the wide margins for improvement.

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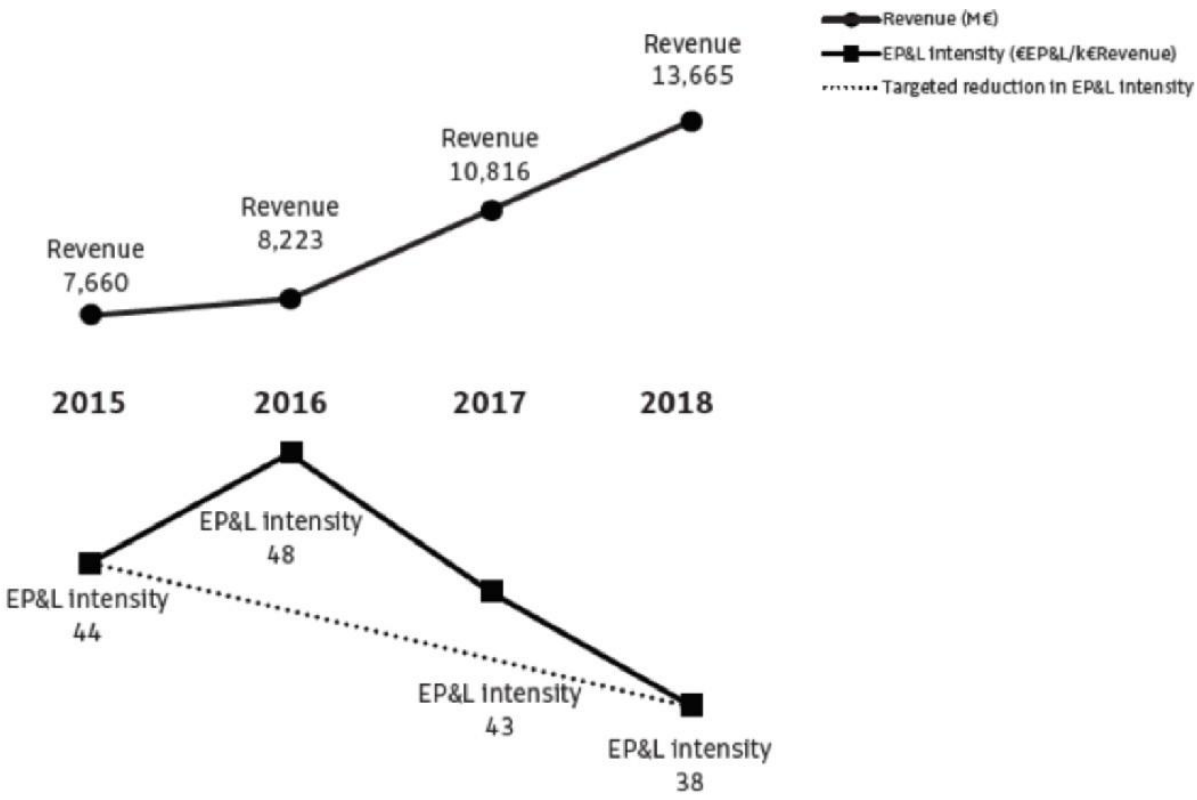
[144] Kering Environmental Profit & Loss, 2018 group results, https://keringcorporate.dam.kering.com/m/4cf9e7e0187fd328/original/https-keringcorporate-damkering- com-media-.pdf

[145] Kering Environmental Profit & Loss, 2018 group results, https://keringcorporate.dam.kering.com/m/4cf9e7e0187fd328/original/https-keringcorporate-damkering- com-media-.pdf



Revenue: € million
EP&L intensity: € EP&L per €1,000 revenue (Intensities based on EP&L results calculated using the 2018 methodology)
Targeted reduction in EP&L intensity: We have targeted a 40% reduction in our EP&L intensity by 2025, with a 2015 baseline. This trajectory is shown in the chart and leads to an EP&L intensity of 27 (€EP&L/k€CA) in 2025. This reflects we are on target to reach our reduction ambitions.

*Figure SEQ Figure * ARABIC 15 Kering Environmental Profit & Loss, 2018 group results*

Sustainability is an important factor that also brings feedback from the point of view of the financial results of group companies and advantages over competitors. From the figure above, it is immediately possible to see the inverse correlation that exists between the group's turnover and the intensity of its environmental income statement: as environmental impacts decrease, the group's overall revenues increase. Although sustainability was not the only factor behind this extraordinary growth, managing to almost double revenues in just 4 years, it was certainly a key component. The Kering Group has developed a strong strategy and invested many resources to achieve one of the leading positions in the luxury industry. This leadership is coupled with a strong commitment to sustainability, as evidenced by multiple campaigns and evolving activities. In 2019, Kering became a fully-fledged exclusive player in the luxury sector and managed to close the financial year once again with excellent results, taking a further step forward on the wave of the positive wake of previous years, driven in particular by Gucci and Yves Saint Laurent.

3.6.2 Maison Gucci

Figure Gucci website

Gucci is one of the world's most renowned and prestigious brands, a benchmark in the international luxury fashion market, and the flagship of the Kering Group.

The brand is characterized by modern management that has made innovation and sustainability their business. The House was founded in Florence in 1921 by Guccio Gucci and has always been known for its eclectic and contemporary creations, a symbol of Made in Italy excellence and unsurpassed quality, attention to detail, and innovative design. Today Gucci more than ever redefines the boundaries of the luxury fashion market, led by two outstanding personalities: Alessandro Michele and Marco Bizzarri, creative director and CEO respectively. Michele's creativity has succeeded in fusing and reinterpreting the cultural heritage of fashion, through a multifaceted approach that gives space to universes that are apparently opposite but potentially highly innovative and modern: for example, a collection combines the style of the Italian Renaissance and the punk look. The message launched by Gucci's creative director wants to give space and value to cultural diversity.[146]

Gucci closed 2019 with a turnover of about 9.6 billion euros (+13%), almost 3 times higher than in 2015 when the BoD was entrusted to the presidency of Marco Bizzarri. In parallel to this resounding growth in revenues, in line with the objectives of the group to which it belongs, Gucci has committed to Kering's long-term sustainable strategy through its ten-year sustainability plan Equilibrium, based on the "Culture of Purpose", introduced in 2018 to drive change and simultaneously reduce its environmental impact. Gucci Equilibrium is a project through which the group shares its goals and analyzes results. It brings together the principles, insights, and ambitions of the brand. At Gucci, a Purpose culture is dominant: nothing happens by chance, each action corresponds to a precise motivation. Through this plan, Gucci intends to make proper use of the limited resources our planet has to offer and to create a culture of innovation, creation, and evolution based on respect.

The main steps taken by Gucci concern the innovation of some manufacturing processes and raw materials that have allowed sustainable management which has given results in terms of materials and energy saved. First of all, Gucci is a great collaborator of the Material Innovation Lab (MIL), provided by Kering, through which the designers of the Florentine brand can gather materials and ideas so that product innovations

[146] Kering https://www.kering.com/it/

take place in an optimal climate. In addition, Gucci was the first brand within Kering and in the luxury sector, in general, to use ECONYL recycled nylon in its ready-to-wear collections. To maximize the utility of this cutting-edge material, Gucci has launched, in collaboration with its suppliers, the ECONYL®-GUCCI pre-consumer fabric take-back program, through which the House can further recover ECONYL waste from production and transform it into a new quality yarn. In addition, it has recently introduced NewLife polyester, a fiber made from 100% recycled bottles, then transformed into yarn through a non-chemical but mechanical process. The supply chain for this new material is fully tracked.[147]

Gucci leather goods constitute the iconic manifestation of the Brand: Gucci handbags, shoes and belts are renowned worldwide. As illustrated back, leather is the material that contributes the most to the Kering Group's total pollution. Gucci aims to reduce waste and the use of water, energy, and chemicals in the leather supply chain through the introduction of the "Scrap-Less" project. It consists in cutting before the tanning process the parts that will not be treated, processing only the part needed, and recycling the waste for parts of the garments deemed less relevant. In this way, Gucci has managed to significantly reduce the waste and energy required to process leather, compared to the traditional methods previously used. In fact, in 2018, energy savings of 843,000 kW were achieved in 8 tanneries; in addition, they decreased:

- water consumption by 10 million liters;
- chemicals by 145 tons;
- waste by 66 tons.

Since the Spring-Summer 2018 collection, Gucci has also completely abolished the use of animal fur and simultaneously introduced a blockchain system for the traceability of raw materials.

Gucci has been a major player in reducing the impact of metals within the Kering Group. Gucci's program is aimed at making accessories from recycled metals, avoiding the extraction of raw material. Many hospital waste materials have been used. The goal for 2025 is to use 100% recycled metals to make accessories and auxiliary components. [148]

In Gucci's philosophy, the luxury experience is not only about the product, but also includes all the elements associated with it, including the packaging. At Gucci it is efficiently designed: the raw material is strictly paper and not plastic and comes from renewable and sustainable sources. Since 2017, 100% of the paper used in the packaging has been FSC certified. As with all Kering Group brands, the bags and shoes cases are made entirely of organic cotton. Gucci is committed to reducing the use of plastic. In particular, it is committed to eliminating from its products plastics that are difficult to recycle or reuse, such as PVC. This has made it easier for Gucci to monitor and act on any leaks of toxic substances during production while encouraging the use of recycled or even bio-plastics. A big step forward was taken starting in 2015 when Gucci began gradually replacing virgin plastic from shoe heels with recycled plastic; as of 2018, 50% of the plastic used is bio-plastic.

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147 Gucci Equilibrium: http://equilibrium.gucci.com/it/

148 Gucci Equilibrium: http://equilibrium.gucci.com/it/

Finally, Gucci has always paid strong attention and interest to its Stakeholders, establishing real relationships with local communities. In this regard, a project called 'I Was a Sari' has been very successful and has managed to combine the Florentine House's commitment to the circular economy with social empowerment. The initiative promoted by Gucci involves working with women from marginalized communities in Mumbai, who, through the upcycling of saris (typical Indian women's garments), have managed to add value to garments that are now in the final phase of their life cycle. Gucci was, therefore, able to provide a new chance of life and redemption to 70 artisans who immediately received an adequate salary and a host of key skills to become future Gucci employees. Thanks to this project, the company was able to win the Circular design challenge award 2019.[149]

3.6.3 Yves Saint-Laurent

*Figure SEQ Figure * ARABIC 17*
Yves Saint-Laurent web site

The Maison was founded in 1961, and is one of the most important fashion houses of the 20th century, revolutionizing the very concept of fashion with the introduction of luxury ready-to-wear (a French term that differentiates luxury fashion made through the production of standard sizes from the luxury fashion of tailor-made clothes). The brand has always had a strong influence both inside and outside the fashion system. Yves Saint Laurent has always defended creativity without being afraid to be provocative, the bearer of a vision that gave space to the empowerment of freedom of thought and culture.[150]

Today, the brand competes in the international luxury market, thanks to the developments of the last few years and the leadership of the Kering group, which has also had great influence from the point of view of an ethical and sustainable policy.

The French Maison has managed to make an extraordinary growth in recent years, especially since it is under the leadership of Francesca Bellettini (President and CEO since 2013), laying a solid foundation for its development and continuing to strengthen its leadership in the fashion industry. When the new CEO arrived in 2013, the company had a turnover of 518 million euros; in 5 fiscal years, it has managed to quadruple its revenues, which is also the result of the creative vision of Anthony Vaccarello (creative director) who has been able to bring high fashion to the streets through a style in step with the times without abandoning the brand's

[149] Gucci Equilibrium: http://equilibrium.gucci.com/it/

[150] Kering https://www.kering.com/it/

history. In fact, in 2019 the French brand reached the milestone of 2 billion euros turnover.[151]

One of Saint Laurent's main goals is to build an innovative and sustainable future, anchoring itself in the tradition of the best talents and promoting gender equality. The brand has a strong focus on valuing diversity and has developed a sustainable model of doing business while preserving craftsmanship.

The fashion house is strongly in line with the standards imposed by Kering, especially concerning the leather traceability system, and actively participates in the 2025 strategy. It launched 2 innovative pilot projects in 2019 based on transparency and raw material traceability systems. The first refers to the use of laser technology to trace leather from farms to finished products, the second involves the use of Blockchain to track the origin of raw materials.[152]

Recently, Yves Saint Laurent has invested in a new project to create a new fashion hub in the Palazzo Delle Finanze in Scandicci (near Florence); this is a building that has been unused for years and is the subject of an urban redevelopment project by the Cassa Depositi e Prestiti to become the Italian headquarters of the leather goods brand's new atelier (which will lease it). It is foreseen that existing architectural elements will be enhanced and reused and that the whole external area will be requalified through the enlargement of the green areas in the surroundings, the improvement of the adjacent public roads, so that, besides constituting a development opportunity for the brand, this project will give competitiveness to the territory and to the community in which the brand is located: in fact, many jobs will be created.[153]

3.7 The 3D Printer and Its Utility in the Fashion World

The new technologies that are available to companies today are numerous and allow them to innovate in many aspects, from the creative/production phase to the management of the shopping experience.

One of the purposes of this thesis is to analyze how new technologies are revolutionizing the fashion industry from the design and development of clothing and accessories ,and create a competitive advantage for those who use them. We began to talk about the marriage between technologies and fashion in 2010 when 3D printing was presented as the tool that would revolutionize the way clothes were produced. Starting with the basics, 3D printing is the process of using a three-dimensional digital model to create a physical object. Typically, a printer creates the object by laying down many thin layers of plastic materials in rapid succession. 3D printing, though amidst many uncertainties, immediately aroused strong interest among industry insiders: dramatically reducing production time, lowering barriers to entry for fashion designers by making production cheaper and faster, but also reducing waste and allowing creative freedom for designers to develop innovative and futuristic designs.

For many years, the use of 3D printing remained relegated to a few brands, which formed a sort of niche of cutting-edge 3D printed fashion, often in both abstract and architectural forms that skipped the "ready-to-

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151 Sacchi M.S.: Saint Laurent all'italiana. Obiettivo bissare Gucci, Corriere della Sera, 27 febbraio 2019.
152 Kering Sustainability progress report 2017-2020, https://progress-report.kering.com/Kering Sustainability-Progress-Report-2017-2020.pdf
153 Cottone N.: Cdp investe 28,5 milioni nel nuovo Hub della moda di Yves Saint Laurent, Sole 24 Ore, 10 gennaio 2020

wear" and went straight to art. It's been years since designers took advantage of this tool to express their creativity on the runway, but the result has never been appealing to the average consumer, who doesn't find in 3D printed garments the flexibility and texture typical of the yarns used in traditional clothing production.[154] Today, however, it seems that 3D printing is evolving towards a more widespread use, leaving behind those fragile, bulky, and uncomfortable printed constructions. Since 2010, technologies have evolved, allowing for the production of contemporary clothing and accessories without letting the end consumer know the production method used.

3.7.1 Florenradica: the perfect combination of technology and craftsmanship

Florenradica is a small company in Montespertoli (Florence) that has responded to a market need by bringing together the innovative technology of 3D printers with artisan knowledge, specializing in the handcrafted production of samples and final products for the fashion industry. A virtuous example of Made in Italy where supplier and customer collaborate, establishing a relationship where the supplier does not simply execute but advises, inspires, suggests processes and solutions.

Florenradica is therefore a small artisan reality born in 1992 that in 2014 has included within its production processes 3D printing, thanks to the entrepreneurial vision of the brothers Mauro and Claudio Baratti, thus enjoying great success over the years: from 425 thousand euros of turnover in the first year to 1.6 million in 2017, therefore quadrupled in three years, the company is also included in the ranking "Leader of growth" drawn up by Il Sole 24Ore and Statista. The vision, at the base of this entrepreneurial project, is to fill with 3D printers a production gap that characterizes many Italian companies, that is, to create complementary pieces of bags with particular shapes, not realizable with traditional casting molds.

Florenradica produces unique objects such as a wooden handbag inlaid in resin, with designs and reliefs of unusual shapes, or a shoe heel resistant but light, because empty inside, on which is hand-painted a sentence, but also a bag handle in imitation bamboo, a plate to paste on the belt, a jewel-bijoux resin, a decoration for a wallet.[155] Florenradica has therefore specialized in manufacturing for fashion design through the production of prototypes and end-use parts for well-known Italian fashion brands.

But how did a company with an artisanal past reinvent itself? Florenradica, when faced with the production of ever-increasing volumes of models for the fashion industry, needed to find a solution that would guarantee flexibility and cost savings. When print runs increase, a handcrafted approach, which for Florenradica consisted of manually creating silicone casts, is no longer sufficient. So the founders turned to additive manufacturing to explore an innovative way to reduce physical labor while maintaining high levels of detail and quality in the final product. With 3D printing, cast originals are created, and if, for example, designer commissions a variety of sizes for an object with different shapes than the original handmade one, they simply 3D print it with the new dimensions, without having to redo it manually, produce a new cast and go into production. Subsequently, Florenradica has expanded the potential of 3D printers in use, used not only for

[154] 3dfashiontrends, https://3dfashiontrends.wordpress.com/
[155] Pieraccini, S. (2018), Per Florenradica il «saper fare» è trendy con la stampa 3D, Il Sole 24 Ore Economia, 13/11/2018.

prototyping but also to produce the final objects, finished by hand with painting, staining, and other processes. In particular, Florenradica has implemented Ultimaker 2+ and, with the collaboration of 3DiTALY, has set up a production plan to manage all the printers and print times up to 60 hours for a very meticulous rendering of details.

Florenradica is, therefore, able to carry out all the steps autonomously thanks to the use of 65 3D printers, 50 of which are Ultimaker branded, fed with wire produced from corn starch that gives a plastic material not derived from petroleum and particularly appreciated by the most environmentally conscious fashion houses, and 15 3D printers with polymerized liquid resin that solidifies with laser beams.[156]

Source: www.3DItaly.it

Florenradica has also managed to internalize all the phases leading to the creation of the final product, from design to post-production. Every Florenradica item is 3D modeled in-house by a team of designers using CAD software. Models are then exported for 3D printing as polygonal meshes and sent to Ultimaker Cura, the CAM software that prepares the Gcode for the 3D printer. Each Ultimaker printer is certified for professional use without the need for a human operator to oversee the work. However, the handcrafted, traditional component of the work does not disappear. After printing, each item is removed from the printer and the media is dissolved in a warm water bath, leaving a clean surface finish. The items are then hand-finished with sanding, priming, and color coating, and finally gloss-coated. All without leaving the company.

Subsequently, Florenradica decided to take advantage of new business opportunities with the Stratasys J750 3D printer to create colorful patterns composed of different materials. This decision greatly expanded the company's design and production capacity in terms of quality and quantity and offered a better return on investment, so much so that after installing the J750, it saw an increase of about 25% in customer visits. This strategic choice strongly depends on the importance that visual and tactile aspects have in the design of a part

[156] Pieraccini, S. (2018), Per Florenradica il «saper fare» è trendy con la stampa 3D, Il Sole 24 Ore Economia, 13/11/2018.

of a fashion accessory, such as the temples of a pair of glasses or the handle of a bag. Mauro Baratti, co-owner of Florenradica, explains the motivations behind this continuous innovation in design, development, and production: "The fashion industry is constantly evolving, and the specific fashion houses we work with demand a high level of quality and uniformity from the products we make. Thanks to the recent investment in 3D printing across our operations, we can develop these designs in a way that is unrivaled in our industry."[157]

The strength of this multi-material, polychromatic machine is the ability to try its hand at advanced prototyping, which allows customers to visually and functionally experiment with new fashion ideas using ultra-realistic 3D models. The machine also enables complex multi-material parts to be produced in a single print, whereas previously the same operation would have required a great deal of assembly and post-processing. The early stages of design and development are greatly accelerated, so you can have fashion concepts approved by customers more quickly than before. The results that can be achieved with this 3D printer are particularly popular with fashion companies because you get an unlimited range of materials, transparencies that can simulate glass, combinations of hard and soft parts, up to 500,000 colors with texture mapping, and gradients. These machines then allow you to print in color, using materials with different textures, reproducing nuances and surface textures, to create prototypes that simulate the final product in every way. The ability to create objects composed of different materials in a single print job eliminates assembly and finishing operations with a consequent reduction in costs and time.

3.8 Rustic wool

Figure InToscana website

The following paragraph illustrates and discusses the motivations, structure, and implementation of the activities, as well as the first results, of the CNR project "Filiera del Tessile Sostenibile (FTS)" (Sustainable Textile Supply Chain), an operational program born from a collaboration between the world of research and the entrepreneurial world, to evaluate a sustainable innovation in the textile supply chain in Italy: experimenting the use of rustic Tuscan wool for the creation of clothing.

In Italy there are about 6 million sheep bred for the production of cheese and lamb meat, it is estimated that the wool coming from their shearing is around 8500 tons per year: from this huge amount you can get 1700

[157] Cadmanager, https://www.cadmanager.it/azienda/referenze/stampa-3d-a-colori-florenradica

tons of fabric that correspond to a production of about 6000 clothes per day. Currently, this wool is considered a waste of sheep and goat breeding, as it is not competitive with more valuable qualities (e.g. merino) imported from Australia, New Zealand, or Argentina, and therefore it is buried despite disposal regulations that involve excessive costs for breeders or exported below cost on foreign markets where it is intended for the production of carpets. Garments produced with rustic wool can be considered sustainable because of the use of a raw material that is currently considered waste, and because for their processing, it is necessary to recover local knowledge and craftsmanship skills that refer to the tradition of Made in Italy, structuring an Italian production chain that does not involve productive delocalization to countries with lower labor costs.

Environmental and social sustainability is therefore an important part of the added value of these garments. The theme, therefore, refers to the production and consumption of a good with important symbolic and immaterial, social, and identity characteristics. Depending on its style, the materials it is made of and the way it is produced, a piece of clothing embodies values and meanings, and therefore allows its owner to identify with them and communicate them in the course of social relations. Deciding to buy a certain item of clothing also means feeling part of a status group, a social group that, beyond economic differences, brings together social actors who share similar lifestyles. Recently, as has happened with food, new attention to the places and methods that distinguish the textile supply chain is spreading in fashion as well, and the concepts of responsible, critical, ethical, organic, eco-sustainable, fair trade, and second-hand fashion are gaining ground.[158]

Companies and consumers are starting to consider the union between the concepts of aesthetics and ethics not only possible but also strategic for the future of fashion and necessary for the preservation of the planet. Green fashion, sustainable fashion is gaining market share in both elite and mass consumer segments. The question, however, is made complex by the many directions in which the concept of sustainability can be declined in the textile sector: is a sustainable garment respectful of the environment, of human labor, of animals, is it such because it is produced in a short supply chain, respects local traditions, is it handmade?

Alongside considerations on the feasibility of the supply chain at an operational level, therefore, the evaluation of the project must take into account the possible response of the market to the introduction of garments in Italian rustic wool. A market, however, is made up of as many different souls as there are consumers. Starting from these theoretical assumptions, the research to which the article refers considers a segmentation of the sustainable clothing market into three typical consumers: the consumer who likes to stand out, the critical consumer, and the mass consumer. The analysis is conducted through combined qualitative techniques such as interviews and an online questionnaire.

3.8.1 From waste to added value: The Sustainable Textile Chain Project

The first phase of the CNR project "Filiera del Tessile Sostenibile (FTS)" (Sustainable Textile Supply Chain) had the objective of understanding whether the use of Italian rustic wool for the creation of clothing was technically possible. The second phase was to investigate the possibility of creating a market for the garments

[158] Camera Nazionale della Moda Italiana (2012). Manifesto della Sostenibilità per la Moda Italiana. www.cameramoda.it/ile/it/Manifesto.pdf.

produced by the experimental supply chain. The investigation entailed a great deal of fieldwork since this field of research suffers from the absence of structured databases and rather scarce literature. Therefore, the main producers/processors of native wool were contacted directly to obtain data on production and reference markets. One hundred cases were mapped (projects/brands of companies/industry operators) for which material was collected from different channels (website, magazine articles, previous studies, etc.). For investigations into the consumer point of view, the research involved the administration and processing of questionnaires, the conducting of direct interviews, and the collection of a considerable amount of qualitative data from privileged witnesses.

The use of qualitative techniques such as interviews is important in that we are evaluating consumer acceptance of a product with alternative characteristics to those offered by the traditional market: our interest is not limited to quantifying the phenomenon, who would buy and what, but looks at the motivations, so it is necessary to reconstruct the "contexts of purchase and use" of clothing, which informs us about the meaning that the garment has for consumers in terms of expression of self-image and promotion of what is considered correct and right on a social level.[159]

The analysis had to respond to the limitations imposed by the needs of the operators and the time and cost involved in the project, so simplifications had to be made for the study of consumer practices.
A distinction into three types of consumers was considered:
-"mass/undifferentiated" consumer;
-"distinctive/exclusive" consumer;
-"critical/responsible" consumer.

We chose to focus attention on cases B and C that allow us to investigate the characteristics of sustainability and uniqueness of the product, but represent niche types of consumption that could not absorb the quantities of garments that could be produced with the large availability of rustic wool considered in the project. Therefore, a desk analysis of the "mass/undifferentiated consumer" target was conducted, trying to verify whether it would be possible, with this type of product, to subtract market areas from the traditional consumption of wool garments by focusing, for example, on elements of the marketing mix such as price, advertising, and large-scale distribution.

For the "mass/undifferentiated" consumer, an online questionnaire has been prepared and the invitation to fill it out has been distributed using web intercept techniques on selected Internet sites and targeted mailing lists. The online channel makes it possible to question a population that is more informed and attentive to lifestyles and consumption than the average: it, therefore, represents a good "critical case" for testing an innovative product. This survey intercepts that segment that is more receptive to the themes of interest in the research; furthermore, it offers an excellent cost-benefit ratio. About the problems concerning the representativeness of the entire Italian population, it should be specified that Internet surveys present distortions above all for some themes linked to technology and information, while they generally offer good results in

[159] Sassatelli R. (2006). Consumo di massa, Antropologia del. Enciclopedia Italiana di Scienze, Lettere e Arti. XXI Secolo. VII appendice, 1:384-87. Roma: Treccani.

terms of ordinal reliability, which is judged to be a sufficient criterion to pass concept tests on contemporary styles of consumption. One section of the questionnaire is dedicated to users' appreciation of the FTS project clothing, while other sections investigate consumption habits more generally for sustainable clothing, asking them to specify what they mean by "sustainability".

For the "distinctive/exclusive" consumer, a tailor's shop (Florence) and a knitwear factory (Turin) were chosen as case studies to conduct direct experimentation of the customers' reaction to garments produced using rustic wools following different processing techniques. The results were completed with interviews carried out with consumers at two specialized fairs where the wools and garments produced were exhibited, as well as other examples are shown in photographs on computer support. For the "critical consumer", contact was made with several entities considered representatives, such as the coordination of the Gruppi di Acquisto Solidale (GAS), the Distretti di Economia Solidale (DES) of Turin, and some cooperatives that manage Botteghe del Mondo (fair trade).

3.8.2 Construction of a short supply chain

In the first phase of the FTS project, a supply chain was experimentally created in collaboration with the operators. This paragraph briefly illustrates the reconstruction of this supply chain, then recalls a best practice that has been operational for some time in the Valle d'Aosta area and, to close, a general profile of the operators of rustic wool clothing and their main argumentative strategies for promoting the fabrics to the public. The key concepts that inspired the experimental construction of the supply chain are:

- short supply chain with low environmental impact; the wool used comes from Italian farms, the production of yarns and fabrics takes place in places close to the farms;
- traditional knowledge; the use of the knowledge, skills, and culture of Italian artisans is promoted, also in line with the training initiatives promoted by the EC Green Charter for Entrepreneurship, which recommends experimenting with how to apply technological innovation combined with artisan techniques to improve local production from the point of view of environmental and economic sustainability;
- the use of equipment and technologies available on Italian territory;
- the style and pleasantness of the garments.

These approaches respond to the specific needs of rustic wool processing, whose process requires specific skills and tools that are partly different from those used in industrial production. The short supply chain has been reconstructed in the Prato area, where the well-known manufacturing district is located; a spinning company has been assigned the role of "head of the line" of all operations, coordinating the other companies that deal with single phases of the processing, from fiber cutting to weaving. These small operators usually work as subcontractors and guarantee high adaptability of machinery at low costs, unlike large specialized

companies.[160]

Finally, professional operators have been involved in the processing of yarns and fabrics, arriving at the final output of the supply chain: garments. The analysis conducted in this first phase has shown that it is possible to process Tuscan rustic wool at costs comparable to those of traditional wool in almost all phases of processing.[161] Despite this important result, it is necessary to consider that the Tuscan wool produced annually (500 tons) cannot be absorbed by the current market.

Today, rustic wools are processed by small companies, often single-person companies or VAT numbers, which are located in market niches where they manage to sell at rather high prices and build customer loyalty: a best practice of this type is the Les Tisserands cooperative, the drap of Valgrisanche, Valle d'Aosta. Drap is the rustic fabric made of raw wool: before the Second World War, every family in the Valley owned a loom for its production. This process was abandoned after the emigration and is now resumed thanks to a training course organized by the City Council, an experience from which the cooperative was born that produces fabrics from wools of different origins: raw and ecological for scarves, blankets, and shawls; from the native Rosset sheep for clothing. Processing is done with looms that reproduce the ancient ones. The blankets and jackets are sold through medium-high range channels, with a price ranging between 500 and 1000 euros.

The analysis of this case has also highlighted how the union of operators in consortia represents an effective way to share the high costs of machinery for processing rustic wool, a typical criticality of the short supply chain. The operators who sell to the public are mainly women (seamstresses, weavers, knitters) who have decided to reinvent their profession and need the training to be able to make the most of the characteristics of this difficult process wool. To place the product on the market, operators focus on Made in Italy and on the uniqueness of each garment, exploiting above all the dissatisfaction of a high segment of customers "disappointed" by the standardization of some famous fashion brands. In recent years, however, there has been an increase in the number of companies that use these wools for the creation of clothing with a high intrinsic value, structuring a production process that combines artisan knowledge and innovations aimed at improving the social and environmental impact, with a more attentive eye to marketing and a less bottom-up approach. These companies integrate the concepts of ethics and aesthetics according to a trend that can be traced worldwide, e.g. The Green Carpet Challenge by Livia Firth; or C.L.A.S.S. (Creativity Lifestyle and Sustainable Synergy), Eco-platform that supports and promotes eco-friendly products for clothing, design, and furniture with various raw materials.

3.8.3 Consumer reaction

Given the comforting results from the point of view of the workability of Italian wool and recent market trends, the second phase of the FTS project was to evaluate the outlet markets for rustic wool garments.

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[160] Guercini S., Ranfagni S., Prospettive di mercato di nuovi prodotti realizzati con lane locali e autoctone della Provincia di Grosseto. Intervento al Programma Med Laine - Meeting di presentazione dei risultati inali, Sassari, 14 ottobre 2011

[161] . Dunford M., Industrial Districts, Magic Circles, and the Restructuring of the Italian Textiles and Clothing Chain. Economic Geography. 82, 1: 27-59, 2006

The result of the experimentation is a fully traceable product with high added value in terms of sustainability, for the use of raw materials, and enhancement of traditional craftsmanship. The question is how to communicate this to the final consumers, to understand if they recognize and share it, and to what extent they are willing to transfer it into a monetary outlay, buying the garment at a certain price. At an aggregate level, the answers to the questionnaires to date show that "the average buyer" of wool garments appreciates the garments of the FTS project above all because they are produced through a short supply chain entirely Made in Italy; however, they are not willing to incur a higher purchase cost than traditional wool garments and require a more attractive and aggressive collection, especially in the use of fashion colors.

On the other hand, consumers who like to stand out and are regular customers of tailors recognize a high added value to the garments in terms of sustainability, above all in terms of craftsmanship and exclusivity, and they are the only ones who are willing to translate this value into a greater outlay compared to a traditional woolen garment. Finally, the market of Tuscan wool sees the exclusion of the most critical consumers: vegetarians and vegans prefer garments in natural fabrics, such as hemp.

The results of the survey make it possible to put forward some hypotheses that need to be explored further, first of all regarding the social construction of the concept of "sustainability". The consumer-actor, that is, the active and responsible consumer who considers the act of buying as a political act, and with it aims to redesign the market and its rules, acts according to criteria that are not uniform, but very differentiated according to what he or she means by sustainability.

The distinctive consumer seems to appreciate our garments for their originality: an essential attribute is the uniqueness of each piece, the handcrafting, possibly made to measure. Sustainability is declined above all as the craftsmanship that allows the customer to control the processing in the final stage of the chain and guarantees the uniqueness of the garment purchased. A fundamental element in affixing the label of sustainability to the garment is how the purchase is made: in a tailor's boutique, after repeated measurements and tests, the characteristics of the rustic wool fabric such as roughness, the incomplete cleaning of the hair take on connotations of exclusivity and embellish a garment that can be shown off as unique and special, also because of the high monetary outlay that the customer has incurred for its purchase. The aggregate results of the questionnaire, which can be traced back to an average/differentiated client who mainly buys in clothing chains, show that it is above all the short supply chain as a whole, from the first to the last phase of production, that ensures rustic wool clothing the attribute of being sustainable and therefore a great added value because it represents Made in Italy, a guarantee of the quality of workmanship and respect for the consumer's health. This attribute, however, translates into a decision to purchase and not into a willingness to pay more than for a traditional wool garment, due to the defects presented: roughness, lack of originality of the colors and classic cuts of the fabrics, the same elements that in tailoring acquired a decisive value. In the latter case, an important element for recognizing the value of rustic wool garments is the provision of a talking label that illustrates the FTS project and the supply chain: however, it must be large and attached to the garment as a packaging element, or placed as a roll-up beside the shelves on which the products are displayed, since the majority of respondents who buy in clothing chains admit that they do not read the normal labels attached to the garments.

3.9 An Example of Humanism: Brunello Cucinelli[162]

Figure Brunello Cucinelli website

The Cucinelli company was founded by the entrepreneur of the same name, as well as a designer, in Umbria, in 1978, in Ellera di Corciano, in the province of Perugia, in a small village. There is a close relationship with the land of origin, which boasts a long textile tradition, and to whose history and humanism the brand is inspired for the traditional weaving and the company vision. From the very beginning, originality distinguished Cucinelli's business, which gave birth to the idea, decidedly innovative at the time, if not extravagant, to dye cashmere, until then used only in natural colors. In this way, he not only subverted the canons of elegance but opened the doors of the cashmere knitwear market to the female public, which until then had been almost completely excluded from that world. Until the end of the '70s, in Italy, this material was reserved for men, especially in the production of jackets and coats.

As Cucinelli himself said, the source of inspiration for his project was another figure from the world of fashion, already on the road to success, namely Luciano Benetton, with his line of colored wool pullovers. The same principle that his fellow countryman had applied with wool, Cucinelli was convinced could be applied to cashmere. His intuition turned out to be a winner: his first mini-collection composed of 5 women's pullovers presented in Trentino Alto Adige was quite successful, and he returned to Umbrian soil with an order of 53 garments, for women, and in different sizes, but above all colored. On that occasion, the historical roots of this company are traced back. From this moment onwards, the brand, which from the beginning makes use of communication-oriented to the made in Italy, is affirmed, conquering gradually the markets all over the world, especially in the North, in Austrian and German land. In the mid-80s, it receives a big help from the Italian government, which subsidizes the company, financing exports. The number of employees increases, and so does the number of orders and consequently the profit from sales.

In 1985, Cucinelli finally succeeded in conquering the world's largest luxury market, the American market, with his cashmere. With his ingenuity, the entrepreneur seduces buyers in the most important poles of the country, such as New York and Los Angeles, who see the goods ordered arrive directly in the store, without the trouble of having to go to the border. With the new millennium, we see the birth of the Brunello Cucinelli brand, which, while having cashmere knitwear as its strong point, expands its production to new clothing and

[162] Part of the information are taken from Calabresi, L., 2017 https://www.leonardocalabresi.com/blog/brunello-cucinelli-storia-del-brand/

accessories, arriving in 2002 at the first total look collection, intended for both male and female customers. This was dictated by Cucinelli's desire not to give licenses to third parties, wanting to exercise direct control over production and distribution, to ensure the quality that distinguishes the products. This aspect was based on the success of the brand, which in 2012 was listed on the Italian Stock Exchange. Its success was unprecedented, with demand exceeding supply by as much as 18 times.

3.9.1 The sustainable actions implemented by Brunello Cucinelli

The responsible behavior of the company can be summarized in a few points, but well defined.

First of all, one of the objectives that have accompanied this company since its foundation is the desire to guarantee the consumer excellent product quality; respect for the environment in the performance of its activities is also important. In this sense, the entrepreneur has been proactive in environmental initiatives, including through agreements for the protection of the ecosystem.

In 2012, for example, the entrepreneur, to promote awareness of the importance of implementing sustainable practices within the textile and clothing sector, signed the Agreements with the Ministry of Environment Corrado Clini. In this way, the company undertook to control and quantify carbon dioxide emissions, along the entire production chain, to reduce them, also following global standards. This will benefit not only the environment but represents a competitive advantage in a scenario where environmental certifications are increasingly in demand.

The company has always shown great consideration for moral human dignity and has always endeavored to ensure the support and well-being not only of its customers, as buyers, but also of its employees. In this sense, the company has always been concerned to ensure that its employees receive not only adequate financial compensation, but also working conditions that allow them to be more productive and creative, conceiving the working environment as a large family, and thus increasing mutual trust. There have been several occasions when the bond between the company and its employees has been strengthened.

For example, in the initial phase of the economic crisis in 2008, Cucinelli decided not to lay off his employees for 18 months, asking them in return to make a greater effort, increasing their productivity. On another occasion, he increased the salaries of his employees by up to 20% more than the artisans of other companies, wanting to quantify, and thus also increasing the value of the product, boosting productivity and competitiveness of the company, which consequently made a higher profit.[163] This demonstrates how this company can adopt an instrumental approach to its stakeholders, bringing benefits to them but at the same time also to itself. The umpteenth occasion in which the relationship between the company and its employees was strengthened was in 2012, when, for Christmas, all employees received a bonus of 6 thousand euros. As previously mentioned, in Cucinelli's philosophy, the preservation of culture and tradition are essential, as demonstrated by the fact that he has been able to maintain a strong bond with his land of origin.

Cucinelli has spent a lot of time for the revaluation of the territory, investing part of the proceeds to

[163] Iozzia, G., Brunello Cucinelli: la mia filosofia del profitto, Panorama, http://archivio.panorama.it/economia/Brunello-Cucinelli-la-mia-filosofia-del-profitto

cultural and social initiatives in his homeland, Umbria. To him, it is owed the construction of the Forum of the Arts of Solomeo, which, in a recall to ancient Rome, wants to promote the social meeting and the maintenance of determined humanistic and artistic values. The conveying of positive messages in a transparent way, induce customers to assume responsible and virtuous behavior. The Cucinelli case is therefore the emblem of a company that has managed not only to reconcile opposing interests within itself but has transformed this ability into a competitive advantage.

Today, this company is known and esteemed throughout the world for the values it embodies and demonstrates every day in its business life, and which have determined its success.

4. Conclusion

The future of clothing is in its sustainability. Fashion can no longer ignore being an active part of an integrated system that helps society itself to be more sustainable. Beyond the very important psycho-social aspect that clothing has, clothing will have to be smart and adaptable and, from a wearable technology perspective, perform three fundamental functions:

1) protection from the environment;
2) reduction of the impact on the environment;
3) interface between us and the health system both passively and actively.[164]

The first function, the oldest, will be increasingly critical given the need for clothing capable of balancing increasingly extreme and sudden climatic variations, also to reduce the use of active, energy-intensive thermal conditioning equipment.

The second function must be seen from the point of view of the pollution that the garment entails from its production, cleaning, and disposal.

The third, given the natural adhesion of the garment to the body, is to act as a support for sensors and actuators for monitoring the health of the person and for the controlled release of drugs. In these perspectives of integrated sustainability, attention will have to be paid above all to the development of new nanotechnological materials that allow for their nature a different behavior according to environmental conditions, that are refractory to foreign substances drastically reducing ecological costs related to cleaning and that are disposable and reusable without negative impact on the environment. The use of these raw materials will lead to an epoch-making change in the sector, with the need to create supply chains that are completely different from the current ones. Within this conceptual framework, it is clear that the new garment will be something closer to a hi-tech product than to one of the conventional garments we are used to today. Therefore, there will be an increasing need for a tracking process that allows the consumer to verify the real quality and functionality of what, at presumably higher prices than at present, they will have to buy.

Of all the technologies that can be implemented, 3D printing is certainly one of the most interesting, given that one of the sectors that are benefiting most from the advent of additive manufacturing is fashion. The Digital Manufacturing model is a winning combination with fashion because it allows for rapid prototyping and the creation of complex shapes. Additive manufacturing allows for cost optimization, an advantage that also comes from the absence of waste materials, and for a sector that is among the most polluting globally, 3D printing is therefore a solution in favor of sustainability. In addition, technology and tradition meet in the creation of unique and highly customizable products, which can be obtained by pandering to consumer needs, in a shorter time frame, and at a lower final cost.

The path of connection between artisan knowledge and new technologies is still in the development

[164] Huang, P. C., Lin, C. C., Wang, Y. H., & Hsieh, H. J. (2019), Development of Health Care System Based on Wearable Devices, in 2019 Prognostics and System Health Management Conference (PHM-Paris) (pp. 249-252). IEEE.

phase, since it is evident that the skills to master new technologies are still lacking, both in companies and at the school level. The technologies, especially those used in manufacturing processes, have limitations that do not yet make them adaptable to any production process. This change cannot, however, start from individual companies, but initiatives involving as many players as possible, such as institutions, universities, and research centers, are necessary to trigger a process of exchange of skills between the artisan and technological worlds. The creation of virtuous networks and the sharing of knowledge and skills are the only way to increase the visibility and competitiveness of Made in Italy excellence.

One limitation that still makes the application of additive manufacturing to the fashion industry complex is the difficulty in reproducing clothing that has the same characteristics of comfort and flexibility as garments produced using traditional techniques. 3D printing is, therefore, more widely used in the production of jewelry and accessories, but it is possible that, in the not-so-distant future and considering the experiments being carried out by innovative startups, this technology could be used to produce any type of garment. Companies should not focus all their efforts on perfecting their production processes, because the search for innovation must go hand in hand with the development of a marketing and communication strategy that can enhance the changes underway. The communication gaps of companies can, in fact, fuel misunderstandings on the part of consumers who, not understanding the innovative scope of the new production processes, do not attribute the right value to the products.

It can be argued that the concepts of craftsmanship and digital, long considered incompatible, are now closer than ever, and it is from their union that Made in Italy companies can find the basis for renewal. We must try to give centrality and importance to artisan work, but from a contemporary point of view, so much so that today we talk about "digital artisan", i.e. the one who can innovate traditional production techniques by applying new technologies. The goal for Italian companies is to be able to be local and global at the same time, artisan and innovative, exploiting all the technologies available to them. The keywords for the fashion industry in Italy are research, innovation, and specialization, which are the objectives to pursue to guarantee Made in Italy companies an increasingly large slice of the market, not forgetting the artisan past but enhancing it, providing that "tailor-made" and made-to-measure experience that mass production has made us forget, in a different way that can also be more sustainable and innovative. Similar but at the same time different is the experiment of rustic wool, which can be divided into two main phases:

1. the experimental construction of a short supply chain that transforms the rustic wool now considered waste, a by-product of sheep and goat farming, into garments;
2. the possible reaction of the end consumer market to a product that is qualitatively inferior but is assumed to have a high intrinsic value in terms of environmental and social sustainability.

The experimentation has highlighted the positive results of the network cooperation of small operators in the textile sector, still active on the national territory despite the increasing delocalization of production, to obtain a final product that combines local tradition and technological innovation. From the first analysis of consumers, it emerges that the product of the experimental short supply chain still has few attributes of sustainability such as leading to the purchase of a good decidedly different from what is on the market in terms

of quality. In particular, the short supply chain and the origin of the raw material are attributes that lead to an appreciation of the project but are not sufficient on their own to make people like the final product. In the field of clothing, perhaps more markedly than in the field of food, the sustainability label seems to have to be accompanied by elements that seem essential in defining the purchase, that is, linked to personal creativity, self-expression, tastes, and culture.

These elements can be distinguished according to the consumers and are probably related to their reference status group and habitual consumption practices: the tailor-made packaging of the product, or the inclusion among the operators of a trusted supplier of a GAS group, or even features of innovative originality combined with the product, such as the possibility of customizing the garment with some changes made by the end-user according to the latest trends in contemporary design.

The conclusion of the experimental phase and, therefore, the definitive elaboration of the results, it is hoped, will allow collecting further elements to confirm these first reflections or to a possible partial remodeling of them, as well as to a greater deepening. The subsequent analyses planned, also through the construction of possible alternative scenarios for the development of the supply chain, aim to identify other useful ideas for the construction of a reference framework for rustic wool and its potential consumers which, by developing the concept of "sustainability" from a more specific and contextual point of view, may also allow the definition of marketing strategies suitable for a sector that is certainly not easy in terms of characteristics and positioning.

By analyzing the literature on CSR, it was possible to understand the benefits that proper implementation of CSR within a company can bring. Since there are several fields of action of CSR and the focus of this thesis is on the environmental field, through the analysis of the literature it was possible to determine what actions put into practice companies in the clothing industry in this area. Another objective that has been achieved is the understanding of the main laws and directives of the environmental sphere in general and more specifically within the fashion industry.

All of this was used to analyze and compare companies in the sector regarding the practices they have developed to decrease their environmental impact. It was possible to see that the various companies are active in different areas and put into practice a variety of actions to minimize environmental impact. The areas in which they act are:

- the environmental sustainability of the materials and fibers used, the reduction of the use of harmful and noxious chemicals;
- the environmental sustainability of the design of the various products;
- the environmental sustainability of the infrastructure and employees;
- other actions in favor of the environment, and finally also the reduction of air and water pollution.

It is possible to say that not all of the companies analyzed are at the same level in terms of the variety of CSR practices and areas of action at the environmental level. Patagonia, for example, uses a variety of innovative and eco-sustainable fibers and materials that require less use of resources, which consequently has less impact on the environment; it also tries not to use chemicals that are harmful to the environment and the

planet, paying great attention to product design to extend the life of products and facilitate recycling and repair to reduce new purchases and fast fashion.

Finally, the company pays close attention to the environmental sustainability of its infrastructure and employees to minimize its impact on the environment. Patagonia supports financially and non-financially a range of environmental organizations and proposes various actions and activities in favor of the environment. TNF differs from Patagonia only in the following areas:

- the environmental sustainability of employees as it does not offer incentive programs for workers to reduce their environmental impact;
- in the environmental sustainability of product design as it does not offer explanations on the website to guide the customer in repairing clothing.

The Swedish company Fjällräven, which differs from the two mentioned above mainly in the area of environmental sustainability of infrastructure and employees since the information that could be obtained did not show that the company is active in this field. Based on the information gathered, Puma is not active in the field of environmental sustainability of product design, while in the fields of environmental sustainability of infrastructure and employees, environmental sustainability of materials and fibers, and other environmental activities it is still slightly behind the other companies and still has ample room for improvement. Brunello Cucinelli's company, on the other hand, focuses on the high quality of the material and its sustainability throughout the supply chain, and is very active in its local area, focusing not only on its customers but also on its employees.

Although the companies analyzed come from different countries and have different sizes, they are all very active in favor of protecting the environment by reducing the negative impact they have on it. This means that the size of the company is not necessarily related to its practices. In fact, for example, Patagonia, while not the largest company, is the best at reducing environmental impact.

Given that climate change is becoming an increasingly important and discussed issue worldwide, companies of all sizes and from all backgrounds are taking more action to improve in terms of reducing their environmental impact, firstly to try to protect the planet and secondly to improve their image in the eyes of an increasingly demanding clientele. Therefore, if we want to take the practices of one of the companies reported as an example, the best example is Patagonia since it seems to be the company that pays more attention and carries out the most effective practices in terms of reducing negative environmental impact. In conclusion, the best practices to be implemented in companies at the level of corporate social responsibility to improve their impact on the environment are those in the area of:

- of the materials and fibers used, given that by replacing the materials used nowadays with more eco-sustainable solutions, it is possible to greatly decrease the consumption of resources, air, and water pollution, and the use of chemicals;
- of reducing the use of harmful chemicals since, being harmful and very often not very biodegradable, they pollute the environment a lot and have a very high environmental impact.

As seen above, companies are trying to eliminate the use of PFCs from their value chain and are

therefore already on the right track. The analysis of the Kering Group, increasingly a leader and symbol of sustainability in the luxury fashion industry, has shown that a company can achieve significant economic returns if it invests energy and resources in sustainability. Although the group's profits are not directly attributable to its sustainability strategy, having implemented, over the years, investments in the entire value chain of green policies, has brought a strong increase in the reputation of the group and all the brands it groups. Moreover, it has managed to pioneer sustainable production processes and products that have helped the group to grow in terms of revenue implementation and cost reduction.

The evolution of sustainability in fashion companies is still ongoing and, now more than ever will be central in the post-Covid19 era: although this has led to a reversal in sustainable practices in fashion companies, it may be the turning point to start again decisively and seriously on a solid and still sustainable basis. Finally, I believe that apparel companies can commit to reducing their environmental impact as I believe they have a multitude of actions at their disposal that can make a difference. CSR changes and practices can be costly, but they bring added value in that they allow for greater returns both economically but more importantly environmentally and socially.

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Summary

Since it entered the common vocabulary, the concept of "sustainability" has taken on a variety of meanings and extensions, which have been applied to different contexts. Being a sustainable company in the ecological sense can therefore mean making choices that lower the ecological impact of one's production activities, containing consumption, designing and producing objects that, because of the raw materials used, the way they are processed, and their behavior at the end of their life, do not burden the environment. But 'sustainability' does not only mean 'ecology'. In this sense, being a sustainable company means not only respect for the environment, but also respect for the health of workers and consumers, saving raw materials and economic resources, respecting human rights, rationalizing creative and production processes, reducing waste, creating new and more transparent ties with communities of interest and exploring new and more 'human' market areas.

If we wanted to summarize in a few words the current meaning of "sustainability" related to economic, social, and production dynamics, we could say that it is conscious consumption, fair trade, transparency in the relationships between producers, suppliers, final consumers, tools and policies to support less "wasteful" production and economic processes, research and promotion of new market portions adhering to sustainable lifestyles. The current economic models of the fashion industry have also led to an exacerbation of the social gap in many countries where the work is concentrated. When we talk about sustainability in fashion, we mean to consider a new model, one that measures the demand for goods against the availability of resources, pursuing the goal of social justice. With ethical and sustainable fashion, we are not defining a trend or a category codified by aesthetic canons and storytelling that convince the buyer.

While in recent decades the fashion industry has conditioned an increasingly large audience, making 52 collections a year "necessary", sustainable fashion aims to dismantle this functioning and reverse it. Everything must be rethought from the perspective of environmental sustainability and social justice. In this sense, fashion is increasingly taking on other values that go in the direction of social responsibility. We can say that the concept of 'sustainability is born, in a certain sense, from the instinctive need of the human being to consider every resource close to him as precious and unique, already predisposed in nature to its reuse and, eventually, to its recycling.

To see the first form of the idea of sustainability as we understand it today, we have to go back to the late 1950s. From it derived alternative practices in clothing, food, and social relations, which quickly became powerful identifying and symbolic elements of the rejection of massification. It was in these years, among other things, that the question of 'sustainability' appeared for the first time on the scene of public debate, rhyming with an antagonistic and pauperist vision of environmentalism, with which one had to identify, for example, through 'renunciatory' clothing, a manifest symbol of the rejection of consumer society. It is from this idea of renunciation that, in the 1990s, a trend towards sustainable fashion emerged on the markets, the vanguard of which can certainly be identified in Northern European countries, in Scandinavia, Germany, and Canada.

The definition of sustainability proposed by the Bruntland Report in 1987 completely changed the concept of development and the orientation of supply chain management. Initially, priority was given to

economic growth, but now it is given to improving the human condition, without excluding attention to the environment, to natural resources. Thus, every supply chain must contribute to improved sustainability performance. A supply chain improves its sustainability when goals are shared, operational solutions are relevant and consistent with each other, and when their implementation is done in a perfectly coordinated manner throughout the supply chain.

Sustainability applied to supply chains implies a reconsideration of production methods in terms of operation and material flows, to limit undesirable environmental effects and improve social conditions. While previously the weight given to sustainability in the production phase was low, today all phases are fully included in the more sustainable ones, undergoing a profound reshaping and becoming longer, more articulated, and more complex. It can be a constraint because the more the supply chain is diversified, the more complex its management can become from the point of view of sustainability policies, but at the same time, it can become an opportunity if one can anticipate legislative changes to obtain the competitive advantage of the first mover and thus to make customers aware of the sustainability characteristics of a product. For these reasons, sustainability is becoming the banner of excellence in our decade, a phenomenon similar to that of quality in 1980.

Furthermore, as defended by Smith, sustainability initiatives are critical to corporate strategies, especially for those operating in sensitive business areas, as is also the case in the fashion industry. One concern still present in the literature relates to the issue of compatibility between sustainability and economic growth. Moreover, 2 Italians out of 3 are not willing to buy clothes whose production is associated with pollution and for 72% brands should ensure that their production and distribution sustainably takes place, in addition to guaranteeing decent working conditions for employees. However, the fact that they are interested in the topic of sustainability does not limit their purchasing options to only sustainable products; over 80% of respondents say they think about the sustainability of a product before purchasing it, but therefore do not only purchase sustainable products. Furthermore, because over 85% of the sample surveyed say they know a product's sustainability through its label, nearly all purchases of sustainable products are made physically in-store.

This is an in-depth market survey of consumer perceptions of environmental and labor standards in the apparel industry.

The increased focus on the textile and fashion industry's environmental footprint suggests greater regulatory and enforcement controls in 2021. Over the past decade, the textile industry has faced increased scrutiny from regulators, investors, and customers due to its significant environmental footprint and the high costs of producing, shipping, and selling textiles worldwide. Globally, climate-related disclosures are increasingly changing from voluntary to mandatory, recognizing the importance for investors to understand companies' climate risks and environmental impacts. In addition, the EU released its Circular Economy Action Plan in March, identifying textiles as the "fourth highest-pressure category for primary raw material and water use, after food, housing and transport, and the fifth-highest for greenhouse gas emissions." In addition to releasing a strategy for textiles in 2021 to improve circular practices, increase transparency, and reduce waste,

the action plan anticipates the Commission's intention to improve corporate disclosure of environmental data also in 2021.

While the fashion industry faces a growing demand for "green" and "sustainable" products, it also faces an increase in consumer protection litigation and enforcement for making misleading environmental claims about its products. In November 2020, the EU released its New Consumer Agenda, emphasizing the importance of protecting consumers against greenwashing and proposing that companies prove environmental claims using the product and organizational environmental footprint methods. In addition to growing disclosure requirements and the need for supply chain transparency to substantiate environmental claims, the textile and fashion industries face increasing human rights requirements for market access.

Finally, the same oversight and transparency of the supply chain will allow stakeholders to ensure that all environmental marketing claims are accurate, avoiding potential exposure for consumer protection enforcement.

There must be an awareness on the part of both the brands that produce fashion and the customers who consume it, as they must recognize their role in causing environmental and human harm. The Apparel Industry Charter for Climate Action, a reflection of the United Nations Convention on Climate Change, was drafted in 2018 by companies and organizations identifying guidelines for action to reduce the environmental impact of the textile and apparel industry. Although the industry's social and environmental performance has improved over the past year, the speed of this progression has slowed "by about a third." Improvements would come primarily from brands that are laying the groundwork for their sustainability strategy, setting primary goals, and better governance.

The Higg Index is a measurement tool for the textile, apparel, and footwear sectors developed by the Sustainable Apparel Coalition to measure social and environmental impacts. The coalition is the brainchild of the CEOs of Walmart and Patagonia, who wrote a joint letter inviting CEOs of major global companies to join together to develop an index to measure the environmental impact of their products. The Higg Index seemed destined to become the new tool for measuring environmental and social impact for the fashion industry, in an industry that is still searching for a common language to hold consumers accountable for product sustainability in a variety of ways. With the data collected, hot spots can be identified, sustainability performance can be continuously improved, and the environmental and social transparency that consumers demand can be achieved.

The MSI looks at environmental impacts including water use, global warming potential, fossil fuels, and water pollution. Nothing is provided on the social side in this set of measurements, thus also promoting a concept of sustainability that considers only the choice of materials and nothing about the garment production chain, its environmental impact, and respect for workers' rights. The Higg Index Sustainability Profile shares information and data on the environmental impact of a product's materials compared to conventional alternatives. Each product is given a score from "basic" to "3" based on the environmental impact of the product's materials.

Products that score level 3 are made from materials that have the lowest environmental impact compared to conventional materials. The results of the Eurobarometer survey on European citizens' attitudes towards the environment confirm broad public support for environmental legislation at the European level and EU funding of environmentally friendly activities.

Environmental matters have become the subject of a specific discipline in Italian environmental legislation. Only since the 80's the number of laws and decrees in the environmental legislation increased, while in the '90s, following the numerous ecological accidents and the strong EU influences, ad hoc legislative decrees were issued for the protection of water.

The need to guarantee valid environmental protection and the need for urgent adaptation to the legislative references of European legislation led to the enactment of Law no. 308/2004, which gave the government the delegation of authority for the reorganization, coordination, and integration of environmental legislation, a delegation that was implemented with Legislative Decree no. 152/2006, also known as the Environmental Code.

Grenelle 2 allows for the concrete implementation of the guidelines of "Grenelle 1" which determined the objectives of the government in environmental matters. In recent years, we have begun to talk about "ecological democracy", it is mainly a matter of developing the right to environmental information by ensuring that public actors and companies make accessible how they take into account the imperatives of sustainable development in their strategy. Under Grenelle 2, companies with more than 500 employees are required to submit a social and environmental report. An "environmental display" will be introduced gradually, after an experiment, for consumer products whose environmental impact, in particular, the "carbon cost", must be explicitly stated.

More coercively, parent companies are required to repair environmental damage caused by defaulting subsidiaries. The text also provides for the generalization of public consultations for all draft regulations with an environmental impact. This methodology will give an environmental rating to each leader. French law has progressively imposed on French companies scattered duties of information and vigilance in environmental matters. Law 2001-420 of May 15, 2001, on new economic regulations, required French companies listed on the market to provide social and environmental data in their annual reports. Law 2003-699 of July 30, 2003, on the Prevention of Technological and Natural Risks and Damage Remediation, required all joint-stock companies operating one or more facilities classified as "High Threshold Seveso" to inform their shareholders about their environmental activities. The Commercial Code requires companies to publish environmental information on an annual basis. Article L225-100-1 requires the board of directors or the board of management of a joint-stock company, as the case may be, to report annually to the general meeting of shareholders, through a management report, on the "financial risks associated with the effects of climate change and the presentation of the measures taken by the company to reduce them by implementing a low-carbon strategy in all components of its business." Article L225-102-1 of the Commercial Code similarly requires the company to report annually to the general meeting of shareholders, through a non-financial performance statement, on "how the company takes into account the social and environmental consequences of its operations," including the

climate change consequences of its operations and the use of the goods and services it produces, as well as its social commitments to sustainable development and the promotion of diversity.

Article 721-3, 2nd, of the Commercial Code, requires that a commercial company's due diligence plan include measures to "prevent the risk of serious violations" of human, social, and environmental rights. A criminal route is also a possible option for sanctioning violations of the supervisory duties imposed on companies in the environmental field, both because of the risk this poses to the public and the profit unduly generated by false ethical commitments.

Also to make companies more accountable, an environmental criminal summary procedure is now available to stop flagrant violations of environmental law. The application is open to the public prosecutor, who acts ex officio or at the request of the administrative authority, the victim, or a recognized environmental protection association. The effectiveness of the system has thus been reinforced by the Supreme Court, which has considered that precautionary measures have above all a preventive and not a repressive purpose. This is further confirmed in some documents of policy value adopted by the British government, first of all, the Waste Policy Review which set environmental policy targets for waste management achieved by 2020.

The problem of pollution in China in recent years has become so serious that, according to the Institute of Public and Environmental Affairs, only 35% of the sites researched throughout China have water of good quality, 32% are suitable for water supply, another 20% can be used for industrial production and agriculture but not for human contact.

By tackling this problem head-on with strict new environmental regulations, China has begun to make progress in addressing water pollution. Within China's textile industry, companies have also found themselves in the environmental spotlight. As the world's largest producer of textiles, the industry has historically been one of the worst polluters in terms of carbon emissions and water pollution. Official Chinese data from the Ministry of Environmental Protection also shows that in the same year, 2015, the textile industry in China was the third-largest source of wastewater and released 10.1% or 1.84 billion tons of effluent into the environment.

Since the passage of China's original Environmental Protection Law in 1989, China's economy has changed dramatically and rapidly. Adopted in April 2014, revisions to China's 1989 environmental law were designed to begin to address enforcement issues and bring civil society and the media into the process through awareness and transparency. The revisions allowed daily fines and removed the cap on environmental fines by making the cost of non-compliance more severe. The law was designed to encourage officials to pool resources to work toward environmental control instead of only addressing the concerns of their specific area.

As China's new environmental policy matures and companies, state and provincial governments, and civic organizations begin to gain experience in their new roles, there has been a resulting impact on the textile industry. The environmental policy has placed textiles on a list of industries that must develop "circular economies." In this model, the industry focuses on reusing, remanufacturing, and closing the loop completely so that little is lost in terms of resources. China's new environmental policy represents a major shift in pollution mitigation and control. The Environmental Protection Tax Act of 2018 and the Water Pollution Prevention and

Control Act, as well as other regulations adopted in the past four years, allow for regional and local differences that could lead to higher typicalities than those required by national law.

Pro-environment investments would have the effect of creating millions of skilled jobs, which would primarily benefit disadvantaged and vulnerable communities. The Environmental Protection Agency has released a plan that proposes to reduce power plant emissions by 30 percent by 2030, starting with 2005 data.

The law often offers only limited protection to intellectual property in the fashion industry, which can encourage fast fashion companies to ignore intellectual property law. This, in turn, further fuels the fast fashion industry's substantial carbon footprint. An extensive network of national laws, international standards, and industry best practices govern working conditions.

In addition, the G7 has formulated due diligence standards for the textile industry to help improve working conditions and strengthen workers' rights in the global textile supply chain. The April 24, 2013 collapse of the eight-story Rana Plaza building in Savar Upazila in Greater Dhaka, Bangladesh, epitomizes the devastating impact of poor working conditions in the garment industry. The industry, in general, exerts a substantial negative impact on the environment and society. Notably, the top 20 companies in the world by revenue have all adopted some form of CSR reporting, famous designers such as Vivienne Westwood and Stella McCartney have helped lead the way towards responsible policies in the fashion industry.

Regarding the fashion industry, in particular, ETI has promoted initiatives to improve working conditions in garment production. The global fashion industry faces several challenges in terms of sustainability and social responsibility. As the law currently provides only limited rights protection in the fashion industry and is often ineffective in improving corporate behavior, corporate social responsibility and sustainability initiatives can help combat inequality in the fashion industry and improve standards and conduct. Therefore, legal reforms and increased support for companies pursuing more sustainable practices are needed to redirect the fashion industry and consumers away from the fast fashion model and toward more sustainable sourcing, production, distribution, marketing, and consumption practices. Companies that adopt the slow fashion model should be the model for the future.

Puma is the third-largest sportswear and footwear company in the world. Protecting the environment and the planet is very important to Puma, as climate change can seriously affect its operations and performance. To comply with their "10FOR20" sustainable strategy, the company has decided to use organic or recycled cotton and recycled polyester or guaranteed by bluesig and Oeko-Tex certifications, the purpose of which is to verify that the production chain is as sustainable as the materials used. The waste that is created in the various stages of production does a lot of damage to the environment because it fills more and more landfills and emits methane and greenhouse gases.

For these reasons, Puma is committed to innovating and discovering new ways to be able to reuse the waste it generates so that it can decrease the negative effect that waste has on the environment. Because hazardous chemicals can harm the environment and people's health, Puma has introduced and adopted the AFIRM Group's Restricted Substances List and the ZDHC's Manufacturing Restricted, Substances List, as strategies for the use and control of chemicals. RSL and MRSL are the leaders in their industry for chemical

and substance management, allowing Puma to use only substances that are not harmful to the environment and to compare themselves with other companies in the industry on which chemicals to use. Today, all of Puma's products are PCF-free, as it is a very harmful and contaminating substance to the environment and workers. To promote the use of electric vehicles, charging stations have been installed in parking lots to support corporate sustainability and reduce the negative impact employees have on the environment.

Patagonia is a company whose mission is to use all the resources at its disposal to try to conserve and preserve the environment that is undergoing very important changes that are harmful to the entire ecosystem and planet. One of the practices the company believes in is called "Worn Wear," which aims to create high-quality products that last and can be repaired, and if repair is not possible they can be recycled.

In addition, the company's website explains to customers how to care for its products, such as how they should be washed and dried or how to repair them. Patagonia uses a variety of eco-friendly fibers and materials in the production of its products, which must have as little impact on the environment as possible. The use of hemp, therefore, leads to a low impact on the environment also because some of the properties of hemp improve the health of the soil as it provides key nutrients that prevent soil erosion.

Patagonia also uses REFIBRA lyocell fiber, which is composed of two innovative solutions that use recycled wood and cotton, reducing the impact on the environment. The manufacturing process of this fiber allows to use 95% less water than the production of cotton fabrics and also does not pollute the environment. The use of recycled polyester allows the reduction of the use of oil and the reduction of the negative impact on the environment. In 1993, Patagonia was the first company in the industry to use recycled plastic bottles in the production of fleece products. Patagonia, to reduce the use of unnecessary resources that have a great impact on the environment, tries to use only wool recycled from other discarded wool garments.

Since 2000, Patagonia has been working with bluesign technologies to try to reduce the consumption of resources in its material supply chain and to receive guidance on the best use of various chemicals. Bluesign Technologies monitors and approves that the use of chemicals, materials, processes, and products are not harmful to the environment. The dyes used to dye various garments are polluting, so Patagonia began using plant-based dyes from 96% renewable resources such as dried beetles, food waste, and silkworm logs to dye a collection called "Clean Color." The GORE-TEX fabrics used by Patagonia have a low impact on the environment because they are high quality and very durable fabrics that provide a long life. PrimaLoft Gold Insulation Eco padding boasts of being made of 55% recycled fibers from post-consumer materials, which has less impact on the environment.

In addition to paying attention to the materials, fibers, and technologies used to try to reduce its environmental impact as much as possible, Patagonia also pays attention to the use of resources in its corporate buildings and facilities. In 2006, the size of the Service Center was doubled, and all the efforts undertaken by Patagonia to reduce the impact of this expansion on the environment as much as possible were rewarded with the achievement of the Gold level of the Leadership in Energy and Environmental Design certification. In 2012, Patagonia was awarded the B Corporations certification, which is only granted when the company has an explicit environmental or social mission. The "B" stands for the benefit the company must demonstrate that it is

committed to creating benefits for the environment, its employees, and the community. From 1985 to 2017, Patagonia has contributed more than $89 million to more than 954 activities that support the environment.

In addition, Patagonia is active in a multitude of pro-environmental projects such as the goal of becoming a zero-waste company in all its subsidiaries.

Another company very active in the field of sustainability is The North Face, one of the many initiatives implemented by the company is called "The North Face Renewed" and consists of the creation of a new line of clothing using and recycling discarded clothing that would otherwise end up in landfills. TNF Renewed, on the other hand, allows the company to lessen its impact on the environment by recycling clothes that don't end up in landfills and less waste is generated, as approximately 85% of clothes end up in landfills each year.

The company is very committed to the use of recycled polyester because it has less impact on the environment, as by reusing existing materials the company can reduce dependence on fossil fuel and can reduce water consumption and air pollution. RDS is responsible for verifying and controlling the origin of feathers, making sure they do not come from abused animals and that the entire feather supply chain is traceable to reduce the negative impact on the environment that comes from feather exploitation. Another of the company's projects is called "Backyard" and represents the company's intention to create products with increasingly sustainable materials. In 2014, Fibershed created Climate Beneficial Wool, which is about encouraging farmers to adopt the new farming technique that draws carbon dioxide from the atmosphere back into the soil to improve soil and environmental health.

In addition, the company and its suppliers rely on the Restricted Substance List to decide and evaluate which chemicals to use to protect and preserve the environment. The company encourages all of its suppliers to participate in this program offered by Bluesign technologies, as it can provide very useful tips for optimizing the use of resources, materials, and chemicals. The "Clothes the Loop" initiative created by TNF aims to collect all discarded clothes of any brand that people can bring to the company's stores or outlets, thus decreasing the volume of waste in landfills and mitigating the environmental impact. Since 2007, to offset the impact of greenhouse gas emissions that it is not yet able to eliminate, TNF through The Conservation Found has been purchasing and planting trees using their CO2 absorption capacity to conserve and preserve the environment.

In 1989 TNF, in partnership with Patagonia and other companies, founded the Conservation Alliance, an organization that funds and participates with other organizations in initiatives to protect the environment. In 1991, it helped found The Access Found, a national organization that aims to conserve the climbing environment and keep climbing areas open. TNF is very committed to the protection of wilderness such as Alaska, as many of its athletes travel there to explore, and many of its products are designed for extreme environments, which with all the changes the planet is experiencing are increasingly at risk and consequently so are the company's activities.

Fjällräven is a Swedish company that manufactures and sells both sports and leisure clothing and technical sports equipment. In the production of its products, Fjällräven tries to use materials that ensure excellent quality and performance, but at the same time have a low negative impact on the environment. In cooperation with the Swedish Chemicals Group, the Fjällräven Chemical Guideline was created, which

contains a list of harmful and banned chemicals to help the company carefully select the least environmentally harmful chemicals to be used. Materials used in the production of various products include animal-derived materials such as wool, leather, and feathers.

Today, the company's feather supply chain is one of the most transparent and traceable in the entire industry. Eco-Shell, one of Fjällräven's most popular materials, is made of recycled polyester and contains no PCF because the company wanted to create a more environmentally sustainable material. By using recycled polyester, Eco-Shel allows the company to consume the least amount of resources and provides greater simplicity for its future recycling to minimize its impact on the environment. This material allows the company to have less impact on the environment, as recycled polyester requires fewer resources, generates less waste, and pollutes less air, water, and soil.

As an almost 100% recycled material, it allows the company to have less impact on the environment as recycled polyamide comes from the waste of second-quality yarns, cuttings, and fabrics, which means less waste is generated and less waste ends up in landfills. In addition, Fjällräven uses Tencel Lyocell, a material made from the pulp of trees from sustainable plantations that allows the company to decrease its environmental impact. Fjällräven has a very long, complex, and the elaborate design process because it wants to make sure that its products last, have good quality and utility, and are also easily repairable so that there is no constant replacement and they have minimal impact on the environment. The company's sustainable design philosophy consists of nine different processes.

To promote future recycling of products, only one or two materials are used in their production to facilitate recycling. In addition, the company is in close contact with all stakeholders in its value chain to make it as transparent and traceable as possible through regular audits and wants to ensure that there is compliance with the code of conduct it has developed.

The Kering Group is one of the most important in the world and has made sustainability one of its strengths, a key aspect being responsible and sustainable production systems embedded in a context of circularity for all raw materials used within the group, as expressed by environmental standards aimed at promoting and encouraging a sustainable approach by all its textile and leather suppliers. Kering invites Maisons to choose a sustainable design by making targeted choices about the origin of raw materials, production processes, and modes of transport.

Kering has launched rigorous standards for all its suppliers and raw materials, the result of years of research and collaboration with international players and NGOs, going beyond the sustainability standards imposed by international regulations and creating its own. In any case, the group has managed to reduce the impact of some raw materials considered very polluting and unethical, such as metals, precious skins, and furs. Gucci is probably the most important Maison of Kering, the main steps taken by Gucci concern the innovation of some production processes and raw materials that have allowed sustainable management that has given results in terms of materials and energy saved.

First of all, Gucci is a great collaborator of the Material Innovation Lab, made available by Kering, through which the designers of the Florentine brand can gather materials and ideas so that product innovations

take place in an optimal climate. Since the spring-summer 2018 collection, Gucci has also completely abolished the use of animal fur and simultaneously introduced a blockchain system for the traceability of raw materials. Many waste materials from the hospital were used. Thanks to this project, the company managed to win the Circular design challenge award 2019.

The Cucinelli company was founded by the entrepreneur of the same name, as well as a designer, in Umbria, in 1978, in Ellera di Corciano, in the province of Perugia, in a small village. There is a close relationship with the land of origin, which boasts a long textile tradition, and to whose history and humanism the brand draws inspiration for its traditional weaving and corporate vision. The company has always shown great consideration for human moral dignity and has always strived to ensure the support and well-being not only of its customers, as buyers, but also of its employees.

In this sense, the company has always been concerned with ensuring that its employees not only receive adequate financial compensation, but also working conditions that allow them to be more productive and creative, conceiving the work environment as one big family, and thus increasing mutual trust. There have been several occasions when the bond between the company and its employees has been strengthened. On another occasion, it increased the salaries of its employees by up to 20% more than the artisans of other companies, wanting to quantify, and thus also increasing the value of the product, the productivity and competitiveness of the company, which consequently made a higher profit. This shows how this company can adopt an instrumental approach to its stakeholders, bringing benefits to them but at the same time also to itself. Yet another occasion in which the relationship between the company and its employees was strengthened was in 2012, when, for Christmas, all employees received a bonus of 6 thousand euros. The Cucinelli case is therefore the emblem of a company that has not only managed to reconcile opposing interests internally but has transformed this ability into a competitive advantage.

The 3D printer represents a great possibility for the development of sustainability in the fashion world, a printer creates the object by laying down many thin layers of plastic materials in rapid succession. One company that has made good use of it is Florenradica, which decided to take advantage of new business opportunities with the Stratasys J750 3D printer to create colorful patterns composed of different materials. This decision has greatly expanded the company's design and production capacity in terms of quality and quantity and offered a better return on investment, so much so that after installing the J750, it saw an increase of about 25% in customer visits. The results that can be achieved with this 3D printer are particularly popular with fashion companies because you get an unlimited range of materials, transparencies that can simulate glass, combinations of hard and soft parts, up to 500,000 colors with texture mapping, and gradients. These machines then allow you to print in color, using materials with different textures, reproducing shades and surface textures, to create prototypes that simulate the final product in every way. The ability to create objects composed of different materials in a single print job eliminates assembly and finishing operations resulting in reduced costs and time.

The future of clothing is in its sustainability. Fashion can no longer ignore being an active part of an integrated system that helps society itself to be more sustainable.

In these perspectives of integrated sustainability, attention will have to be paid above all to the development of new nanotechnological materials that, by their nature, allow a different behavior according to environmental conditions, that are refractory to foreign substances drastically reducing ecological costs related to cleaning and that are disposable and reusable without negative impact on the environment. The use of these raw materials will lead to an epoch-making change in the sector, with the need to create supply chains that are completely different from the current ones.

Within this conceptual framework, it is clear that the new garment will be something closer to a hi-tech product than to one of the conventional garments we are used to today. The path of connection between craft knowledge and new technologies is still developing, as it is clear that the skills to master new technologies are still lacking, both in companies and at the school level. Technologies, especially those used in production processes, have limitations that do not yet make them adaptable to any production process. However, this change cannot start from individual companies, but initiatives are needed that involve as many players as possible, such as institutions, universities, and research centers, to trigger a process of exchange of skills between the artisan and technological worlds.

The communication gaps of companies can, in fact, fuel misunderstandings on the part of consumers who, not understanding the innovative scope of the new production processes, do not attribute the right value to the products. It can be argued that the concepts of craftsmanship and digital, long considered incompatible, are now closer than ever, and it is from their union that Made in Italy companies can find the basis for renewal. We must try to give centrality and importance to craftsmanship, but from a contemporary point of view, so much so that today there is talk of a "digital craftsman", i.e. one who manages to innovate traditional production techniques by applying new technologies.

The goal for Italian companies is to succeed in being local and global at the same time, artisanal and innovative, exploiting all the technologies available to them. The keywords for the fashion industry in Italy are research, innovation, and specialization, which are the goals to pursue to guarantee the Made in Italy companies an increasingly larger slice of the market, not forgetting the artisan past but enhancing it, providing that "tailor-made" experience that mass production has made us forget, in a different way that can also be more sustainable and innovative.

Since there are different fields of action of CSR and the focus of this thesis is the environmental field, through the analysis of the literature it was possible to determine what actions companies in the clothing sector put into practice in this area.

Another goal that has been achieved is the understanding of the main laws and directives of the environmental sphere in general and more specifically within the fashion industry. All of this was used to analyze and compare companies within the industry regarding the practices they have developed to decrease their environmental impact. It was possible to see that different companies are active in different areas and implement a variety of actions to minimize their environmental impact.

The companies pay a lot of attention to the environmental sustainability of their infrastructure and employees to minimize its impact on the environment. Patagonia financially and non-financially supports several environmental organizations and offers a variety of environmentally friendly actions and activities.

Companies are trying to eliminate the use of PFCs from their value chain and are therefore already well on their way. The analysis of the Kering Group, increasingly a leader and symbol of sustainability in the luxury fashion industry, has shown that a company can achieve significant economic returns if it invests energy and resources in sustainability. Although the group's profits are not directly attributable to its sustainability strategy, having implemented investments throughout the value chain of green policies over the years has led to a strong increase in the reputation of the group and all the brands it groups together.