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SECOND LIFE IN SUSTAINABLE FASHION DESIGN
The contribution of Made in Italy

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ABSTRACT
The article aims to highlight the process, product and cultural innovations implemented by the Italian fashion design manufacturing sector as a part of an overall environment-centred strategy. The analysis of these innovations makes it possible to identify a sustainable approach to design in the Made in Italy sector. This approach is typical and linked to its territory, therefore it can be defined as an actual 'Italian way'. The aim is to demonstrate, through case studies, the need and desire of the Italian Fashion System to show a way to respond to environmental problems. In the same way, we intend to underline how eco-innovation in this sector provides solutions aimed at improving the efficiency of our resources, becoming a driving factor for environmentally friendly economic growth.

KEYWORDS
made in Italy, fashion design, genius loci, environment-centred design, circular economy

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The design industry is now faced with major environmental challenges such as climate change, depletion of natural resources and loss of biodiversity, with no room for procrastination. The current situation no longer allows for isolated or locally effective solutions, as the implementation of sustainability requires context-specific temporal and spatial indicators. Sustainability is, indeed, a property of the system and not a property of individual elements, and achieving global sustainability requires a systemic, multiscalar approach, guided by vision rather than a traditional optimisation approach (Bagheri and Hjorth, 2007; Holling, 2001; Walker et alii, 2004), which takes into account human beings and the environment and the interconnections they create in the system. This also requires major changes in the way we use and produce goods and services. All too often, they come at a market price that does not reflect their real environmental and social costs. Therefore, to protect and preserve the planet, consumers and producers must begin to play their part in an economy that focuses on low CO_2 emissions, energy and resource-efficient processes.

Through targeted policy actions it is necessary to identify and promote sustainable economic and social models, and to stimulate and disseminate innovative technology solutions that deliver clear and substantial environmental benefits to achieve environmentally friendly economic growth. Europe has developed a range of economic tools on environmental innovation and entrepreneurship with the purpose of encouraging investment in environmental processes and technologies. The challenge is to invest in eco-innovation in order to improve the overall environmental performance of products throughout their life cycle, increase the demand for sustainable products and production technologies, and help consumers make informed choices. In this sense, this contribution aims to highlight the key role that the Italian Fashion System can play in orienting the national market towards sustainable production and consumption. Therefore, best practices in the different phases of the fashion supply chain have been analysed to highlight the innovations implemented by Italian companies to improve the environmental impact of their products. Specifically, they were characterised by a deep knowledge of the territory and its specificities, the rediscovery of the genius loci and the enhancement of circularity actions.

Evolution of sustainable thinking | The Covid-19 pandemic tragically devastated global economies, highlighting how worrying it was to manage current needs according to old paradigms. The coronavirus entered a global framework already disrupted by deep inequalities (Piketty, 2018), where the ways of capitalism had long since begun to show signs of structural fragility, with serious consequences for liberal democracies (Jacobs and Mazzuccato, 2016). The health emergency has dramatically highlighted the flaws in the system, forcing governance models and industrial systems to face a radical and urgent transformation. The complexity of our economic, social and cultural systems has led to the exploitation of resources and alteration of natural cycles. The scientific com-

munity compared the damage done by human intervention in nature to the great geophysical forces that have transformed our planet over the millennia.

In fact, in the 1980s the scientist Stoermer defined the geological era we are living in with the term Anthropocene (from Greek, anthropos: man) and, subsequently, the term was also taken up by the Nobel Prize winner Paul Crutzen. He proposed the second half of the 18th century as the beginning of this new era, emphasising that since then – as it had never happened in human history – the global effects of human activities become evident and accelerated (Crutzen and Stoemer, 2000). Therefore, humanity is today facing a life driven by a capitalist consumption model that does not take into account the limits of the ecosystem, which is in a state of progressive deterioration. The dynamics linked to the quantitative growth of the dominant economic model of consumption have led humanity to dramatic consequences not only from an environmental, but also from a social, economic and cultural point of view (Meadows et alii, 1972; Meadows, Meadows and Randers 2004).

Various economic theories have been developed as an alternative to consumerism growth, criticising the current capitalist system, such as the application of the degrowth and post-development concept (Latouche, 2006; 2015) of qualitative growth (Capra and Henderson, 2013) or the happiness economy (Kahneman, 2007), the Circular Economy (Ellen MacArthur Foundation, 2010) and the Blue Economy (Pauli, 2009). Or bottom-up movements implemented by the Collaborative Commons (Rifkin, 2014) Sharing Economy (Botsman and Rogers, 2010) and creative communities (Florida, 2006). These are development alternatives that propose to measure the well-being besides the monetary and material aspects, more oriented towards qualitative indicators and not only focusing on the individual, but on the community. For its part, Design for Sustainability has put in place effective methods and tools such as the Life Cycle Design (LCD) or the Life Cycle Assessment (LCA) that favour an analytical approach. The design orientation has shifted its focus from damage remediation to strategic design for sustainability (Vezzoli, Kohtala and Snrinivasan, 2014) thus leading to more complex approaches such as Cradle to Cradle (McDonough and Braungart, 2003), Biomimicry (Benyus, 1997) or Social Innovation (Manzini, 2015).

Throughout history, the evolution of the concept of sustainability can be summarised in three phases. The first begins between the 1960s and 1970s, a period in which designers began to manifest an ecological consciousness linked to the direct implications of design for society and the environment. An important role was played by Rachel Carson's book Silent Spring (1962) and the birth of the Green Movement. Over these years some new approaches emerged, such as ecodesign and ethical consumption. The pioneer of social and sustainable design was Victor Papanek, with his critique of consumerism also based on political awareness. In 1972, the report The Limits of Growth commissioned by the Club of Rome has unequivocally shown the problems originating from population growth and the inconsiderate use of resources and environmental pollution, showing how that growth model was unsustainable for

the planet. The same year saw the first major United Nations Conference on the Human Environment in Stockholm, at which UNEP (United Nations Environment Programme) was established.

The second phase took place in the 1980s and 1990s, based on the economic and energy crises, and coincided with the green consumer revolution. The first half of the 1980s was characterised by design experimentation with materials, and the advent of artificial and intelligent materials that were also of great interest from an environmental point of view (Pietroni, 2001). In 1987, the World Commission on Environment and Development, established in 1983, published the well-known report Our Common Future in which the concept of 'sustainable development' was defined for the first time: «[...] Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs» (WCED, 1987, p. 15). The subsequent Rio de Janeiro Conference in 1992 took up the definition of sustainable development coined in the Brundtland Report and placed it at the centre of the new socio-economic policy analysis. It also drew up the Agenda 21 document, which required member states to put environmental objectives at the core of their national policies. It also began to monitor the pollution load resulting from human activities, especially greenhouse gas emissions into Earth's atmosphere. The industry of design is changing, overcoming the throw-away culture. Among the international agreements made during this period, there was also the Kyoto Protocol, signed in 1997, which came into force in 2005 and ended in 2012, aimed at reducing CO_2 emissions.

Finally, with the beginning of the new millennium we are witnessing a global awareness on the damage of incorrect product and process design from an environmental, social and economic point of view (Bhamra and Lofthouse, 2007). In 2000, the OECD developed Guidelines, a set of recommendations to encourage governments and multinational companies to make a positive economic, social and environmental contribution to society and sustainable development. In 2012, the United Nations Conference on Sustainable Development Rio+20 was held, which set new goals for member states, making up for some of the shortcomings that had emerged from previous actions by creating new Sustainable Development Goals (SDGs) and drafting the concluding document The Future We Want (United Nations, 2012), that established the definition of the Sustainable Development Goals. This led to the 2030 Agenda for Sustainable Development, a programme of action for people, planet and prosperity, signed in September 2015 by the governments of the 193 UN member countries, a key document aiming to show how the transition to sustainability goes through values that can still place man at the centre of the process.

Fashion Design System | The transition to a post-Covid-19 era seems to offer a rare opportunity for change for the entire fashion system, pushing towards a competitive advantage in an environment that has always been labelled as volatile, uncertain, com-

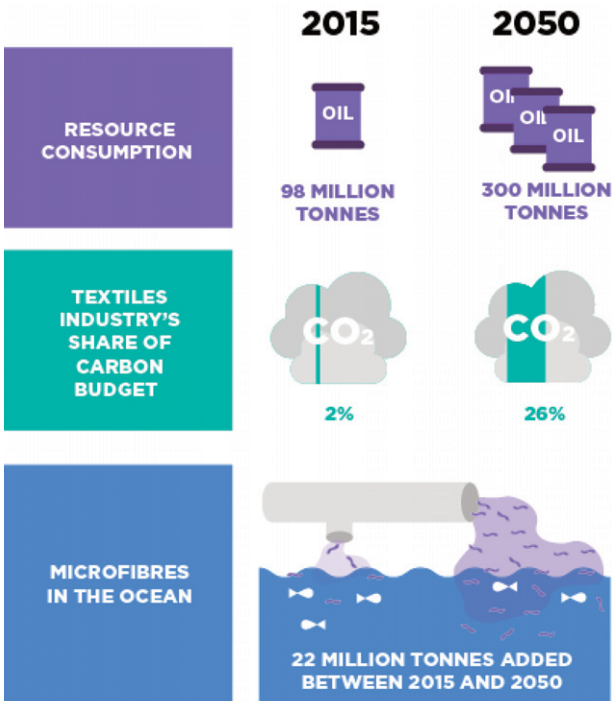


Fig. 1 | Negative environmental impact of the textile industry: forecast to 2050 (source: Ellen MacArthur Foundation and Circular Fibres Initiative, 2017).

plex and ambiguous. This urgency is now reflected in the methods of production, distribution and consumption of its products: developing as a resource-intensive industry and a powerful global growth engine, the fashion system, especially in its latest 'fast' mutation, has massively participated in human and environmental exploitation (Niinimäki et alii, 2020; Rinaldi, 2019).

Currently, the global fashion industry is responsible for 10% of global pollution and 8% of global greenhouse gas emissions are attributable to the clothing and footwear industry, while the textile sector emits 1.2 billion tonnes of CO_2 annually (Ellen Mac Arthur Foundation, 2020; Fig. 1). However, the environmental impact of this industry continues in most cases in the linear 'throw-away' approach of its consumers. The State of Fashion 2020 report (Amed et alii, 2020) states that today 60% more clothes are bought than 15 years ago and they are stored for less time, and that 85% of the clothes produced end up in landfills while only 1% are recycled. But the report also shows that, on the one hand, many companies are making efforts to increase the supply of sustainable products, and, on the other hand, consumer choices are becoming more aware of and sensitive to 'sustainable fashion'. According to some data from Lyst Club (2020), the increased interest in sustainable fashion is expanding worldwide and Italy is in 12th place, with a 78% increase in purchases of sustainable garments from October 2018 to March 2019. For its part, the Camera Nazionale della

Fig. 2 | Summary of the analysis of the Made in Italy Fashion Best Practices examined (by Authors, 2021).

Moda Italiana in collaboration with Eco-Age and with the support of the Ministry of Foreign Affairs, has set up the Green Carpet Fashion Awards with the aim of rewarding the commitment of fashion houses to sustainability, as well as to highlight the national commitment of institutions on it.

In fact, several scholars have pushed for more sustainable fashion since before Covid-19 (Birtwistle and Moore, 2007). Despite its limited scope, the trend for fairer fashion has gradually been supported by many forms of activism, ranging from the 'fashion revolution' (Ditty, 2015) to the 'anti-fashion manifesto' (Edelkoort, 2015), aimed at raising awareness about the necessary reformulation of its industrial models. In this sense, the pandemic has shortened the timeframe for action, becoming an unexpected discontinuity moment. The Copenhagen Fashion Summit of 2020, held in virtual mode, entitled Redesigning Value, raised a complex question about the values that fashion will and must express in the near future. The answer stems from a tragic underlying emergency, based on a humanitarian crisis and aggravated by a rampant environmental crisis, characterised by hypertrophic global supply chains with a high ecological footprint (Gazzola, Pavione and Dell'Ava, 2019). Today, the pandemic has disrupted society and markets, forcing fashion to confront radically different, more critical consumers with high expectations of greater transparency and social, environmental and economic responsibility (Amed et alii, 2020). Therefore, the need for a transi-

Fig. 3 | ECONYL®, patented in 2011, is made from post-consumer waste including fishing nets that are sourced by divers (photography courtesy of Aquafil).

tion from previous industrial paradigms seems to be emerging. In this sense, the paper intends to analyse the strategies implemented by the fashion industry specifically in Italy to respond to the complexity of contemporary life. The Italian fashion system, intended as the whole of the upstream and downstream sectors of the supply chain, took shape in the 1970s. It is a pillar of Italian manufacturing and has a solid tradition and a consolidated competitive advantage at the international level.

Fashion Design Made in Italy | Considering that the fashion industry is one of the most polluting in the world and that, at the same time, it is the jewel in the Made in Italy crown, many examples of national excellence in sustainable innovation now show how Italian fashion expresses the desire and the need to show a viable way to respond to environmental issues. Leaving aside the legal aspect of the definition, the expression Made in Italy began to be used in the 1980s and concerned those manufacturing sectors that express the district characteristics and the strong roots in the territorial specialisations of the Italian production system, such as: the fashion system, typical Mediterranean food products and the furniture sector (Fortis, 1998; Quadrio Curzio and Fortis, 2000; Rullani, 2000). These products are therefore linked by a particular mix of elements that determine their unquestionable recognisability at an international level, and through which the tangible and intangible values of our territory are highlighted and made known throughout the world. Values deriving from the specific know-how and the creative and design capacity of its creators (Plechero and Rullani, 2007; Bettiol, 2015; Capalbo, 2020).

The different cultures and civilisations that have followed one another and lived in our peninsula over the millennia, the geographical variety of the territory, the socio-political history that, starting from the 11th century in the medieval era, went through the phase of the Communes, have favoured the flourishing of a multifaceted identity on the national territory, which today claims its reason to exist, to express itself and to be known (Terenzi and Furin, 2020). The territory, intended as an integrated place of

skills, knowledge, culture, environmental assets, tangible and intangible excellence, is now widely considered as the subject of interest for models and innovative strategies of accreditation, enhancement and socio-economic development (Bassi, 2017; Giumelli, 2019). Truly believing that knowledge and critical awareness of an articulated identity, including its mutations, is the key to continuing to express it with meaningfulness, keeping alive and peculiar the link between design, knowledge of materials and workmanship, executive quality and the complex of everyday life, assigning to the genius loci a highly conceptual and communicative value, regardless of the national location of the entire supply chain. Therefore, the work intends to outline the Italian Way in the approach to Design for Sustainability which, starting from the rediscovery of the genius loci, and using solutions of up-cycling, reuse, valorisation of secondary raw materials and eco-innovation (Puglia and Terenzi, 2020) giving rise to product, process and cultural innovations, to create a sustainability future.

By analysing how the fashion industry has mastered short-term horizons, this article aims to promote new strategic tools for the fashion system. The relationship between production, territory and environment can, in fact, be rebalanced through a strategic design, which goes from the simple concept of a product to a system of products and services. Strategic design favours new models of harmonious local development, enhancing and transforming the local material and immaterial resources present in a territory (Catania, 2011). The cases presented will outline the possibilities offered by the circular transition linked to territorial design, centred on local roots, as an identifying and winning tool in the identification of eco-sustainable innovations. It will be demonstrated that design can and must help us to visualise environmental urgency in all its forms, in favour of unique and unrepeatable creativity that gives new form and function to production processes, allowing a paradigm shift capable of determining multiple and different environmental, economic, social and cultural implications.

With this aim, the analysis carried out on the best practices currently implemented in the different phases of the fashion supply chain is presented, in order to decline the multiple possibilities that the sector can express and demonstrating how it is possible to intervene in a green-friendly way. Companies that would like to open up to the world of sustainability are often catapulted into an infinity of disconnected data that is difficult to use. To systematise this information, the study divided the fashion supply chain into a) raw materials; b) manufacturing processes; c) finished products; d) end-of-life products. Subsequently, it was defined where and how to intervene for the single phases, through the analysis of best practices of Italian companies that have already undertaken sustainable actions.

The previous four macro-categories have in turn been divided into sub-categories: raw materials will be addressed for the textile and leather sectors; production processes have been distinguished by actions to reduce emissions of CO_2, hazardous chemicals, and the use of renewable energy; finished products are broken down by innovation in design, by physical and emotional durability criteria, by choice of packaging,

and finally by an offer for repair and warranty services; finally, the end-of-life of products will be addressed under the entries of reuse, which includes rental, vintage and take-back programmes, and recycling (Fig. 2). In the next section we will analyse best practices in the exploitation of the most commonly used raw materials for the sector: from textiles, which are divided according to their origin into synthetic, natural or artificial, to leather.

Textiles | Synthetic fabrics are neither recyclable nor biodegradable and are mostly derived from oil waste. The main synthetic fabrics used in fashion are nylon, which is responsible for nitrogen oxide emissions, and polyester, which contaminates water systems. The Aquafil company, founded in the 1960s in Arco, has succeeded in transforming an apparently non-renewable material such as nylon into a regenerated material for other uses. The chemical process developed starts with a funnel of waste (in particular used carpets and fishing nets). The polymers separate and become monomers that form caprolactam, a distilled liquid identical to that derived from benzene. The liquid, once cooled, is transformed into plastic granules, 'pure nylon 6'. Finally, the granules are spun and arranged on reels to be sold to the customer, under the name Econyl (Fig. 3). The quality and processing characteristics of this regenerated material are the same used for petroleum-derived nylon, with 50-60% lower energy consumption. The first fashion brand to use the new yarn was Speedo, which produced part of its swimwear collection, then Adidas with a line of swimwear and socks. They were followed by fashion brands such as Gucci (Fig. 4), Stella McCartney and Prada (Fig. 5), which has declared its intention to make all its nylon bags entirely from Econyl by 2022. Finally, Napapijri, with its new Infinity jacket project, which is 100% recyclable, and Safilo which, for the first time, has used Econyl for the frames of an eyewear line.

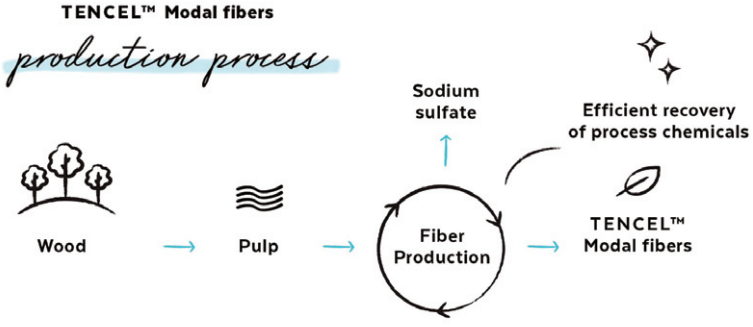
Natural textiles are made from plant fibres, animal fibres, or are extracted from a mineral. They are recyclable and biodegradable, but involve considerable use of soil, water and energy. For example, the application of chemicals in cotton cultivation impacts 33%, cotton ginning 25%, irrigation 19% and the use of fossil fuels 17%, highlighting various socio-economic and environmental impacts (Hossain, 2015). The Bergamo-based company CFT Masserini S.p.A working in textile trade since the early post-war period and was the first to introduce natural and recycled organic cotton yarns. The company's organic cotton comes only from certified organic farming and an ethical production chain.

With the COREVA® patent, the Candiani company, founded in 1938 near Milan, processes organic cotton by wrapping it around a layer of natural rubber, creating a fabric free of plastic and microplastics. By replacing normal, synthetic, petroleum-derived elastomers, Candiani has created an innovative biodegradable stretch denim fabric (Fig. 6). In the dyeing and finishing phase, the company uses Kitotex® as a substitute for chemicals, starches, fixatives and polyvinyl alcohol (PVA) and the Indigo Juice technique that maintains indigo on the fabric surface. Both technologies reduce

Figg. 4, 5 | Off The Grid Gucci Shopping bag, made of Econyl, 2020 collection (source: gucci.com); Screenshot from the video Prade Re-Nylon – What We Carry, documentary created by Prada in collaboration with National Geographic, 2019 (source: youtube.com).

Fig. 6 | Jason Denham's 2019 Denim line using technology developed by Candiani to make the first biodegradable stretch jeans (source: it.fashionnetwork.com).

Fig. 7 | Image from Detox My Fashion, a campaign launched by Greenpeace in 2011 that ended in 2020 with the Detox Fashion Show, a real ranking that highlighted the progress of the fashion brands that had joined the Detox My Fashion campaign (source: green.it/moda-detox/).



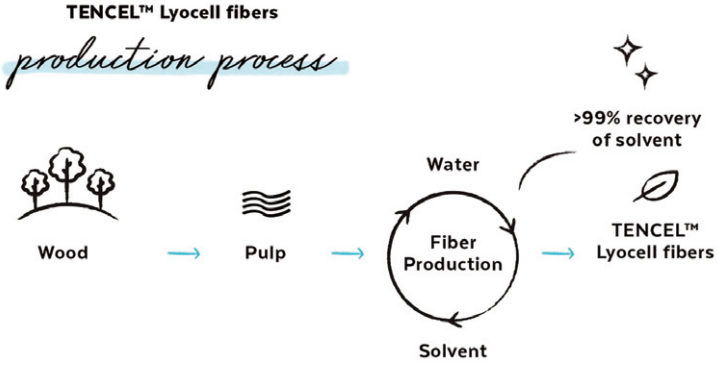


Fig. 8 | CasaGin and TENCEL™ modal fibers mainly manufactured from wood, renewable raw material, sourced from sustainably managed forests. The production process of these fibers is also environmentally sound, with the use of renewable energy and recovery of raw material components for the production of co-products (source: hotlifestyletale.com).

the consumption of water, energy and chemicals used in dyeing and laundry processes. Canepa Spa, founded in Como in 1966, has developed Kitotex® in collaboration with CNR-Ismac in Biella, a polymer obtained by recycling the exoskeleton of crustaceans, a waste product of the food industry. The fabrics obtained using this technology also provide health benefits to consumers thanks to the antibacterial, anti-static and anti-mite properties of chitosan.

Man-made textiles are biodegradable, although not all of them are recyclable. They are made from natural raw materials that are transformed into fibres by chemical processes. Today there are processes for their production with a low environmental impact. The company Orange Fibre, founded in 2014 in Sicily, has developed and patented an innovative fabric derived from citrus by-products from local crops. The process starts with citrus pulp, the wet residue, waste from the process, which remains after the industrial juice production. From the pulp, citrus cellulose is extracted and transformed into yarn using an innovative process. The result is a very high-quality yarn that can be printed and dyed, allowing for sustainable, innovative and high-quality collections. The company presented its first fashion collection in 2017 in collaboration with the fashion house Salvatore Ferragamo from Florence. In 2019, citrus fabrics were chosen for the Conscious Exclusive Collection of Swedish brand H&M and a capsule collection of ties signed by the historic tailoring brand Marinella from Naples.

Fili Pari is a start-up company that combines design, innovation and circular economy, producing clothing with a completely innovative material, which comes from marble processing waste. Veromarmo fabric is a waterproof, breathable, windproof, flame-retardant and abrasion-resistant microfilm that combines technical performance with aesthetic qualities. It is made from marble powder, selected from Italian stone districts, which is mixed together with a special composite. The marble contained in the fabric not only increases the material's resistance to abrasion, but also gives it colour and special graphic effects, enhancing the original product. For example, grey is obtained from black ebony marble and a bright salmon from red Verona marble.

Leathers | Leathers used in the fashion industry have to be traced and certified, in compliance with the most relevant regulations and certifications, for transparency on farming and conservation of certain protected species. Animal welfare policies of some brands and several legal guidelines, such as bans on the sale of fur in some countries, are leading to a steady increase in demand for artificial fur and fur-free alternatives. However, even alternative products have sustainability complications, as most of them are made from synthetic fibres, including acrylic, modacrylic and polyester, all of which are petroleum-based.

Gucci, the fashion house from Florence active in the haute couture and luxury goods sectors and part of the Kering Group, has shown a marked sensitivity towards issues of environmental, ethical and social sustainability. With this in mind, in 2019 the Kering Group developed and published a series of Animal Welfare Standards, de-

Fig. 9 | In 2020, the start-up Rifò proposes Repack, the reusable packaging service, advertising the initiative on Twitter (source: twitter.com).

Fig. 10 | Gianfranco Lotti luxury brand offers customers a lifetime guarantee on purchased products (photography courtesy of Gianfranco Lotti, 2020).

signed to be applied in the supply chain in the steps concerning live animals (especially on farms and in processing plants). Concerning leather of bovine and ovine origin, although it is considered a by-product or co-product of the meat industry, the Group is committed to ensuring the most responsible and sustainable sourcing possible, helping to reduce the negative impacts of livestock farming. For Kering, the only way to reduce the risks associated with social and environmental impacts is to have complete traceability of the leather throughout the supply chain. About fine leathers, the Group is committed to ensuring that these leathers are sourced according to the highest standards of animal welfare, environmental and working conditions.

Manufacturing processes | In order to meet the needs of an exhausted planet, it is important for sustainability to focus heavily on manufacturing processes, before addressing only the end-of-life of the product. It is necessary to develop effective solutions, using renewable energy, to reduce harmful emissions from the industrial production system and avoid the use of chemicals that are extremely dangerous to the environment and humans.

Reducing harmful emissions. The Sharing Economy promotes more conscious forms of consumption based on reuse rather than purchase and access rather than ownership. Thanks to the support of technology and social networks, collaborative consumption is expanding into other areas of daily life, reflecting the values of openness, sustainability and collaboration, derived from digital culture. The beneficial outcome is to reduce environmental pollution by reducing transport. The sharing model has also spread to the field of fashion, where more and more online platforms provide collective wardrobes. In Italy, the My Secret Dressing Room platform has taken off, connecting those who lend an item of clothing or an accessory with those who borrow it, even if only for a day.

Water pollution. In the textile district of Prato, about three hundred and fifty indus-

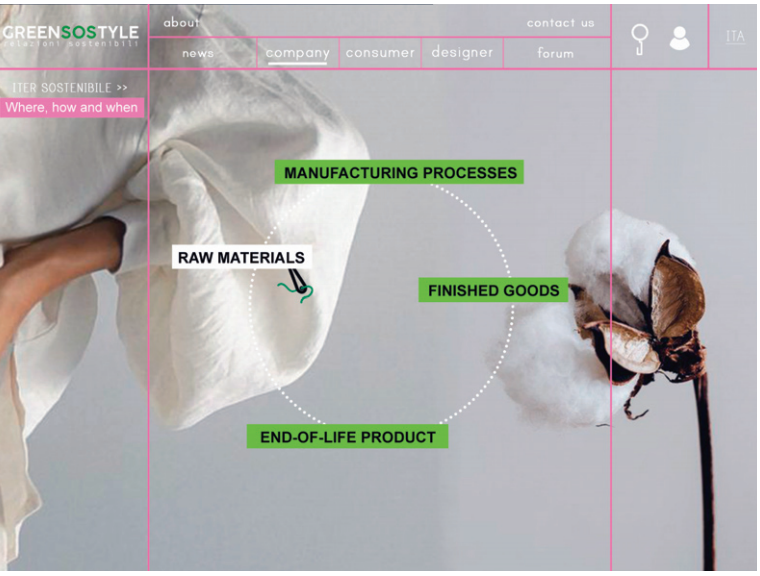
tries are connected to the GIDA (Gestione Impianti Depurazione Acque S.p.A.) wastewater treatment plant. The water, once purified, is used in the cycle of the textile production chain. The purification process involves an initial phase of water treatment up to its last stage when it takes on a transparent colour and is treated with ozone which totally reduces its yellow colour. This process is essential for the washing, finishing and fabric treatment stages. GIDA is the only industrial system in the world to reuse water from civil and industrial waste and return it to the production cycle. The result is a textile supply chain that always uses the same water, purified for each use, without the need to exploit other water resources.

Dangerous chemicals. Greenpeace was among the first to believe in sustainable fashion, launching the Detox Campaign in 2011. After a careful analysis of the entire fashion supply chain, numerous trips to South-East Asia to take samples of polluted water and air and to better understand the gaps in the entire supply chain, and appropriate laboratory tests in collaboration with the Buzzi Lab in Prato, Greenpeace drew up the Manufacturing Restricted Substances List (MRSL), a list of 435 hazardous chemicals (Fig. 7). The Detox philosophy does not analyse subcategories but considers the group of hazardous chemicals and fully eliminates them. The programme challenges companies to eliminate the substances on the MRSL list. Italian companies that have signed up include Uniqlo, Valentino and Mirò, who have committed to completely eliminating harmful chemicals from their supply chains and publishing the updated list of products eliminated to date on their website.

Finished Goods | For this phase of the fashion supply chain, the role played by correct design choices is decisive, as they can bring about a real change in the relentless consumerism and consequent waste production.

Product design. It is possible to intervene with a wise choice of quality and durable materials, but it is also necessary to extend the durability of the finished products, not only physical but also emotional durability. By linking the product to the sensorial and emotional sphere of the end-user, in fact, it is possible to give the user an experience of purchase and use of the goods that goes beyond simply wearing a garment and then forgetting about it after a few uses. The philosophy of luxury brands is closer to this approach, as very often the possession of these garments is considered as a way of being, a lifestyle, a sign of belonging to a group and the brand identity.

CasaGin is a young company from Veneto founded in Padua in 2017, awarded as an innovative start-up in the field of fashion, at an international level, by the MIT of Boston together with the Business School of Bologna. It produces underwear, home and beachwear and sportswear, sold on its e-commerce website, in specific marketplaces for sustainable products and, in Italy, also in pharmacies and herbalist shops (Fig. 8). The company's mission is to create a 100% Made in Italy brand, linked to comfort and environmental protection. The first fabric is used for its products was Tencel, made from a fibre obtained from beech and eucalyptus wood. Then other ma-



Figg. 11, 12 | Website GreenSOStyle by Francesca Piccinini, 2019. This graduation project starts from the awareness of current environmental issues such as climate change and the dependant responsibility of fashion. this work's uniqueness is the creation of an online platform called greensostyle.com dedicated to sustainable fashion. The platform connects three main groups involved in sustainable fashion (companies, consumers and designers) and offers each group some useful tools that fill the gap of information and cooperation between actors (source: francescapiccinini.design).

terials were used such as Econyl, derived from the recovery of fishing nets and plastics thrown into the sea and, from this year, biodegradable nylon has also been introduced. For packaging, CasaGin uses small laboratories located between Veneto and Piedmont, thus combining sustainability and innovation with the great Italian craft tradition.

Packaging. The idea of durability should not be limited to the final product, but also to its surroundings and context. This is why it is important to plan a second life also for the accessory parts of the product, such as the packaging, which has a great communicative function and has a significant impact both on the price of the final product and on the environmental cost. It is estimated, in fact, that from 100 to 500 grams of CO_2 are emitted for the realisation of a cardboard box and from 100 to 200 grams for a plastic bag. Rifò, a company from Prato founded in 2017 with the mission of creating quality clothing and accessory lines with 100% regenerated and regenerable fibres, has understood the importance of intervening in product packaging as well. Rifò products are packaged and shipped through cardboard packaging and plastic-free materials, 100% recyclable and made in Italy. Rifò has also introduced the use of Repack packaging, i.e., special packaging that can be reused up to 20 times, thus considerably reducing the impact of traditional packaging production (Fig. 9).

Repairability and warranty. One cannot think of a circular economy without keeping in mind the need to minimise the reintroduction of post-use products into the remanufacturing process as waste. This is why some companies have taken action with specific reparability services for the products they sell. Durability and sustainability go easily together. Important steps towards an ethical approach to fashion products, abandoning the linear and ephemeral disposable approach. It was demonstrated by the advertising campaign of the company Patagonia, which urged the customer to repair their old jacket through waterproofing or maintenance treatments, to increase the life of the product by at least three years. Similarly, Farfetch, the e-commerce giant for luxury fashion, has launched Farfetch Fix, a new initiative to encourage the circular economy, in collaboration with The Restory, a company specialised in the restoration and care of fashion accessories. This will allow customers to restore damaged garments, extending the life cycle of the products. As far as Made in Italy is concerned, Valentino, for example, has introduced a 5-year guarantee on its products. While the company Gianfranco Lotti from Florence, which produces luxury leather accessories, has a lifetime guarantee on the purchased product, for which the customer can request maintenance or repair within an unlimited time after purchase (Fig. 10).

End-of-life of products | The obsolescence of fashion products, induced by aesthetic evolution and linked to changing social preferences, highlights the psychosocial nature of the factors that condition their service life. A vision linked to the assumption of a development model that is also capable of overcoming the crisis of the current production model, undoubtedly goes in the direction of extending the potential linked to

the recycling and reuse of products, and the search for technical solutions and materials that prolong their life and convert their uses at the right time, transforming products perceived as waste or having reached their end-of-life into new raw materials or new products. The aim is to see a second life or second raw material in the end-of-life of a product, through reuse and recycling strategies.

Reuse. Svuotaly is an Italian platform that allows you to buy and sell used goods online. Specific and very detailed profiling has been devised to make supply and demand easy to match. 90% of the users are women aged between 25 and 40, demonstrating the trend of interest in this market segment (Figg. 11, 12). In the company Quid, from Verona, clothes are sewn and made from waste material, fabrics donated by textile companies in the major Italian districts and by clothing companies, which would otherwise end up in landfills with a considerable environmental cost. To create the products, it uses a production process that goes backwards compared to the traditional one. It starts by analysing the waste to understand what can be created and with what techniques. Quid now employs 120 people, 70% are vulnerable, disabled people, ex-convicts, asylum seekers, of 17 different nationalities and 80% are women.

Recycling. The Bisbag company was founded in Scandicci, in the centre of the Tuscan leather goods production sector. In this case too, the idea stemmed from the desire to recover production waste from local companies – which otherwise would be disposed of – to transform it into new and unique accessories. The company's mission is based on the desire to enhance the value of leather and make this historic and world-famous production sector more sustainable.

Conclusions | Sustainability is now an immanent value in the whole design process: from conception to realisation. The growing attention to issues related to social responsibility and sustainability, both on the part of end consumers and companies, has led the luxury and fashion industry to attribute increasing importance to the inspiring principles of the sustainable approach, introducing them into their basic strategies and core business. Revisiting products, services and management processes in the direction of sustainable development and developing new socially responsible business models are becoming key in creating value for both companies and society. In light of these considerations, the research aims to understand how sustainability and social responsibility are influencing luxury and fashion companies to support strategic decisions.

This paper, through the presentation of significant case studies, aimed to outline the 'Italian way' in the approach to Design for Sustainability. The analysis carried out made it possible to categorise the types of interventions in the Made in Italy fashion manufacturing sector, describing innovative, proactive and responsible approaches to value creation. Best practices undertaken at a national level were then summarised, taking into account the seven priorities highlighted during the Copenhagen Fashion Summit in 2018 by Eva Kruse, regarding the challenges of sustainability in the contemporary fashion system. The contribution is aimed at highlighting the importance of

research and the establishment of 'virtuous connections' at various levels (Universities, companies, public and private bodies) in the definition of innovation drivers. These drivers will allow fashion manufacturing companies to become and remain competitive on the market by supporting the diffusion of a culture of sustainability, considered as the development of new products and processes, the mitigation of the environmental impact of processing and the development of eco-materials able to create new product categories. Clearly, the issues mentioned are intertwined, in broad terms, with political ideologies and choices, touching on issues such as rethinking production systems, quality of life and work: these are issues that in the short term could represent an obstacle to the spread of these practices, if they are not supported by targeted governance actions and tax breaks for businesses.

The Italian Fashion System must, however, seek to network in order to assert its economic strength and aim to become a beacon for the entire Made in Italy sector. By taking note of the possibility of converging towards solutions that reduce the impact of our production methods on the environment, strengthen the resilience of nature to environmental pressures and encourage more efficient and responsible use of natural resources. As a powerful cultural lever, fashion will be able to influence the behaviour of important critical masses, so the eco-innovations and positive practices introduced in the sector will attract a new generation of high-tech manufacturing and services, increasing Italy's competitiveness and creating new highly skilled jobs. This will ensure lasting prosperity for the sector, while respecting ecological and social limits.

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