ONE OCEAN FOUNDATION

BUSINESS FOR OCEAN SUSTAINABILITY

FOCUS – FASHION INDUSTRY

In collaboration with

SDA Bocconi SCHOOL OF MANAGEMENT
SUSTAINABILITY LAB

Under the patronage of

Camera Nazionale della Moda Italiana

TABLE OF CONTENTS

Photo by Kurt Arrigo

FOREWORD

Our human footprint is threatening the health of the ocean: climate change is warming and acidifying the ocean and depleting ocean oxygen, overfishing is removing species from the food chain and accelerating biodiversity loss and unsustainable industrial development along coastlines is contributing to ocean pollution. For too long, the ocean, which represents 71% of the Earth's surface, has been under-represented in global policy but **things are finally starting to change.**[1] In 2018, the High Level Panel for a Sustainable Ocean Economy was established and this year the United Nations has proclaimed a **Decade of Ocean Science for Sustainable Development (2021-2030)**.

Change is not only occurring at policy level, the business world is finally starting to move in this direction as well. **The One Ocean Foundation aims to be part of this transformation**, developing an increasing number of high-quality tools and information for companies, to support them in their journey towards sustainable transformation and guide them to minimizing their impact on marine and coastal ecosystems. As part of our multi-annual research project "Business for Ocean Sustainability", which has already seen the publication of two cross-industry reports with increasingly broad geographic scopes in 2019 and 2020, we believe it is important to adopt an industry-specific approach too, in order to identify precise issues and solutions that can be readily adopted by companies.

This report, **focused on the fashion industry**, is the first step in this direction: we aim to contribute to the discussion by **providing a holistic framework** which, starting from key pressures exerted by fashion companies on marine ecosystems, seeks to provide best practices for ocean sustainability for each step of the supply chain, and for all the related transversal activities.

The fashion industry is open to sustainable change, as demonstrated by the increasing success of "The Fashion Pact", a global coalition of companies in the fashion and textile industry committing "to a common core of ambitious quantified environmental objectives focusing on three themes: climate, biodiversity and oceans".[2] **With everyone's contribution**, from raw material producers, to manufacturing companies, logistics companies and consumers, and with collaboration and awareness along the entire supply chain, **it is possible to adopt best practices and solutions to mitigate pressures** on coastal and marine ecosystems.

We truly believe sustainable change is possible.

One Ocean Foundation

1 Nature (2020) available at: https://www.nature.com/articles/d41586-020-03301-5?WT.ec_id=NATURE-20201203&utm_source=nature_etoc&utm_medium=email&utm_campaign=20201203&sap-outbound-id=89E58AB56712273038FE25372D4944F4A15A5277

2 https://thefashionpact.org

EXECUTIVE SUMMARY

This report represents the continuation of the journey undertaken with the two previous publications of “Business for Ocean Sustainability - Focus on the Mediterranean” and “Business for Ocean Sustainability - A Global Perspective”, published in 2019 and 2020 respectively, developed thanks to the contribution of SDA Bocconi Sustainability Lab, McKinsey & Company and CSIC.

In particular, this study stems from “Business for Ocean Sustainability – a Global Perspective” and deep-dives into a specific industrial sector: the fashion industry. It uses an in-depth analysis of the sustainability reports of 28 fashion companies and multiple sources: academic publications, statistical data, government reports and practitioner-based literature.

The insights offer a snapshot of the fashion industry’s main pressures on the environment and, more specifically, on marine ecosystems, and provides a clear view of sustainable best practices along the value chain.

The fashion industry is one of the world’s biggest manufacturing industries. It generates more than USD 2.5 trillion in global annual revenues,[3] employing more than 300 million people along its value chain.[4] Besides its relevance in the global economy, the industry plays a fundamental role in social and cultural life. From an environmental point of view, the industry presents numerous critical issues which are still not fully known. According to several studies, fashion is considered one of the most polluting industries in the world.[5]

According to our findings, the pressures exerted by the sector on the environment are worsened by several structural and generational phenomena such as population growth and increasing wealth, and new business models such as fast fashion. Key pressures include extreme water usage, chemicals and waterways contamination, waste and pollution including microplastics, and energy and greenhouse gas emissions.

According to the analysis we carried out in *Business for Ocean Sustainability – A Global Perspective*, which analyzed the level of pressure exerted by 17 industrial sectors on each of the 11 GES indicators through the involvement of a panel of experts and scientists,[6] the textile and apparel industry shows higher criticality with respect to the problems of marine litter, eutrophication and contaminants (including contaminants in seafood).

In fact the fashion industry creates a huge amount of marine litter in the form of microfibers, which are flooding our oceans and becoming toxic; many marine ecosystems are affected by the eutrophication processes which occur during the cultivation of raw materials for the fashion industry; and cultivation and processing of raw materials cause the release of contaminants into the oceans and freshwater systems.

---

3 McKinsey & Company, BOF (2020), The State of Fashion 2020 Coronavirus Update
4 Ilen MacArthur Foundation (2017), A new textiles economy: Redesigning fashion’s future
5 For example, according to the United Nations and the EllenMacArthur Foundation it is the second most polluting industry after the oil industry
6 The questionnaire was completed by 56 experts in different natural science areas (e.g. marine ecologists, environmental scientists, biologists, etc.) from leading international universities and research centers in Europe, North and South America and Australia.

Our studies reveal that a collaborative effort along the value chain is fundamental to achieve sustainable transformation in the fashion industry. To effectively lower their impact, firms need to gather together and coordinate their environmentally conscious practices within an overall sustainability strategy (which, in turn, should be coherent with the company's general strategy). A holistic approach is required in order to address the many challenges that arise along the extended value chain, from raw materials extraction to product disposal, and to plan specific actions aimed at reducing overconsumption of natural resources and pollution.

The report introduces a framework which visually summarizes such an approach by illustrating a strategic planning process, deep-diving into the implementation of activities along the value chain, and describing support tools and key features. This framework aims to create awareness with regard to the opportunities related to each step of the supply chain. Any firm can reduce its pressure on the ocean at each stage, both by implementing best practices within its operations, and by collaborating with stakeholders along the value chain.

To incorporate best practices within a company's overall sustainability strategy, strategic planning is crucial - assessing the footprint, setting clear goals and targets, implementing activities along the value chain and monitoring the outcomes:

- Assessment tools and practices are needed to obtain thorough knowledge of the pressures exerted on marine ecosystems;

- Clear goals and objectives need to be coherently included in a firm's overall strategy;

- In order for a firm to improve the sustainability of its operations, key activities must be implemented along the entire value chain;

- Constant monitoring is key to continuous improvement.

Adopting a holistic approach means implementing sustainable best practices, from raw material extraction to consumption and product disposal, across the entire value chain:

- The production of raw materials is responsible for a large proportion of the environmental impact of the fashion industry. Adopting sustainable practices during cultivation is paramount;

- To make apparel & footwear manufacturing more sustainable, companies need to rethink their products and packaging, from design to manufacturing and disposal;

- Improving the sustainability of the logistics phase is key in order to reduce CO_2 emissions, 30% of which are absorbed by the ocean;

- It is fundamental to educate customers on sustainable consumption patterns through innovative business models and detailed instructions for garment care;

- Research and development activities at each stage of the value chain are needed to tackle urgent and unsolved ocean-related issues.

Companies need to consider three key features and tools in their journey towards sustainability: transparency & traceability, standards & certifications and partnerships aimed at pushing their commitments to ocean sustainability further:

- Traceability of companies' pressures on marine ecosystems is key to transparency;

- Standards and certifications can help companies to strengthen and formalize their commitment to sustainability;

- Partnerships for sustainability are a key tool to enable resource and knowledge sharing.

Overall, the report provides a view on the key issues companies in this sector need to acknowledge and act upon promptly. We believe that with everyone's contribution, from raw material producers to manufacturing companies, logistics companies and consumers, and with collaboration and awareness along the entire supply chain, it is possible to adopt best practices and solutions to mitigate pressures on coastal and marine ecosystems.

OBJECTIVES OF THE REPORT

This report represents the continuation of the journey undertaken with the two previous publication of “Business for Ocean Sustainability - Focus on the Mediterranean” and “Business for Ocean Sustainability - A Global Perspective”, published in 2019 and 2020 respectively, developed thanks to the contribution of SDA Bocconi Sustainability Lab, McKinsey & Company and CSIC.

In particular, this study stems from “Business for Ocean Sustainability – a Global Perspective” and deep-dives into a specific industrial sector: the fashion industry.

In contrast to the two previous cross-sectoral reports, this edition is industry focused and aims to identify the key pressures exerted by fashion companies on marine ecosystems, and to investigate what they are doing to address the many challenges related to ocean sustainability.

In order to do so, our report provides companies in the fashion industry with an analysis of their supply chain, identifying not only the key pressures on the ocean, but also several best practices to minimize and mitigate these pressures, building upon the actions implemented by leading companies in the sector.

Methodology

The methodology adopted is based on qualitative and quantitative research methods.

The first chapter, which aims to put the fashion industry’s pressures on the environment into perspective, was built by gathering and elaborating information from multiple sources: academic publications, statistical data, government reports and practitioner-based literature.

The second chapter identifies the key pressures on marine ecosystems, and stems from the analysis developed in the report “Business for Ocean Sustainability – A Global Perspective”, of direct and indirect pressures exerted by business activities – both ocean and non-ocean related - on marine and coastal ecosystems. The ocean pressures were analyzed through the lens of the 11 Good Environmental Status (GES) descriptors defined by the EU Marine Strategy Framework Directive. The evaluation of the direct and indirect pressures was assessed through a thorough scientific review. A panel of 56 international scholars and experts with different scientific backgrounds from leading research institutes and universities across Europe, North and South America and Australia was

involved. For the scope of this report, only the pressures related to the "textile and apparel"[7] sector were considered.

The next chapter focuses on identifying best practices to be implemented by companies. These are based on a qualitative analysis of the latest available sustainability reports from 28 fashion companies, selected by integrating three samples: all the fashion companies analyzed in "Business for Ocean Sustainability – Focus on the Mediterranean", all the fashion companies analyzed in "Business for Ocean Sustainability – A Global Perspective" and the top 10 companies identified by the Fashion Transparency Index 2020.[8] All 28 Sustainability Reports were qualitatively analyzed to identify sustainability best practices across the supply chain, aimed at mitigating direct or indirect pressures on ocean sustainability.

A framework with a supply-chain perspective was elaborated in order to provide a clear view of sustainable practices along the supply chain, from raw materials extraction to their transformation into products, and from logistics to product disposal, in order to promote better and more sustainable planning and design of their activities.

7 The term "Fashion Industry" is used throughout the report for simplicity. However, the report adopts a holistic supply chain view which incorporates best practices related to textile production. Moreover, the main focus is on apparel, although large fashion brands which also produce accessories are considered.

8 The Fashion Transparency Index is a tool created by Fashion Revolution to incentivize and push major brands to be more transparent, and encourage them to disclose more information about their policies, practices and supply chain. In 2020, the fifth annual edition of the Fashion Transparency Index was released. 250 of the world's largest fashion brands and retailers were reviewed and ranked according to how much they disclose about their social and environmental policies, practices and impacts. https://www.fashionrevolution.org/about/transparency/

CHAPTER 1 – THE FASHION INDUSTRY IS A LEADING FORCE OF ECONOMIC GROWTH, BUT ALSO A MAJOR CAUSE OF ENVIRONMENTAL PRESSURES, INCLUDING ON THE OCEAN.

Photo by Kurt Arrigo

The fashion industry is one of the world's biggest manufacturing industries. It generates more than USD 2.5 trillion in global annual revenues,[9] employing more than 300 million people along its value chain.[10] If it were ranked as an individual country, it would represent the world's seventh largest economy.[11]

Besides its relevance in the global economy, the industry plays a fundamental role in social and cultural life. Today fashion is an expression of values, status and identity, and an essential part of social communication.

From the environmental point of view, the industry presents numerous critical issues, which are still not fully known. According to several studies, fashion is considered one of the most polluting industries in the world.[12]

THE PRESSURES EXERTED BY THE SECTOR ON THE ENVIRONMENT ARE WORSENED BY SEVERAL STRUCTURAL AND GENERATIONAL PHENOMENA SUCH AS POPULATION GROWTH AND INCREASING WEALTH, AND NEW BUSINESS MODELS SUCH AS FAST FASHION

The pressures exerted by the sector on the environment are worsened by several structural and generational phenomena such as population growth and increasing wealth, and new business models such as fast fashion:

- **Population growth.** According to UN estimates, given global population growth that could reach 9.6 billion people by 2050, the equivalent of three planet Earths will be needed to provide the natural resources necessary to support current lifestyles.[13] If demographic and lifestyle habits continue on the current trajectory, global apparel consumption is expected to rise from 62 million metric tons in 2019 to 102 million tons in 2030.[14]

- **Increasing wealth and clothing demand.** The increase in per capita wealth of large sections of the world population has also led to an increase in the demand for clothing. This has contributed to the rise in production in the sector, and to the use of higher quantities of natural resources to cope with increasingly sustained demand. The combination of greater wealth and disposable income, along with more affordable products, has led to a doubling of global apparel production over the past 15 years.

- **Fast fashion.** The phenomenon of fast fashion, which consists in the reduction of the time necessary for the presentation of new collections,and continuous renewal of collections, several times during the same fashion season, has revolutionized the sector and made products available, including at low prices, to a larger segment of the world population. This translates into an increase in the number of garments produced and purchased, which requires enormous quantities of raw materials, chemicals, and processing resources such as water. In addition, the high speed with which the styles change and the consequent restocking of new collections, creates rapid obsolescence of the products, with only a small part of

9 McKinsey & Company, BOF (2020), The State of Fashion 2020 Coronavirus Update
10 Ellen MacArthur Foundation (2017), A new textiles economy: Redesigning fashion's future
11 McKinsey & Company, BOF (2018), The State of Fashion 2017
12 For example, according to the United Nations and the EllenMacArthur Foundation it is the second most polluting industry after the oil industry
13 United Nations, Sustainable Development Goals, Goal 12: Ensure sustainable consumption and production patterns available at https://www.un.org/sustainabledevelopment/sustainable-consumption-production/
14 World Bank (2019), https://www.worldbank.org/en/news/feature/2019/09/23/costo-moda-medio-ambiente

the clothing purchased recycled for the recovery of raw materials. In fact unsold inventory is sometimes burned or landfilled by fast-fashion companies to preserve reputation and price integrity, however countries are starting to increase scrutiny to prevent this from happening, forcing companies to find new ways to deal with unsold inventory.

THE FASHION INDUSTRY GENERATES MAJOR PRESSURES ON THE NATURAL ENVIRONMENT AND ECOSYSTEMS

The fashion industry generates major pressures on the natural environment and ecosystems:

• **Extreme water usage.** The production of raw materials, starting with the cultivation of the crops, and their manufacturing into end products through the various phases of weaving, dyeing, washing, and finishing, requires enormous quantities of water, often in countries characterized by chronic water scarcity, thereby overexploiting freshwater resources. A single pair of jeans requires from 3,800[15] to 7,500[16] liters of water for their production, while 2,700 liters are needed to produce just one T-shirt.[17]

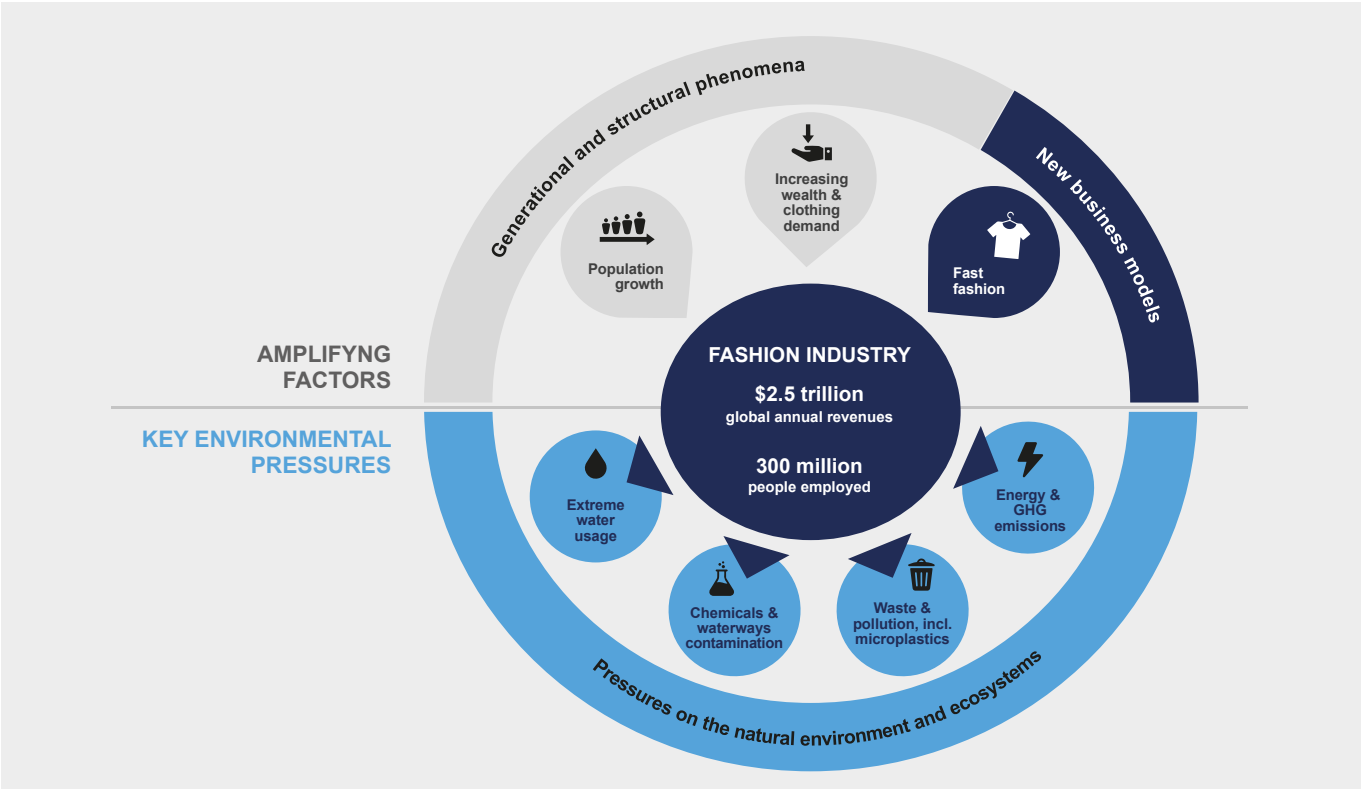
• **Chemicals and waterways contamination.** It is reported that the fashion industry is one of the largest consumers of chemicals in the world, and that the production of 1 kg of fabric requires similar quantities of chemicals.The production of raw materials, the spinning and weaving of fabrics, as well as the washing and dyeing processes, all require enormous quantities of chemicals, including from 10% to 20% of the world's pesticide use for the cultivation of raw materials such as cotton. Out of the 1,900 chemicals used in the production of clothing, the European Union classifies 165 as dangerous to the health of the environment.[18] Solvents and dyes used in the washing process and in manufacture are responsible for about 20% to 25% of industrial water pollution.[19] Additional environmental footprint is also created by consumer use, due to the water, energy and chemicals used in washing, tumble drying and ironing.

• **Waste and pollution, including microplastics.** According to the Ellen MacArthur Foundation, the global fashion industry produces about 53 million tons of fibers every year. More than 70% ends up in landfills or incinerated, while less than 1% of clothing is collected for reuse or recycling to produce new clothes.[20] This is also due to the lack of fully viable recycling technologies to effectively and economically separate blended fibers, or separate fibers from chemicals, including colorants, used in the production process in the first place.[21] Every year, more than 500 million tonnes of microfibers, which includes microplastics, are released into the environment, the equivalent of 50 billion plastic bottles.[22] A large part of the microfibers end up in the ocean, contributing to the pollution of marine ecosystems and eventually entering the food chain, as will be described in detail later in this report.

---

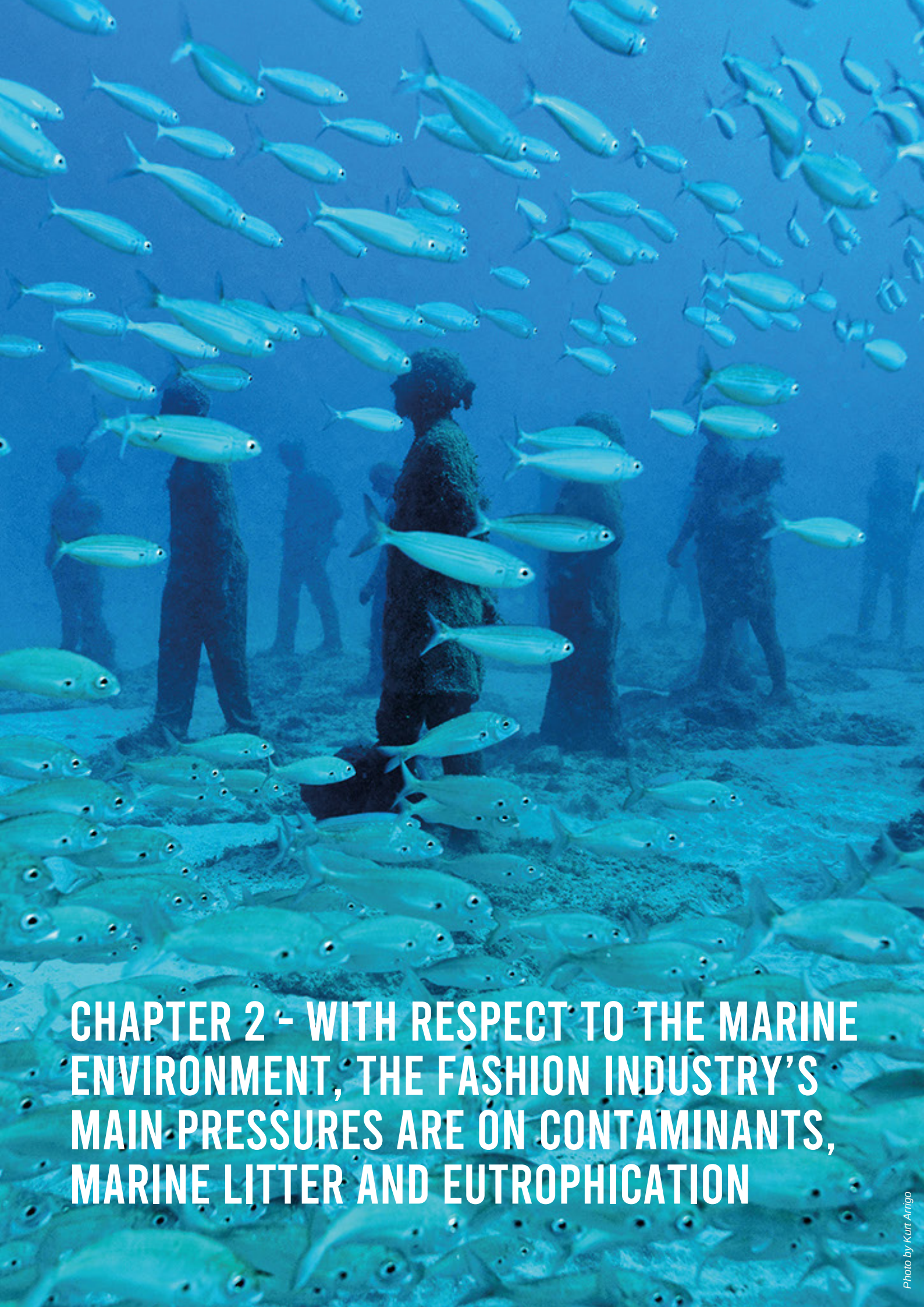
15 World Bank (2019), https://www.worldbank.org/en/news/feature/2019/09/23/costo-moda-medio-ambiente
16 United Nations (2019), https://news.un.org/en/story/2019/03/1035161
17 McKinsey (2020), https://www.mckinsey.com/industries/retail/our-insights/biodiversity-the-next-frontier-in-sustainable- fashion
18 European Parliamentary Research Service (2019), Environmental impact of the textile and clothing industry available at https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/633143/EPRS_BRI(2019)633143_EN.pdf
19 McKinsey (2020), The State of Fashion 2020 Report
20 Ellen MacArthur Foundation (2017), A new textiles economy: Redesigning fashion's future
21 European Parliamentary Research Service (2019), Environmental impact of the textile and clothing industry
22 Ellen MacArthur Foundation (2017), A new textiles economy: Redesigning fashion's future.

FIGURE 1 – OVERVIEW OF FASHION INDUSTRY PRESSURES



• **Energy and greenhouse gas emissions**. It is estimated that due to its long supply chains and energy intensive production, the fashion industry represents from 4% to 10% of the global carbon emissions in the atmosphere, outweighing the carbon footprint of international flights and maritime shipping, or about the same total quantity of greenhouse gas emitted per year by the economies of Germany, France and the United Kingdom combined.[23] [24] [25]

23 McKinsey (2020), The State of Fashion 2020 Report
24 Ellen MacArthur Foundation (2017), A new textiles economy: Redesigning fashion's future,
25 McKinsey (2020), Fashion on Climate Report

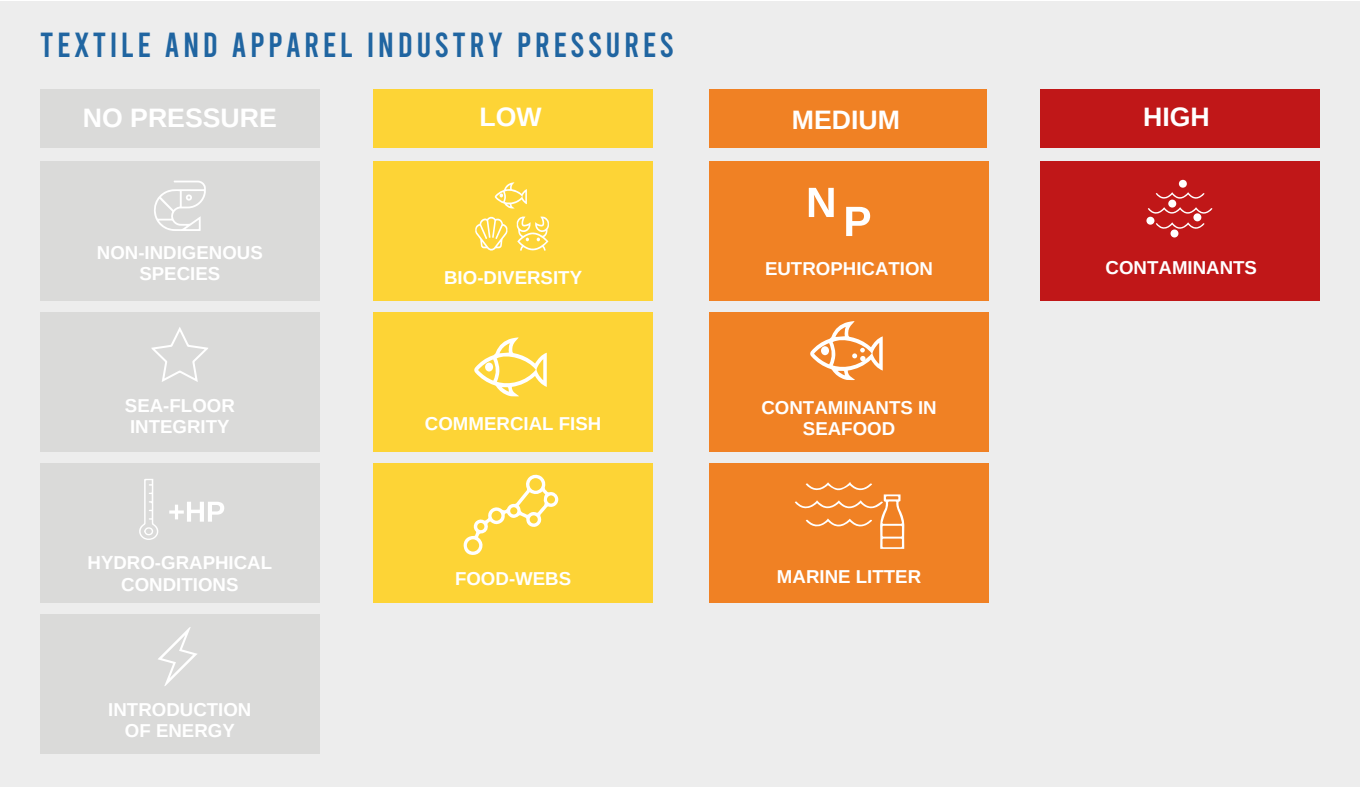


CHAPTER 2 - WITH RESPECT TO THE MARINE ENVIRONMENT, THE FASHION INDUSTRY'S MAIN PRESSURES ARE ON CONTAMINANTS, MARINE LITTER AND EUTROPHICATION

Photo by Kurt Arrigo

One Ocean Foundation's latest report *Business for Ocean Sustainability – A Global Perspective*, which analyzed the level of pressure exerted by 17 industrial sectors on each of the 11 GES indicators through the involvement of a panel of experts and scientists[26] (Figure 1), reveals that the *textile* and apparel industry shows higher criticality with respect to the problems of marine litter, eutrophication and contaminants (including contaminants in seafood).

FIGURE 2 – REVIEW OF NEGATIVE DIRECT AND INDIRECT PRESSURES OF THE TEXTILE AND APPAREL SECTOR[27]



The fashion industry creates a huge amount of marine litter in the form of microfibers, which are flooding our ocean and becoming toxic

As mentioned previously, in the fashion industry marine litter is mainly composed of microfibers – which also fall under the category of contaminants and contaminants in seafood. Microfibers are tiny threads that are shed by clothes during manufacturing and when they are washed.

Although around 50% of our clothing is made from plastic,[28] and about 35% of primary microplastics that enter the ocean come from synthetic textiles,[29] microfibers are also generated by natural fibers such as cotton, linen and other man-made fibers such as raylon which have been impregnated with chemicals to such an extent that they are not able to naturally biodegrade.[30]

26 TThe questionnaire was completed by 56 experts in different natural science areas (e.g. marine ecologists, environmental scientists, biologists, etc.) from leading international universities and research centers in Europe, North and South America and Australia.
27 One Ocean Foundation, SDA Bocconi, McKinsey & Company, CSIC (2020), Business for Ocean Sustainability – a global perspective
28 E.g. nylon and polyester - Reuters (2020), https://www.reutersevents.com/sustainability/fashion-slow-act-ocean-plastic-pollution-microfibres
29 International Union for Conservation of Nature (2017), Primary Microplastics in the Ocean report
30 Italian institute of Marine Science (2019)

IN TOTAL, IT IS ESTIMATED THAT ABOUT 1400 TRILLION MICROFIBRES ARE FLOODING OUR OCEAN, ABSORBING POLLUTANTS AND OTHER CONTAMINANTS, HENCE BECOMING TOXIC

In total, it is estimated that about 1400 trillion[31] microfibers are flooding our ocean, absorbing pollutants and other contaminants, hence becoming toxic. The effects of microfiber ingestion on marine life are catastrophic: they may cause starvation, endocrine disruption, stunted growth and break down digestive systems.

Laundry alone causes around half a million tonnes of plastic microfibers to be released in the ocean every year (equal to almost 3 billion polyester shirts). This is mainly due to the fact that, on average, water treatment plants let up to 40% of microfibers they receive into lakes, rivers and seas[32] and only a part of the population is connected to wastewater treatment plants.[33] Research shows that one machine load of washing can shed more than 700,000 microfibers.[34]

The consequences of this problem are huge, and microfibers are starting to enter the food chain – 63%of shrimps[35] in the North Sea now contain microfiber sand 73% of fish caught at mid-ocean depths in the Northwest Atlantic had microplastics in their stomach.[36]

ONLY 20% OF COMPANIES HAVE A STRATEGY IN PLACE TO PREVENT MICROFIBRE SHEDDING FROM THEIR CLOTHING

Despite the seriousness of the problem, the business world is not responding as it should. The latest annual Fashion Transparency Index, based on a survey of 250 fashion brands, revealed that only 20% of companies had a strategy in place to prevent microfiber shedding from their clothing.

Action must be taken from a holistic point of view, tackling the problem along the entire value chain, from product design to production (e.g. fabric manufacturing), usage and product cleaning (e.g. use of washing machines) and end of life. It is fundamental to eliminate microfiber pollution in all phases of operations, while educating customers on product care.

Many marine ecosystems are affected by the eutrophication processes which occur during the cultivation of raw materials for the fashion industry

The fashion industry also plays a role in the eutrophication of the ocean and freshwater systems, which is a leading cause of damage for many marine ecosystems, typically resulting in problems associated with excessive growth of macrophytes, algae or cyanobacteria that leads to the death of marine life from lack of oxygen.[37] This process is included among the qualitative descriptors which delineate what the environment will look like when good environmental status has been achieved. The EU Marine Directive, in fact, states that human-induced eutrophication, primarily caused by nitrogen and phosphorous loads, should be minimized to reduce losses in biodiversity and ecosystem degradation.[38]

---

31 Ellen Mac Arthur Foundation (2017), a New Textiles Economy
32 UN Environment (2019), https://www.unenvironment.org/news-and-stories/story/fashions-tiny-hidden-secret
33 For example, in 2018 Austria had the highest % of population connected to wastewater treatment plants in the EU (95.94%) and Slovenia the lowest (67.50%) according to OECD data available at https://data.oecd.org/water/waste- water-treatment.htm
34 Reuters (2020), https://www.reutersevents.com/sustainability/fashion-slow-act-ocean-plastic-pollution-microfibres
35 Reuters (2020), https://www.reutersevents.com/sustainability/fashion-slow-act-ocean-plastic-pollution-microfibres
36 Microfibre Masses Recovered from Conventional Machine Washing of New or Aged Garments (2016), Niko L. Hartline, Nicholas J. Bruce, Stephanie N. Karba, Elizabeth O. Ruff, Shreya U. Sonar, and Patricia A. Holden, Environmental Science & Technology
37 European Commission and World Health Organization Regional Office for Europe (2002), Eutrophication and Health
38 European Commission and World Health Organization Regional Office for Europe (2002), Eutrophication and Health

The enrichment of water by nutrients can be of natural origin, but it is often dramatically increased by human activities that emit nearly twice as much nitrogen and three times as much phosphorus as natural emissions. Contributions to eutrophication come from several land sources such as agriculture and aquaculture, or from wastewater treatments and industrial discharges, especially in developing countries of Latin America, Asia, and Africa where factories and sewage facilities are less regulated.[39] According to the European Environment Agency, the main source of nitrogen pollutants is run-off from agricultural land and this sector contributes 50–80 % of the total load. Moreover, agriculture remains the main source of phosphorus pollution even though there has been better management of these nutrients in the sector's practices in recent years.[40]

WITHIN THE FASHION INDUSTRY VALUE CHAIN, THE PHASE THAT CONTRIBUTES THE MOST TO EUTROPHICATION IS THE RAW MATERIAL PRODUCTION

Within the fashion industry value chain, the phase that contributes the most to eutrophication is raw material production. Indeed, the production of raw materials is responsible for a large share of the environmental impact of the textile and clothing industry. The production of clothing can involve the release of nutrients directly, like when a farmer grows cotton or linen to produce fabrics. Cotton production, for instance, the most important natural fiber used in the textile industry worldwide, consumes 4% of nitrogen fertilizers and phosphorous globally.[41] Globally, this crop covers just 2.4% of the world's cultivated land but uses 6% of the world's pesticides and 16% of insecticides, more than any other single major crop.[42]

Moreover, there are also more indirect sources that contribute to eutrophication, such as the energy sources used to power the factories. These can release nitrogen oxides as air pollution which then can be absorbed by the oceans and add to the nutrient load.

In order to reduce human induced eutrophication in the fashion industry, it is necessary to take action against the nitrogen and phosphorous load in the oceans. This challenge requires changes in agricultural practices, such as restrictions on the use of fertilizers, the optimization of nutrient use to crop requirements, and the establishment of more sustainable agricultural cropping techniques.

Cultivation and processing of raw materials for the fashion industry cause the release of contaminants into the oceans and freshwater systems

As seen, the abuse of fertilizers and pesticides by agriculture for the production of fibers contributes substantially to excessive eutrophication. Raw materials processing is the other main source of contaminants from the fashion industry.

---

39 National Geographic, Dead zone, https://www.nationalgeographic.org/encyclopedia/dead-zone/
40 EEA Report (2005), Source apportionment of nitrogen and phosphorus inputs into the aquatic environment
41 Heffer, P. (2013). Assessment of fertilizer use by crop at the global level. Paris, The International Fertilizer Industry Association.
42 IISD (2019), Why Transparency in Fashion Matters

THE MAIN SOURCES OF HARD-TO-TREAT SUBSTANCES ARE COLOUR AND METALS, EMPLOYED IN THE DYEING PROCESS, PHOSPHATES USED FOR DYEING AND PREPARATORY OPERATIONS, AND NON BIO-DEGRADABLE MATERIALS RELATED TO SURFACTANTS

Processing includes the actual chemical processing and the re-processing in preparatory, dyeing, printing and finishing phases. The main sources of hard-to-treat substances are colorants and metals, employed in the dyeing process, phosphates used for dyeing and preparatory operations, and non-biodegradable materials related to surfactants.[43]

Chemical release is closely related to water usage, since most of the processing procedures adopt aqueous systems and water baths to apply dyes and otherchemical substances to fabric.[44] By doing so, hazardous substances are dispersed into water, which if not treated properly, brings them to watercourses. While on the one hand chemicals can facilitate some processing steps and contribute to the functionality of garments (e.g. water-proofness or resistance to shrinkage) and their aesthetics (e.g. color and color-fastness), on the other, they entail a severe threat to human health as well as to natural ecosystems.

CHEMICAL POLLUTION CAN AFFECT BIODIVERSITY (BOTH WILDLIFE AND HABITAT CONDITIONS), MARINE FOOD WEBS FUNCTIONING AND SEA-FLOOR INTEGRITY

In particular, with respect to the ocean, chemical pollution can affect biodiversity (both wildlife and habitat conditions), functioning of marine food webs, and sea-floor integrity. Moreover, chemicals propagated within the aquatic environment can be taken up by marine organisms and enter the food chain, right up to our plates. In fact another GES focuses precisely on the level of contaminants in fish and other seafood destined for human consumption.

The reduction of water use through wastewater recycling, rainwater harvesting or water-saving fixtures, as well as the adoption of the Restricted Substances List released by ZDHC (Zero Discharge of Hazardous Chemicals) to end the use of toxic compounds and the introduction of on-site treatment plants to properly process wastewater, could significantly reduce water pollution deriving from processing.[45]

OCEAN WATER IS NOT AN INFINITE RESOURCE AND POLLUTANTS BIO- ACCUMULATE WITH ONLY PARTIALLY KNOWN CUMULATIVE CONSEQUENC- ES ON HUMAN HEALTH AND THE MARINE ENVIRONMENT

Even though environmental regulations impose “safe levels” of chemical dispersion into water, the “dilution is the solution to pollution” approach should be rejected. Indeed, ocean water is not an infinite resource and pollutants bio-accumulate with only partially known cumulative consequences on human health and the marine environment.[46]

In general, companies in the fashion Industry should pay particular attention to the pressures placed on marine ecosystems by their operations, implementing solutions and best practices aimed at minimizing their contribution to the issues of marine litter, eutrophication and contaminants.

43 Fibre2Fashion (2006), https://www.fibre2fashion.com/industry-article/740/textile-effluent-treatment?utm_source=f2f&utm_medium=content&utm_campaign=interlinking
44 Fibre2Fashion (2006), https://www.fibre2fashion.com/industry-article/740/textile-effluent-treatment? utm_source=f2f&utm_-medium=content&utm_campaign=interlinking
45 Global Fashion Agenda (2017), Pulse of the Fashion Industry Report
46 IPEN (2018), Ocean pollutants guide. Toxic threats to human health and marine life.

CHAPTER 3 - A COLLABORATIVE EFFORT ALONG THE VALUE CHAIN IS FUNDAMENTAL TO ACHIEVE SUSTAINABLE TRANSFORMATION IN THE FASHION INDUSTRY

Photo by Kurt Arrigo

Many scholars, industrial associations, consultancies, certification bodies and multi-stakeholders platforms provide fashion companies with recommendations and practical examples of best practices aimed at leading them onto a sustainable pathway,[47] alternately referring to one or more environmental or social issues. This report aspires to identify some best practices, illustrating virtuous activities with a specific focus on ocean sustainability. These examples provide guidance to companies that want to reduce and mitigate their pressures on the marine environment.

To effectively lower their impact, firms need to gather together and coordinate their environmentally conscious practices within an overall sustainability strategy (which, in turn, should be coherent with the company's general strategy). A holistic approach is required in order to address the many challenges that arise along the extended value chain, from raw materials extraction to product disposal, and to plan specific actions aiming at reducing overconsumption of natural resources and pollution.

In Figure 2 we introduce a framework that visually summarizes such an approach. It is the result of our research based on a qualitative analysis of the sustainability reports of 28 firms recognized as leaders in terms of sustainability, and information collected for the Business for Ocean Sustainability reports (2019 and 2020), including interviews with key brands.

The framework illustrates a strategic planning process, and deep-dives into the implementation of activities along the value chain, supported by a variety of key features and tools.

A clear and precise strategic planning process is fundamental for the incorporation of best practices within an overall sustainability strategy. It is composed of four main steps (A, B, C, D in Figure 2): assessment, setting goals & targets, implementing activities along the value chain, and monitoring, reporting & feedback. These are fundamental to plan actions and to keep them coherent with regard to the company's issues.

Step C, the implementation of activities along the value chain, is further explored in the framework's core section (C1, C2, C3, C4, C5 in Figure 2) which illustrates the main phases of a typical supply chain in the textile and apparel sector: raw materials production, manufacturing, logistics, consumption & end use and research and development. The value chain is represented as a circular process, where R&D plays a fundamental role for continuous improvement, aiming to innovate products, processes and business models to improve the company's sustainability.

The level of breakdown was chosen so that the framework can show all the activities that exert a pressure on the ocean, without focusing too specifically on any particular type of product or supply chain. Nonetheless, two main clarifications are needed. Firstly, the manufacturing phase, which usually refers to procedures applied to fabrics, (e.g. cutting, sewing, buttonholing,

47 Among others, Ellen MacArthur Foundation's "A New Textile Economy" and Camera della Moda "Manifesto" or McKinsey & Company's "Fashion on Climate".

gluing or dyeing[48]) here is also intended to include the design and development and processing stages. Processing refers to the transformation of raw materials into fabrics (e.g. spinning or weaving). Secondly, the consumption step encompasses the reverse logistics implemented for circularity purposes.

For each step, the framework indicates some practices currently adopted, which can reduce companies' pressures on the marine environment. Some of them are sector-specific, while others are cross-industry. Similarly, some of them primarily relate to ocean issues, while others respond not only to a threat to marine ecosystems, but also to a broader range of environmental problems. Such variety of consequences is due to the complexity of natural ecosystems, which implies that any action has multiple effects on several interconnected elements within the biosphere. Consequently, many practices which are usually implemented to address certain environmental problems exert positive effects on the ocean as well. For example, reduction in GHG emissions, which is commonly adopted to tackle climate change, also mitigates ocean acidification.

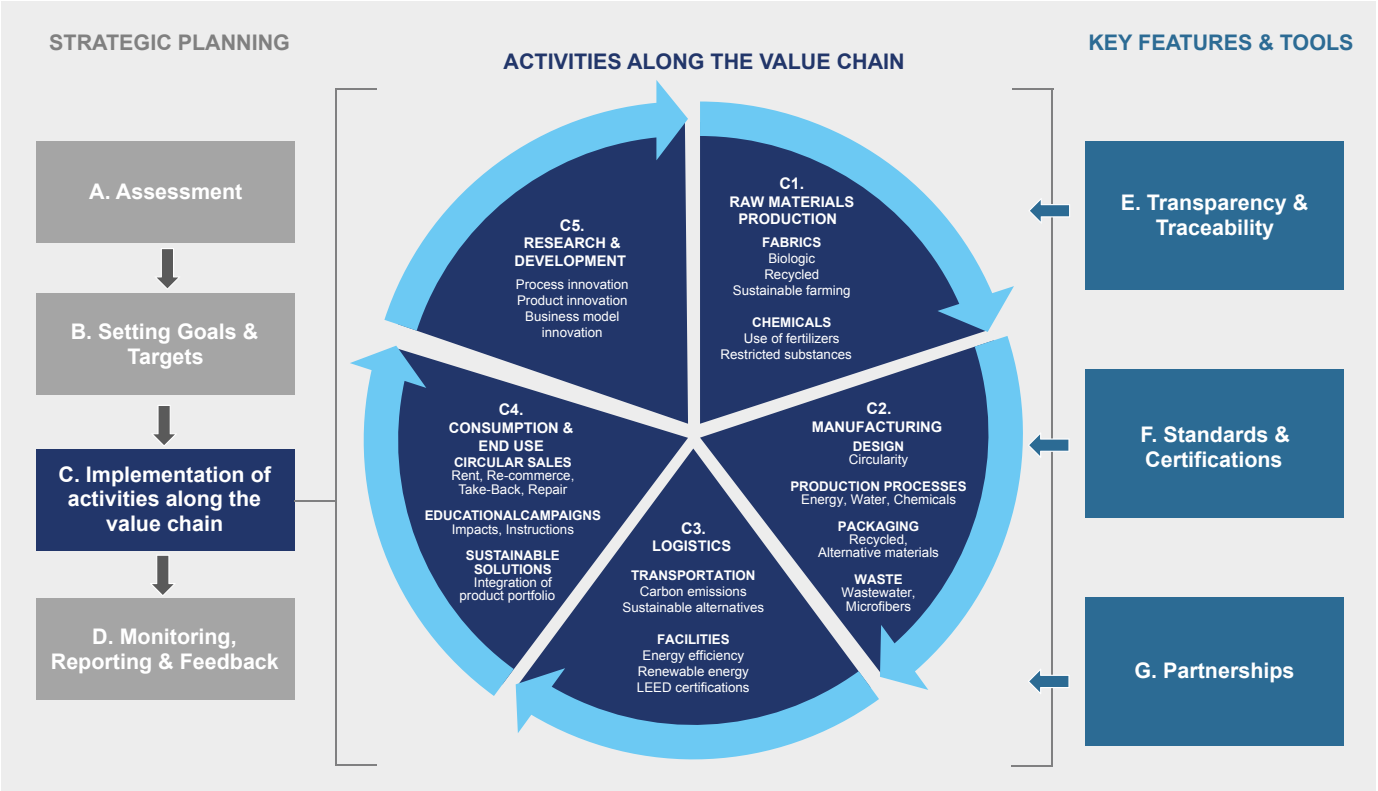
For each step of the value chain, the report provides examples of virtuous companies which are already implementing best practices within their operations.[49]

Finally, the framework illustrates a variety of key features and tools (E, F, G in Figure 2) to be applied at every step of the value chain in order to push companies' commitment towards sustainability further. Traceability and transparency should be applied to all the suggested actions. As described in more detail in the next section, traceability can help companies to be more conscious regarding the pressures of their activities on marine ecosystems and to engage suppliers, distributors and consumers in mitigation initiatives. At the same time, transparency is essential to respond to the increasing demand for information from consumers, policy makers and civil society. At the same time, standards and certifications bodies can help companies to design their sustainability strategy and to strengthen and formalize their efforts. Partnerships with NGOs, industry peers or other stakeholders are fundamental for sharing knowledge and resources, as a support to each of these purposes.

This framework aims to create awareness with regard to the opportunities related to each step of the supply chain. Any firm can reduce its pressure on the ocean at each stage, both by implementing best practices within its operations, and by collaborating with stakeholders along the value chain.

48 Global Fashion Agenda and Boston Consulting Group (2017), Pulse of the fashion industry.
49 The examples provided derive from publicly available information found in the companies' sustainability reports and corporate websites.

FIGURE 3 – BEST PRACTICES FOR OCEAN SUSTAINABILITY IN THE FASHION INDUSTRY



3.1 To incorporate best practices within a company's overall sustainability strategy, strategic planning is crucial: assessing the footprint, setting clear goals and targets, implementing activities along the value chain and monitoring the outcomes.

Companies are asked to integrate their practices to address ocean challenges in their sustainability strategy. Strategic planning requires an assessment of the firm's footprint, the definition of clear goals and targets and, once activities are implemented along the value chain, periodical upgrades must be applied on the basis of monitoring and evaluation activities.

A. Assessment tools and practices are needed to obtain thorough knowledge of the pressures exerted on marine ecosystems

Best performers adopt measurement practices and tools in order to develop knowledge about the different types of pressures they exert on the environment and on society. By doing so, they can assess their footprint (e.g. carbon, water or environmental) and make sense of the most critical issues along their value chain. Moreover, this exercise is paramount to identify a baseline in order to set sustainability goals and targets and monitor performance improvements.

Life-cycle assessments or footprint indicators can be useful tools as they offer detailed information about the impacts of companies or products and reveal the main related risks and opportunities with respect to sustainability. Some leading companies within the fashion industry have developed their own assessment tools. For example, the Environmental Profit & Loss Account (EP&L)[50] was designed to gauge the environmental impacts of the entire supply chain and to estimate the corresponding monetary value. It assesses carbon emissions, air pollution, water use, water pollution, land use and waste, with respect to raw materials, processing, manufacturing, assembly, operations and retail.

WITH RESPECT TO OCEAN-RELATED ISSUES, A FIRM COULD ESTIMATE, FOR EXAMPLE, THAT CARBON EMISSIONS ACCOUNTED FOR THE MAJORITY OF ITS ENVIRONMENTAL FOOTPRINT, FOLLOWED BY WATER POLLUTION, AND THAT RAW MATERIAL PRODUCTION AND PROCESSING CONTRIBUTED THE MOST TO CHEMICAL RELEASES IN WATERWAYS

The calculation of the related monetary value allows quantification of the company's use of natural resources and measurement of its environmental performances. This and other similar tools, therefore provide a clear indication about which activities contribute more to the company's environmental footprint, informing its planning activities. With respect to ocean-related issues, a firm could estimate, for example, that carbon emissions accounted for the majority of its environmental footprint, followed by water pollution, and that raw material production and processing contributed the most to chemical releases in waterways.

In order to integrate the internal and external stakeholders' points of view within the measurement practices, companies can rely on another widely used tool: the materiality assessment. This procedure allows identification and measurement of the most relevant topics of interest to a company's internal and external stakeholders, from the environmental, social and governance factors that could affect them or the business. Firms usually undertake interviews or survey in order to collect the opinions of their top and middle management and other employees, as well as external partners, institutions and civil society. The data gathered converge in a materiality matrix, in which all the topics considered are positioned according to their relevance to stakeholders, on one axis, and their impact on the business, on the other. The issues defined as relevant by the stakeholders and which could have high impacts on the business are the priorities that need to be addressed.

TOOLS OR ASSESSMENT PROCESSES SPECIFICALLY AIMED AT MEASURING FIRMS' PRESSURES ON MARINE AND COASTAL ECOSYSTEMS ARE STILL LACKING

Even though the calculation of GHG emissions, as well as the evaluation of water usage and chemicals releases, are fundamental elements to assess a company's impact on marine ecosystems, tools or assessment processes specifically aimed at measuring firms' pressures on marine and coastal ecosystems are still lacking and ocean health is rarely accounted for in companies' materiality matrix. Nonetheless, best performers within the fashion industries show increasing awareness of the consequences of their activities on the ocean, mentioning the most pressing issues in their sustainability reports and considering such topics in their impacts assessments, through self-defined indicators.

50 The EP&L was firstly conceived by Puma's chairman, Jochen Zeitz, in 2010, and applied to evaluate the company's GHG emissions, water usage, air pollution, land use and waste. In 2011, Kering (PPR Group) also adopted it to verify all its brands' impacts, and further developed it to keep tracking progress.

B. Clear goals and objectives need to be coherently included in a firm's overall strategy

Definition of goals and targets is another critical step which contributes to the effectiveness of the sustainability strategy. Best performers define objectives which are clear, specific, preferably science-based[51] and with a long-term orientation. If possible, sustainability goals should be coherently included in the firm's general strategy and their contribution to it should be made explicit. At the same time, more detailed targets and guidelines should be provided to the company's internal functions, with respect to processes and products, as well as to external partners, to support their alignment.

Recurrent internal communications on the identified goals and guidelines or their inclusion within purchasing contracts can help employees, suppliers and distributors to internalize and openly discuss them. Indeed, such goals should not be considered as fixed, but rather as upgradable statements, which can be recurrently updated according to new risks and opportunities, to the firm's achievements, and to its more and more ambitious objectives.

ONLY A FEW COMPANIES ARE CURRENTLY SETTING GOALS AND TARGETS SPECIFICALLY AIMED AT REDUCING THEIR PRESSURES ON MARINE AND COASTAL ECOSYSTEMS

Due to the lack of recognized assessment practices and objectives frameworks, only a few companies are currently setting goals and targets specifically aimed at reducing their pressures on marine and coastal ecosystems. For the same reason, leading companies within the fashion industries adopt self-defined targets and goals. On the other hand, with respect to indirect pressures, policy makers, civil society and the scientific community offer companies a multitude of reference frameworks to set their objectives at the corporate, function and supply chain level.

LEADING COMPANIES ADDRESS THEIR OCEAN-RELATED ISSUES BY COMMITTING TO THE SDG14 – LIFE BELOW WATER OBJECTIVE

Just to mention a few examples, with respect to strategic goals at the corporate level, leading companies address their ocean-related issues by committing to the SDG14 – Life below water objective, explicitly related to marine ecosystems health, or joining the Science Based Targets Initiative (SBTI), which indirectly affects ocean acidification through reducing emissions. The latter is a partnership between the Carbon Disclosure Project (CDP), the United Nations Global Compact (UNGC), the World Resources Institute (WRI) and the World Wide Fund for Nature (WWF), which helps companies to define emissions reduction targets in coherence with the Paris Agreement objective and with the latest climate science findings. Meanwhile, with respect to products and processes, for example, best performers also set detailed targets regarding materials (e.g. percentage of recycled, organic or certified materials utilized), water use and chemicals (e.g. wastewater treatment objectives and abolition of hazardous substances within processing activities), energy consumption (e.g. percentage of sourcing from renewable energy), packaging (e.g. percentage of recycled or FSC certified paper or percentage of recycled or regenerated plastic used) and any other critical aspect of their activities. Finally, at the supply chain level, leading companies

51 i.e. in line with the latest scientific evidence.

tackle their pressures on the environment by including standards and targets (e.g. requirement of certifications on materials origin, chemical substances use, GHG emissions, water use) when selecting their partners, within their purchasing contracts, or by involving their partners through common objectives.

As described later in this report, standards and certifications bodies, as well as industrial associations and multi-stakeholder partnerships, can guide companies in setting common and ambitious goals.

C. In order for a firm to improve the sustainability of its operations, key activities must be implemented along the entire value chain

Once sustainable activities have been identified for each step of the value chain, the company must implement them in its operations. This phase will be described in detail in Chapter 3.2 of this report.

D. Constant monitoring is the key to continuous improvement

A continuous-improvement approach needs to be based on a structured monitoring system to track compliance with internal procedures and guidelines, accomplishment of activities, and effects in terms of mitigation of pressures. In fact, recurrent assessments and evaluations of outcomes could highlight new opportunities for improvement. Best performers within the fashion industry identify a set of KPIs and other metrics related to their targets and goals to check the implementation of their strategies. Other than monitoring activities on internal operations, firms should also focus on supply chain traceability. Tracing difficulties can occur nonetheless, in particular with respect to geographically remote areas, tier 2, 3 or 4 suppliers, or subcontractors. To strengthen their monitoring activities on their partners, leading companies within the fashion industry adopt technologies such as cloud-platforms, barcodes, chips and data management systems which enable detailed information collection and elaboration. Best performers also make sure to directly engage their partners on monitoring procedures. Moreover, they carefully inform their suppliers and then conduct recurrent audits, directly or through external auditors.

BEST PERFORMERS WITHIN THE FASHION INDUSTRY IDENTIFY A SET OF KPIS AND OTHER METRICS RELATED TO THEIR TARGETS AND GOALS TO CHECK THE IMPLEMENTATION OF THEIR STRATEGIES

BEST PERFORMERS DIRECTLY ENGAGE THEIR PARTNERS ON MONITORING PROCEDURE

Some companies also perform spot-checks and implement fine mechanisms in case of non-compliance. Labeling or certification organizations or multi-stakeholders platforms, like, for example, the Better Cotton Initiative (BCI) or the Leather Working Group (LWG), can support companies in structuring and carrying out monitoring activities and overcoming tracing difficulties.

3.2 Adopting a holistic approach means implementing sustainable best practices from raw material extraction to consumption and product disposal, across the entire value chain.

As previously mentioned, the implementation of sustainability activities across the value chain is a core phase of the strategic planning process. The company value chain needs to be seen as a circular process, which starts from raw material extraction and is continuously improved through research and development.

C1. The production of raw materials is responsible for a large share of the environmental impact of the fashion industry. Adopting sustainable practices during cultivation is paramount.

For a textile product, the value chain starts with sourcing of fiber that involves agriculture or synthetic processes. This is the phase that contributes the most to eutrophication and pollution of the ocean and freshwater systems, through the release of nutrients and chemicals.

Leading companies have already started to launch environmental responsibility and animal welfare programs to guide the phase of cultivation and production of raw materials. Switching from fossil fuel–intensive farming to organic and zero or low tillage practices that build healthy soil and draw back/maintain carbon in the ground, could transform the agricultural system from a problem to a solution. With regard to conventional natural crops, such as cotton and wool, research has shown that extensive and intensive use of synthetic fertilizers, soil additives, defoliants and other substances exert negative pressures on soil, water and air.

The alternative to this scenario is to eliminate synthetic chemical use and to adopt organic farming practices to support healthy ecosystems. Some companies are actually reporting a drastic reduction in CO_2 emissions, water and fertilizer use in growing organic cotton instead of using conventional practices. Moreover, there are several standards, such as the Responsible Wool Standard (RWS) and Better Cotton Initiative (BCI), that provide the industry with useful tools for sustainable land management. Their key importance will be illustrated later in this report.

TO HELP PROTECT THE WORLD'S OCEANS FROM PLASTIC POLLUTION, SOME COMPANIES ARE INTEGRATING INTO THEIR SUPPLY CHAINS A RESPONSIBLE ALTERNATIVE TO VIRGIN PLASTIC WHICH COMES FROM DISCARDED FISHING NETS

To help protect the world's oceans from plastic pollution, some companies are integrating into their supply chains a responsible alternative to virgin plastic which comes from discarded fishing nets, one of the most harmful forms of marine pollution. Turning this product into a raw material reduces the need for new plastic and dependence on petroleum, gives value to existing waste and prevents harmful plastic pollution from entering the world's oceans. Moreover, the use of recycled polyester, coming from different sources such as bottles, containers thrown away by consumers and recycled

ocean plastics, allows companies to use fewer resources, discard less and promote new recycling streams for polyester clothing that is no longer wearable.

TABLE 1 – EXAMPLES OF BEST PRACTICES IN RAW MATERIALS PRODUCTION (C1)[52]

ACTIVITY	DEFINITION	EXAMPLE
FABRICS		
Biologic	Applying new technologies to use what was previously considered waste to create biodegradable materials.	**Esprit** uses an innovative alternative to conventional polyester: Sorona® from DuPont. One major difference between Sorona and conventional synthetic materials is that Sorona incorporates annually renewable plant-based ingredients, replacing about 37% of the typical petroleum-based components and shifting from a chemical process to an eco-efficient biological one.
Recycled	Applying new technologies to recycle post-consumer waste into raw materials to be used in apparel production.	**Patagonia's** hat brims are produced from NetPlus® material which is made entirely from old, frayed and torn fishing nets collected in fishing communities in South America. Nets are sorted, cleaned and shredded in Chile, then recycled into NetPlus–made from 100% fully traceable post-consumer materials.
Sustainable farming	Growing crops in a way that can maintain levels of production with minimal environmental impact while supporting producer livelihoods and communities.	**Adidas** scored the highest in the 2020 Sustainable Cotton Ranking as it acknowledges the sustainability challenges with conventional cotton cultivation and was committed to using 100% sustainable cotton by the end of 2018. The company is one of the founding members of the Better Cotton Initiative.
CHEMICALS		
Use of fertilizers	Eliminating the use of synthetic chemical fertilizers and pesticides during farming.	**Inditex** has taken part in several Farmer Engagement and Development (FED) programs. Directly collaborating with upwards of 5,900 small farmers and training them in organic practices, this helps to preserve local biodiversity, enrich soils, eliminate chemical fertilizers and pesticides, as well as to prohibit the genetic modification of seeds.
Restricted substances	Eliminating the use of harmful chemicals during farming, in addition to those already regulated by legislation.	In 2019, **Benetton Group** took further steps towards the goal set when it signed up to the Detox Commitment that provides for the total elimination of 11 groups of chemicals, the adoption of a Restricted Substances List (RSL) and the publication of wastewater test outcomes relating to suppliers involved in wet processes.

C2. To make apparel & footwear manufacturing more sustainable, companies need to rethink their products and packaging, from design to manufacturing and disposal.

After the sourcing of raw materials, subsequent manufacturing stages involve spinning the fibers into yarn, and knitting, weaving or bonding the fibers into fabric. The fabric is then subjected to chemical/mechanical processing to produce a textile with the desired properties. Nowadays, several ways for reducing the environmental impacts of the processing and manufacturing phase are recommended, including reduced chemical use,

52 The examples provided derive from publicly available information found in the companies' sustainability reports and corporate websites.

using dye controllers and dyeing machinery that require less water, and water recycling.

WASTEWATER DISCHARGE FROM APPAREL AND FOOTWEAR MANUFACTURING CAN INCLUDE MICROFIBERS THAT SHED FROM COTTON AND POLYESTER FABRIC DURING DYEING AND FINISHING OPERATIONS

Moreover, wastewater discharge from apparel and footwear manufacturing can include microfibers that shed from cotton and polyester fabric during dyeing and finishing operations. Some companies are working to investigate methods to measure microfibers in wastewater and to understand mitigation options during materials production. For this purpose, the Zero Discharge of Hazardous Chemicals (ZDHC) Coalition recognizes the importance of addressing hazardous substances that may be discharged into the environment during the manufacturing processes and it released specific guidelines on wastewater. Through the adoption of ZDHC Guidelines, companies can simplify compliance processes, aligning their facilities and the activities of their suppliers to specific environmental standards and reducing their environmental pressures.

CIRCULAR DESIGN CAN INFLUENCE BOTH THE LIFESPAN OF CLOTHING AND ITS SUITABILITY FOR RECYCLING OR REUSE WHEN DISCARDED

Besides improvements in the manufacturing processes, the design phase also has to be taken into account to reduce the pressures of the fashion industry on the environment. Circular design can influence both the lifespan of clothing and its suitability for recycling or reuse when discarded. This approach relies on three focus areas: new business models that extend the use of clothing, safe and renewable inputs, and solutions to turn used clothes into new ones. Companies embrace circular design to maximize the environmental benefit of their products.

For example, designing modular clothes and footwear (e.g. shoes with interchangeable soles) enables customers to satisfy their need to change style without having to change product, hence increasing its usage rate. On the other hand, to ensure that fashion products are designed to be recyclable at end-of-life, the main recommendations are to create mono-material design (unless this shortens the lifespan of the product) and avoid chemical treatments that may disturb the recycling process or contain restricted chemicals. The environmental benefits of recycling largely depend on what material is replaced and how much of that material is replaced.

MANY COMPANIES WITHIN THE FASHION INDUSTRY HAVE ALREADY STARTED TO WORK ON THE REDUCTION OF SINGLE-USE PLASTICS

Another crucial source of ocean pollution derives from the use of single-use plastic packaging for clothes and footwear. Many companies within the fashion industry have already started to work on the reduction of single-use plastics. More precisely, alternatives to single-use plastics include sustainable and decomposable materials for hang tags, labels and packaging that have to be rethought starting from the beginning of the supply chain. For example, a growing number of companies are producing recycled plastic bags for products, using a high percentage of post-consumer waste, while others are adopting recyclable packaging when shipping online orders.

TABLE 2 – EXAMPLES OF BEST PRACTICES IN MANUFACTURING (C2)[53]

ACTIVITY	DEFINITION	EXAMPLE
DESIGN		
Circularity	Incorporating the principles of the circular economy in the design phase to design out waste and pollution, regenerate natural systems and keep products and materials in use[1].	**ASOS** has trained 100% of its designers on circular design principles, which have now been translated into a fully circular collection characterized by three principles: design out waste, versatility and durability, and recycling.
PRODUCTION PROCESSES		
Energy, water and chemicals	Reducing the environmental impacts of the processing and manufacturing phase through chemicals use reduction, use of dye controllers and dyeing machinery that require less water, water recycling and increasing energy efficiency and renewable energy use.	**Inditex** produces its garments using processes which help reduce emissions and the use of chemical products in production processes. The use of technologies such as renewable energy consumption or tanneries certified by the Leather Working Group enable them to carry out washing, dyeing or tanning processes in a more sustainable way.
PACKAGING		
Recycled and lternative materials	Replacing conventional virgin packaging with more eco-friendly alternatives e.g. bio-based materials, recycled materials, etc.	In 2019, 85% of **Prada's** total packaging consumption was represented by paper certified by the Forest Stewardship Council (FSC) and recycled paper. The Group also embarked on a program within the clothing and leather goods divisions aimed at converting some packaging components made from 100% virgin plastic into recycled or regenerated plastic.
WASTE		
Wastewater and microfibers	Investigating methods to measure contaminants and microfibers in wastewater and to identify mitigation options during materials production.	**Nike** is working with its suppliers to investigate methods to measure microfibers in wastewater and to understand mitigation options during materials production. In 2017, Nike scaled the ZDHC Wastewater Guidelines across its source base. These guidelines address total suspended solids, which include microfibers – they can be removed from wastewater with cost-effective, commercially available technologies which are being championed by the Nike Water Program.

1 Ellen MacArthur Foundation

C3. Improving the sustainability of the logistics phase is key to reduce CO_2 emissions, of which 30% are absorbed by the ocean.

IT IS FUNDAMENTAL TO CONSIDER AND WEIGH THE DIFFERENT RISKS, BENEFITS, BUSINESS NEEDS, AND IMPACTS ON THE ENVIRONMENT FOR EACH MODE OF TRANSPORTATION

Once the product has been manufactured and inserted into its packaging, it is either shipped to physical points of sale or directly to the customer. In the logistics phase, best practices can be divided into two main areas: transportation and facilities.

Companies need to minimize the impact generated by the transportation of products, which may be by sea, truck, rail, or air. In general, it is fundamental to consider and weigh the different risks, benefits, business needs, and impacts on the environment for each mode of transportation. Some leading companies in sustainability prioritize trains as they have the lowest carbon

53 The examples provided derive from publicly available information found in the companies' sustainability reports and corporate websites.

footprint, allow for large quantities to be moved at once, and are not associated with risks for ocean life. Furthermore, as the online sales channel represents 22% of global apparel revenue in 2020 and is estimated to increase significantly in coming years,[54] it is increasingly important for companies to optimize their logistics in order to minimize emissions – for example by grouping multiple orders into single bulk shipments, by offering customers carbon-neutral shipments through offsetting emissions, and working with wholesalers to reduce individual shipments and limit return shipping (i.e. shipping of customer returns).

BEST PERFORMERS MAXIMIZE THE ENERGY EFFICIENCY OF LIGHTING AND EQUIPMENT AND FAVOR RENEWABLE SOURCES OF ENERGY IN ALL THEIR FACILITIES

Emissions reduction is possible in warehouse and storage facilities as well, best performers maximize the energy efficiency of lighting and equipment and favor renewable sources of energy in all their facilities (warehouses, points of sale, etc.) and seek to certify their buildings with the highest standards of sustainability, e.g. LEED Certifications.

Finally, transportation between facilities (e.g. between stores and warehouses), also needs to be considered when optimizing the sustainability of logistics, ensuring inventory management of stores is done in the most efficient way through continuous analysis of purchases and consumer habits.

TABLE 3 – EXAMPLES OF BEST PRACTICES IN LOGISTICS (C3)[55]

ACTIVITY	DEFINITION	EXAMPLE
TRANSPORTATION		
Carbon emissions & sustainable alternatives	Evaluating different modes of transportation-based CO_2 emissions and other environmental impacts.	**Esprit** keeps CO_2 emissions front-of-mind when thinking about shipments, but also weighs different risks, benefits, business needs, and impacts on the environment for each mode of transportation. Their top choice is to use trains whenever feasible, since this has the lowest carbon footprint, allows for large quantities to be moved at once, and is not associated with risks for ocean life.
FACILITIES		
Energy efficiency	Minimizing the amount of energy used in operations, eliminating energy waste.	**VF corporation's** 160,000 square-feet Californian campus, home to many VF Outdoor brands, has a low impact on the environment. Using a combination of energy-saving design components, the campus boasts net-zero electricity consumption—meaning all electricity used is less than or equal to the amount of electricity the building produces
Renewable energy	Sourcing energy only from renewable sources, which are not depleted when used (e.g. wind, solar, etc.).	75% of **Puma's** own electricity use is from renewable sources (through renewable energy tariffs or RECs certificates) and the company aims to move 100% of its entities to renewable electricity and increase the percentage of renewable energy used by core suppliers to 25% by 2025.
LEED certifications	Obtaining LEED certifications (Leadership in Energy and Environmental Design: an internationally recognized green building certification system) for company facilities.	In 2019, **Prada** signed the first Sustainability Linked Loan of the luxury goods industry: the Sustainability Term Loan which interest rate can be reduced following the achievement of various targets, including some related to the number of stores assigned LEED Gold or Platinum Certification.

54 Statista (2020), available at https://www.statista.com/outlook/249/100/apparel/worldwide#market- onlineRevenueShare
55 The examples provided derive from publicly available information found in the companies' sustainability reports and corporate websites.

C4. It is fundamental to educate customers on sustainable consumption patterns through innovative business models and detailed instructions for garment care

Once the product has been bought, either online or physically, it finally reaches the customer and is ready for use. Even though the consumption phase is mostly in the hands of customers, sustainable fashion companies can implement a variety of initiatives aimed at educating customers and facilitating sustainable behavior. Consumption best practices can be divided into three main pillars: circular sales models, integration of product portfolio with sustainable solutions, and educational campaigns.

LEADING COMPANIES ARE ADOPTING CIRCULAR BUSINESS MODELS AIMED AT EXTENDING THE LIFE-SPAN OF PRODUCTS AND REDUCING WASTE, HENCE CONTRIBUTING TO MITIGATING THE ISSUE OF MARINE LITTER AT ITS SOURCE

Leading companies are adopting circular business models aimed at extending the life-span of products and reducing waste, hence contributing to mitigating the issue of marine litter at its source. Four main approaches emerge: rental, recommerce, take-back and repair.

In addition to the variety of rental platforms which have emerged and grown rapidly in recent years (e.g. Rent the Runway, By Rotation, etc.), fashion companies have begun to adopt rental models themselves, giving their customers the chance to rent a certain dress or accessory for a defined period of time, through a subscription-based service. However, the environmental impact of rental services depends greatly on the structure of the business model adopted and the resulting consumption patterns. It is therefore fundamental for companies to carry out a clear evaluation of potential environmental benefits before introducing this business model – for example, a key KPI to consider before activating a rental platform is to analyze whether the rental service would increase the usage rate of the garment throughout its useful life – something which is usually true for formal garments.[56]

The same objectives are pursued through another circular business model: recommerce. The recommerce business model is not new; peer-to-peer platforms for second-hand products have existed for a long time, both fashion-specific (e.g. Depop) and cross-product (e.g. EBay). However, leading fashion companies have started to take ownership of this business model, launching proprietary recommerce platforms where renewed products are sold, along with their regular e-commerce.

This is also possible through two key activities: take-back and repair. Fashion companies can divert used clothes from landfill by launching take-back programs where customers can give back their used clothing in exchange for a reward (e.g. voucher, discount, new product, etc.). Companies can then repair these used clothes and re-sell them or recycle them to make new products with recycled material, hence closing the loop. As much as 20 million tonnes of textiles are being landfilled or incinerated every year in the EU and US alone;[57] recommerce and repair are a way to allow consumers to

56 Felix M. Piontek, Eri Amasawa, Koji Kimita,(2020), Environmental implication of casual wear rental services: Case of Japan and Germany, Procedia CIRP,Volume 90 available at https://www.sciencedirect.com/science/article/pii/ S2212827120301670
57 Circle Economy (2017), https://www.circle-economy.com/resources/reblend-transforming-post-consumer-textile-waste-into-high-quality-products

adopt more conscious behavior and divert a portion of textile waste from landfill.

BEST PERFORMERS ALSO INTEGRATE THEIR PRODUCT PORTFOLIO WITH SUSTAINABLE SOLUTIONS AIMED AT FOSTERING CORRECT BEHAVIORS AMONG CONSUMERS AND MINIMIZING THE IMPACT OF THEIR GARMENTS ON THE OCEAN DURING WASHING

Best performers also integrate their product portfolio with sustainable solutions aimed at fostering correct behaviors among consumers and minimizing the impact of their garments on the ocean during washing. Key examples include the development and sale of microfiber reducing laundry bags and laundry machine filter systems such as the innovative “Cora Ball” which prevents microfiber from breaking off clothes during washing and collects them into fuzz which can be seen and disposed of correctly. Selling these solutions directly at the point of sale (physical or digital) makes them more impactful as customers are simultaneously educated on the issue and presented with a potential solution during their shopping journey.

EDUCATIONAL CAMPAIGNS FOR CUSTOMERS, AIMED AT INFORMING THEM ON THE ENVIRONMENTAL IMPACT OF PRODUCTS AND GIVING INSTRUCTIONS FOR SUSTAINABLE USE ARE IMPORTANT

Another key pillar is represented by educational campaigns for customers, aimed at informing the final consumer on the environmental impact of products and at giving instructions and guidelines for their sustainable use. For example, virtuous fashion companies provide a series of written instructions and engaging video tutorials that explain how to take care of garments at home, including correct washing, to make them last longer and contribute to reducing their water use and carbon footprint. This material may be positioned in store, on the company’s website and e-commerce, on social media and on the product packaging. As mentioned in the previous section, one machine load of washing can shed more than 700,000 microfibers,[58] making correct washing of garments fundamental for ocean conservation.

Finally, it is fundamental to educate customers on correct product disposal, encouraging recycling and donation of clothes in good condition when possible.

While on the one hand there is a long list of virtuous practices that fashion companies can adopt to reduce their pressures on marine ecosystems, on the other, some of the most concerning issues still lack viable and scalable solutions.

58 Microfibre Masses Recovered from Conventional Machine Washing of New or Aged Garments (2016), Niko L. Hartline, Nicholas J. Bruce, Stephanie N. Karba, Elizabeth O. Ruff, Shreya U. Sonar, and Patricia A. Holden, Environmental Science & Technology

TABLE 4 – EXAMPLES OF BEST PRACTICES IN CONSUMPTION & END USE (C4)[59]

ACTIVITY	DEFINITION	EXAMPLE
CIRCULAR SALES		
Rent, recommerce, take-back, repair	Introducing circular business models for product sales, aimed at increasing garment usage rate and useful life.	**VF Corporation** has introduced a series of circular sales models for The North Face® brand: - Launch of a pilot in Europe with The Library of Things to develop a rental program for camping gear, luggage and other equipment. - Launch of VF's first recommerce platform, "The North Face® Renewed", which provides the same great quality and performance brand consumers expect from The North Face®, while being lightly worn. - Introduction of a large-scale consumer take-back program "Clothes the Loop".
EDUCATIONAL CAMPAIGNS		
Impacts, instructions	Providing customers with educational material on the environmental impact of products and instructions for correct garment care, aimed at increasing useful life.	**Benetton Group** published a revised version of the B-Care guide that includes a series of written instructions and video tutorials that explain how to simply take care of one's garments at home in order to make them last much longer and contribute to reducing the carbon footprint of Benetton products.
SUSTAINABLE SOLUTIONS		
Integration of product portfolio	Giving customers the opportunity to purchase sustainable solutions for garment care, aimed at minimizing microfiber dispersion during washing.	**Nike** offers its customers two solutions against microfibers: the Cora Ball and the Lint LUV-R, which are both researched and data-backed technologies that can reduce the amount of microfibers being washed away with home laundry water. The Cora Ball is a laundry ball added to the wash that collects microfibers into visible fuzz so it can be disposed of in the right way. The Lint LUV-R is a washing machine discharge filter, originally designed for septic systems, that is installed on the discharge hose of a laundry machine. In testing, The Lint LUV-R captured an average of 87% of microfibers in the wash, compared to the Cora Ball which captured 26%.

C5. Research and development activities at each stage of the value chain are needed to tackle urgent and unsolved ocean-related issues.

BEST PERFORMERS CARRY OUT CONSTANT RESEARCH ACTIVITIES IN ORDER TO DEVELOP PRODUCT, PROCESS AND ORGANIZATIONAL INNOVATIONS TO TACKLE PROBLEMS THAT REMAIN UNSOLVED

While on one hand there is a long list of virtuous practices that fashion companies can adopt to reduce their pressures on marine ecosystems, on the other, some of the most concerning issues still lack viable and scalable technological solutions. Best performers carry out constant research activities in order to develop product, process and organizational innovations to tackle problems that remain unsolved. Leading companies undertake in-depth studies and pilot projects both in-house and externally, in collaboration with universities, research centers and peers.

Leading companies within the fashion industry conduct research to lower their resource consumption and pollution release from raw materials production, through manufacturing and processing activities, and up to consump-

59 The examples provided derive from publicly available information found in the companies' sustainability reports and corporate websites.

tion and disposal. They carry out research on materials (e.g. substituting natural rubber derived from FSC forests to lower propene GHG emission), processes (e.g. the adoption of sulfur, instead of synthetic indigo, to color denim, reduces water and energy use), but also on design (e.g. eco-design and design for the environment techniques enable the selection of sustainable materials and color choices) and organizational solutions (e.g. pilot projects are implemented to test reverse logistics mechanisms).

An increasing number of innovative start-ups are working on the development of new sustainable materials, thanks also to the support of incubators and accelerators dedicated to sustainable development. Even those activities which are not directly focused on the ocean often have indirect benefits on marine ecosystems, as they favor circularity, foster the use of renewable resources and increase resource efficiency.

WITH REGARD TO OCEAN RELATED-SUSTAINABILITY, A CRUCIAL AREA OF RESEARCH REFERS TO DISPERSION OF MICROFIBERS

With regard to ocean related-sustainability, a crucial area of research refers to dispersion of microfibers. Leading companies are struggling to manage microfiber release during washing. As mentioned previously, currently available solutions include washing machine filters or clothing bags, which capture microfibers and avoid their dispersion in wastewater, but more effective innovations are needed.

TABLE 5 – EXAMPLES OF BEST PRACTICES IN RESEARCH AND DEVELOPMENT (C5)[60]

ACTIVITY	DEFINITION	EXAMPLE
R&D		
Product Innovation	Implementing research projects, in collaboration with research centers and universities, aimed at improving product sustainability.	**H&M** initiated a 24-month research project — A Management Tool for Microplastics from Textile Production Process — together with the Hong Kong Research Institute of Textiles and Apparel (HKRITA). This project studies the release of microplastics from textile products, and their management in textile manufacturing processes.
Process Innovation	Implementing research projects, in collaboration with research centers and universities, aimed at improving process sustainability.	**Patagonia** continues to explore new developments in the fields of material traceability and supply chain transparency, including adopting best practices used in textile and other commodity supply chains. They are researching the latest generation of traceability service providers with the goal of ensuring the chain of custody of their sustainable materials and improving the overall transparency of these sectors.
Business model innovation	Based on research efforts, developing clear strategies for business model innovation towards circular business models.	In 2019, **Adidas** further focused on taking responsibility for the entire product life cycle and established a clear strategy aimed at developing a circular business model. In 2020 it launched its three-loop strategy to push forward its circularity efforts.

60 The examples provided derive from publicly available information found in the companies' sustainability reports and corporate websites

3.3 Companies need to consider three key features and tools in their journey towards sustainability: transparency & traceability, standards & certifications, and partnerships aimed at pushing their commitments to ocean sustainability further.

Best performers within the fashion industry adopt a continuous-improvement approach, corresponding to a constant effort to ameliorate the effectiveness and reach of their sustainability strategy. From this perspective, collaborating with external stakeholders is a key element to highlight areas of improvement and seize new opportunities. Standards and certification bodies can help companies in refining and formalizing their commitment to sustainability. Partnerships can help in building new knowledge and competencies to address and manage complex sustainability challenges at local and global levels.

E. Traceability of companies' pressures on marine ecosystems is key to transparency

Such initiatives are also crucial in response to the increasing demand for transparency from the public. Indeed, customers, institutions and civil society seem more and more interested in the sustainability aspects of products and services and require companies' to act in a transparent way, in addition to aligning with ambitious standards.[61]

If transparency can be described as the extent to which companies make available to their internal and external stakeholders information about their activities, products and supply chain networks, their capability to collect data about their practices become crucial. Traceability, defined as "the ability to identify and trace the history, distribution, location and application of products, parts and materials, to ensure the reliability of sustainability claims, in the areas of human rights, labor (including health and safety), the environment and anti-corruption)",[62] is thus an essential element to achieve transparency and works as an assurance system with regard to the information published.

TECHNOLOGIES AND SUPPLIER ENGAGEMENT, AS WELL AS PARTNERSHIPS AND CERTIFICATION BODIES CAN SUPPORT FIRMS TO STRENGTHEN THEIR TRACING CAPABILITIES

With respect to the ocean, most textile companies are still unaware of the pressures they exert[63] and, as a consequence, are still far from providing full transparency. Nonetheless, technologies and supplier engagement, as well as partnerships and certification bodies can support firms to strengthen their tracing capabilities. Best performers adopt total transparency with respect to their resources and processes. They provide external stakeholders with all the information they require both in physical stores, through shop assistants and through labels and tags, and through websites, with dedicated sections for each material, product, collection, and on the company's activities in general.

---

61 Nielsen (2019), Consumers Buy The Change They Wish To See in The World. Available at: https://www.nielsen.com/us/en/insights/report/2018/unpacking-the-sustainability-landscape/

62 United Nations Global Compact and BSR (2014), "A guide to traceability. A practical approach to advance sustainability in global supply chains"

63 One Ocean Foundation, SDA Bocconi, McKinsey & Company, CSIC (2020), Business for Ocean Sustainability – a global perspective

To communicate their standards to consumers, leading companies also adopt ecolabels. These are certifications which provide clients with immediate information about product impacts with respect to a certain stage of the supply chain or to the entire chain. These are issued by governmental agencies, industry associations, NGOs and research institutions which, as independent third parties, certify a firm's sustainability according to a set of standards identified by experts. The Ecolabel Index, the largest global directory on these certifications, currently lists 104 ecolabels for the textile industry.

F. Standards and certifications can help companies to strengthen and formalize their commitment to sustainability.

Standards can be defined as a set of "voluntary predefined rules, procedures, and methods to systematically assess, measure, audit and/or communicate the social and environmental behavior and/or performance of firms".[64] Such rules need to base their credibility on an assurance system, which verifies their actual implementation. Certifications offer just such a guarantee by providing third-party checks on compliance with standards. In recent years, several multi-stakeholder platforms, as well as industry or commodity self-regulation schemes, have issued sustainability standards and certifications. They gather companies together to achieve specific goals and support them in assessing their issues, identifying their priorities, implementing coherent activities and monitoring their results.

Moreover, such organizations enable firms to interact with a broad range of stakeholders and provide guidelines based on the existence of relevant local and international actors and communities.

LEADING COMPANIES WORK TO MAKE THEIR SUPPLIERS ADOPT STANDARDS AND CERTIFICATIONS

The Better Cotton Initiative (BCI), Leather Working Group (LWG), OEKO TEX and Zero Discharge of Hazardous Chemicals (ZDHC) are just some of those related to the textile industry. Leading companies work to make their suppliers adopt standards and certifications. They disseminate information and foster activities among their partners and propose joint memberships.

Moreover, since obtaining a certification can take a long time, best performers also support their suppliers who are implementing the required procedures and buy their products before they get the official certification.

G. Partnerships for sustainability are a key tool to enable resource and knowledge sharing.

Leading companies often engage in partnerships to develop product, process or organizational innovation and to strengthen their means of implementation. As stressed by the United Nations in fact, which dedicates the 17th SDG to partnerships, collaboration among different sectors and actors

64 Gilbert, D. U., Rasche, A. and Waddock, S. (2011). Accountability in a global economy: The emergence of international accountability standards . Business Ethics Quarterly, 21(1), 23–44.

COLLABORATION AMONG DIFFERENT SECTORS AND ACTORS TO SHARE FINANCIAL RESOURCES, KNOWLEDGE AND EXPERTISE IS FUNDAMENTAL TO ACHIEVE SUSTAINABILITY GOALS

to share financial resources, knowledge and expertise is fundamental to achieve sustainability goals. The Fashion Pact, The Sustainable Apparel Coalition and 1% for the Planet are just some examples of partnership platforms, which can support textile companies. [65]

Other than joining these types of multi-stakeholder platforms, best performers also establish partnerships with external developers of technological innovations (e.g. for the creation of web-based data management systems for monitoring emissions and chemicals), NGOs (e.g. to organize post-consumer usage collection programs within circularity projects), universities (e.g. to conduct scientific research on unsolved issues, such as dispersion of microfibers) or peers (e.g. to produce new products which results from other companies' or industries' waste materials).

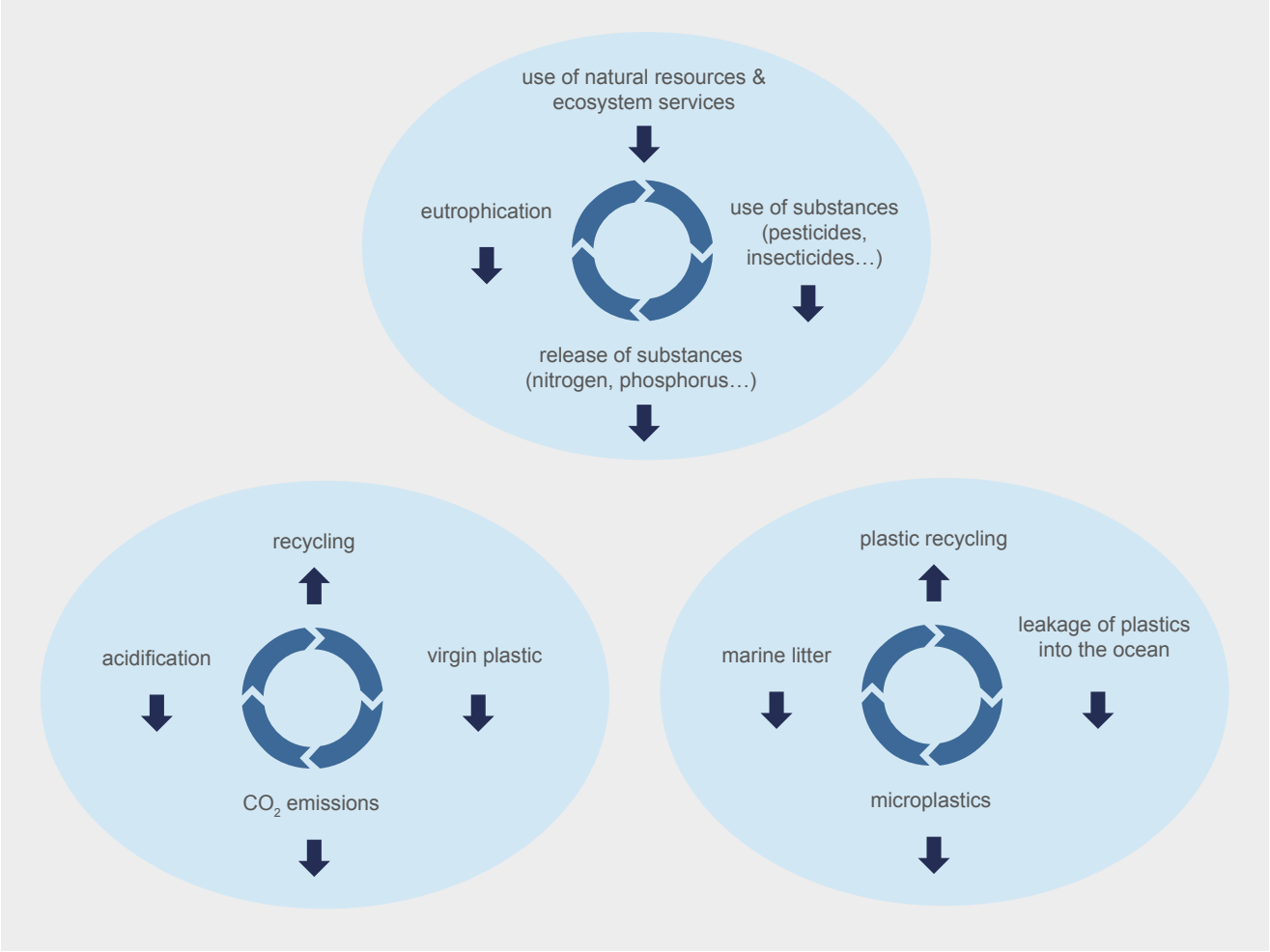
65 United Nations Department of Economic and Social Affairs. Available at: https://sdgs.un.org/topics/multi-stakeholder-partnerships-and-voluntary-commitments

NEXT STEPS AND BEYOND

Through two years of extensive research on the relationship between the business world and the ocean, combined with a broad and thorough exam of the sustainability reports of global fashion companies and a substantial literature review, “Business for Ocean Sustainability – The Fashion Industry” provides a view of the key issues that companies in this sector need to acknowledge and act upon promptly.

More specifically, the report provides an understanding of critical areas with respect to marine ecosystems, with a distinction between direct and indirect pressures by companies, and systematizes existing best practices to understand the relationships between the various activities and the corresponding effects (Figure 3).

FIGURE 4 –EXAMPLES OF VIRTUOUS CYCLES ACTIVATABLE THROUGH THE IMPLEMENTATION OF SUSTAINABLE BEST PRACTICES



In addition, the innovative review carried out by scientific experts has allowed us to identify the materiality of key pressures of the fashion industry according to scientists, which is a new type of research.

In general, as identified in the previous reports, leading companies committed to sustainability and aware of their pressures on the ocean also exist in the fashion industry, and they adopt innovative supply chain practices to mitigate their pressures on the ocean. However, there is vast room for improvement.

Firstly, the awareness gap must be closed: companies need to identify, understand and quantify their pressures on marine ecosystems in order to tackle them effectively. Awareness is fundamental for effective and scalable action on key critical issues. In this regard, the One Ocean Foundation is already working on the development of a tool aimed at facilitating disclosure on ocean pressures.

Specifically, companies should start tackling the issue of microfibers in a concrete and scalable manner during production and consumption, moving from research to action. As seen, leading companies are struggling to manage microfiber release during washing. Currently available solutions include washing machine filters or clothing bags, which capture microfibers and avoid their dispersion in wastewater, but more effective innovations are needed.

Furthermore, for a complete industry transformation, focal companies need to reinforce their relationship with suppliers both by implementing sustainability criteria and by supporting them in the application of sustainable best practices.

In terms of research, further studies can be done on the relationship between the fashion industry and marine ecosystems, going beyond the focal company and identifying key impacts and best practices for players at each step of the supply chain, from agriculture to retail.

PROJECT TEAM

One Ocean Foundation

Jan Pachner

Giulio Magni

Giorgia Rizzi

SDA Bocconi School of Management Sustainability Lab

Francesco Perrini

Stefano Pogutz

Manlio De Silvio

Virginia Allevi

Aristea Saputo

GLOSSARY

Acidification – Reduction in the pH (i.e. increase in acidity) of ocean waters over an extended period of time, caused primarily by the uptake of carbon dioxide (CO_2) from the atmosphere

Blue economy – Economic sectors whose activities take place in marine and/or coastal environments

Contaminant – Substances (i.e. chemical elements and compounds) or groups of substances that are toxic, persistent and liable to bio-accumulate and other substances or groups of substances which give rise to an equivalent level of concern

Eutrophication – The process by which a body of water becomes enriched in dissolved nutrients (such as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen

Food web – A system of interlocking and interdependent food chains

Greenhouse Gas (GHG) – Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth's surface, the atmosphere itself, and by clouds. This property causes the greenhouse effect. Primary greenhouse gases in the Earth's atmosphere are water vapor (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), ozone (O_3)

Hydrographical conditions – The physical parameters of seawater, such as temperature, salinity, depth, currents, waves, turbulence, turbidity

Microfiber – A staple fiber or filaments of linear density approximately 1 dtex or less, and above 0.3 dtex

Non-indigenous species – Species introduced outside their natural past or present range, which might survive and subsequently reproduce, threatening the biodiversity of an ecosystem

Overfishing – The uncontrolled catching of fish in a watercourse or sea area, destined to irreparably compromise its reproductive capacity

Pressure – Any action that makes a change to the state of the natural environment whether adverse or beneficial, wholly or partially resulting from the activity of an organization, or the utilization of products or services

ABOUT
ONE OCEAN FOUNDATION

The One Ocean Foundation (OOF), created in march 2018, is an Italian initiative with international reach dedicated to ocean conservation.

The OOF was born from an idea by the Yacht Club Costa Smeralda (YCCS), which is directly interested in the sustainability of the marine environment. The mission of the Foundation is to accelerate solutions to ocean issues, by inspiring international leaders, institutions, companies, and people; promoting a sustainable blue economy and enhancing ocean knowledge through ocean literacy.

To pursue this mission, the One Ocean Foundation is engaged on a daily basis in numerous projects, in particular: scientific research projects, education & communication activities and environmental projects.

The distinctive feature of the One Ocean Foundation is its scientific scope and, at the same time, its strong relationship with the business world, in order to increase awareness and establish constructive relationships between all stakeholders engaged in marine preservation at different levels to foster an increasingly sustainable economy.

One Ocean Foundation's projects are supported by its partners:

Contacts:
One Ocean Foundation
via Gesù, 10 - 20121 Milan, Italy
secretariat@1ocean.org | +39 02 796 145
www.1ocean.org

All pictures are kindly provided by
the photographer Kurt Arrigo
kurtarrigo.com


ONE OCEAN
FOUNDATION
DEDICATED TO MARINE ENVIRONMENT PRESERVATION
FOUNDED BY THE YACHT CLUB COSTA SMERALDA