

2 The Production Chain

Fashion, Technology, and Globalization (1800–2022)

Audrey Millet

Many technical improvements marked the textile industry in the eighteenth century, but it (still) could not meet the growing demand of the population. On the one hand, wars and slow transportation caused supply difficulties.¹ On the other hand, the weaving looms, that were not yet all mechanized, did not produce fast enough in 1850 to increase production volumes.² The cost of importing American cotton to Europe was too high. The smooth functioning of the production chain was based on industrialization, mechanization, chemical processes, and the concentration of the workforce, which was mostly servile or exploited. However, as transportation improved and colonization expanded, globalization became a key to the growing complexities in the production chain. Ready-to-wear gradually replaced custom manufacturing, until cheap t-shirts invaded consumers' closets from the 1980s. In two centuries, the production chain has become so globalized that we no longer know where our clothes come from. A cotton fiber from Texas may be sold to a Chinese manufacturer to be woven. Then it will be transformed into clothes in Bangladesh or Ethiopia. The printing can be done in France. Finally, the garment will be sold for \$5 in a store on a California beach.³ However, this travel is made possible thanks to deep technical transformations and a specific organization of work that find their origins at the beginning of the nineteenth century.⁴ The democratization of clothing is dependent on the machines to gin the cotton ball, chemical dyes, and pesticides. The globalization of the industry has now become synonymous with abundance and waste, as evidenced by the 35,000 tons discovered in the Atacama Desert in Chile.⁵

During the eighteenth century, cotton was used increasingly, with European countries depended upon overseas production for their supply. Indeed, India dominated the production and trade of cotton in the Indian Ocean before the eighteenth century.⁶ The development of international trade after 1500 contributed to the establishment of future European domination. This is why the study of technologies, products, and raw materials; sociocultural changes; and the integration of these transformations into the Western socioeconomic system mobilized so many political and economic actors.⁷

Looking at the fashion production chain requires studying Schumpeterian patterns of innovation. Joseph Schumpeter distinguishes five forms of innovation: product innovation, process innovation, production mode innovation, market innovation, and raw material innovation. For Schumpeter, the engine of the system is innovation and technical progress through the phenomenon of creative destruction. Growth is a permanent process of creation, destruction and restructuring of economic activities. In 1850, the market seemed promising, and it stimulated the entrepreneurs. To attract consumers, it was necessary to produce more, and at a lower cost.⁸ The continual changing of fashions

increased as a method to boost sales. Today, from the traditional eight seasons—spring, summer I, summer II, fall, fall–winter, winter I, winter II, and vacations⁹—the industry now produces yearly up to 52 seasons—in other words, new trends every week.¹⁰ Nevertheless, such a race for performance has serious consequences. Agricultural workers, dyeing workers, and manufacturing plant workers are the ones most exploited. Their misery is the hidden cost of the limitless production that presents itself as avant-garde, creative, innovative, and even, in some cases, responsible.

The production chain is particularly complex because the fashion industry is composed of numerous segments. In most cases, it is both highly global and decentralized. The first step in the production chain is the production of the fibers. This is followed by yarn and fabric production and the garment manufacturing process. After that, the end product is sent to the retailer. Diversified production lines exist for similar garments depending on factors such as the type of material used and the final product required. Numerous production techniques can also be used for various types of fiber, yarn-spinning system, and fabric and garment technology. As a result of this complexity, it is difficult to map out the processes. Throughout its life cycle, a textile product requires numerous inputs. The land is used directly to produce the fibers and indirectly to build the production facilities, from storage to incineration. Processing the fibers requires fresh water supplies. Production and transportation have a cost in energy from renewable and non-renewable sources. Large amounts of pesticides, fertilizers, and chemicals are often used to protect the crops, and further chemicals are used to protect the final product in storage and transportation, as well as in packaging materials, especially as plastic and paper. Each of these stages requires a significant workforce. In the tradition of Fernand Braudel, historian Daniel Roche has linked the history of material culture and social behavior to the study of clothing.¹¹ Giorgio Riello has, in his book on the topic, given substance to a commodity, cotton, by grasping the interactions between desires, needs, and consumption and raw material and production processes, exchanges, and know-how, without forgetting the different actors—states, traders, craftsmen, and consumers.¹² Finally, the work of Liliane Hilaire-Pérez has modified a disciplinary field, the history of techniques, by rethinking the genealogy of industrial history with technicians, their know-how, and the plasticity of gestures at the center of production.¹³ The study of techniques is quite recent.¹⁴ They were first considered as the engine of industrialization and a symbol of the linear progress of civilization. Nevertheless, the great panoramas have finally given way to a history of technical knowledge, workers, and gestures, i.e., the know-how and the technical skills of the workers in the workshop.¹⁵ From 1800 to 2020, the freedom of trade, exchange, and enterprise was in the ascendant. The recent triumphant neo-liberalization of the world has modified the different stages of the production chain. The consequences for workers and the environment, however, question the limits of production and corporate social responsibility.¹⁶ The industrial problems, such as pollution, low wages, labor-induced diseases, and work accidents, are related both to structures and to a quasi-religious belief in a triumphant materiality and progress. The objective of this article is to trace the main transformations of the fashion industry production chain. It treats fashion as a total fact at the crossroads of economic and social history and the history of techniques.

In the first section, we will examine the characteristics of industrialization in the nineteenth century and major examples of technological innovations. Machines were introduced and transfers between sectors, such as the contribution of steel to the textile industry and to transportation that allows for the construction of machines and

the establishment of rail and port infrastructures, produced their first concrete results. However, the burden placed upon the workforce was a heavy one. Until the 1960s, techniques were oriented toward synthetic fabrics, which corresponded to new lifestyles and to an indestructible belief in technical progress. The second section of this chapter examines what happened during the second half of the twentieth century, when the fashion industry became global, motivated by a new credo: neo-liberalism. Finally, the chapter then examines the point of no return reached in 2005, when the Multifiber Arrangement ended. These successive agreements, concluded between developing and developed countries, set export quotas by country and by product that varied over time according to the growth of developing countries. They protected the industries of developed countries from competition from low wages in developing countries.¹⁷ The end of quotas has consequences on each step of the production chain. Nevertheless, since the 1980s, voices have been raised denouncing the excesses of production chains that pollute and often exploit a precarious and vulnerable workforce.¹⁸ In a sort of continuity of the poor working conditions of the nineteenth century, the textile industry remains one of the most unequal in the world.

The Industrialization of the Chain of Production

The historians mentioned above argue that a main driver of industrialization and economic globalization is the fashion industry. The advent of the consumer society in the nineteenth century, the evolution of morals, lifestyles linked to urbanization and the belief in progress helped to transform the production chain. Initially, the price of clothing fell. This decline had already begun in the seventeenth century when manufacturers imposed mass production on workshops in order to dress the many English and French soldiers and sailors. Supply was stimulated by technological innovations.¹⁹ To make mass production possible, it was first necessary to secure a supply of raw materials. The cotton gin, patented in 1794, enabled the southern regions of the United States to increase their output considerably.²⁰ The boom in cotton production in the United States is all the more astounding because at the beginning of the Industrial Revolution it did not seem to have a great future. However, from the 1830s to the 1840s its production increased 25-fold. Before the outbreak of the Civil War, the South produced about two-thirds of the world's cotton and, by 1860, over 70 percent of all US cotton produced was exported, mainly to England.²¹ Friedrich Engels explains that "the history of the proletariat in England begins with the invention of the steam engine and the machines for working cotton." Engels sees the Industrial Revolution as having led to "a rapid fall in the price of all manufactured goods, the prosperity of trade and manufacture, the conquest of almost all unprotected foreign markets." But the new "national wealth" did not benefit everyone.²² The rural exodus intensified demographic pressure on the industrial cities, which were unable to accommodate the new populations decently. The discussions of the industrialists on the English Factory Act of 1833 illustrate their fears. They thought that the regulations would put them at a disadvantage. The reduction in child labor that resulted from that Act led to an increase in the expenses of employers, who also subcontracted to workers whose activity was not regulated. The sanitary conditions in the workshops led to serious diseases, including tuberculosis, known as the "tailor's disease." The steam power used in the textile mills also lowered prices of clothing as it was made more quickly. New textile designs, which attracted customers with their shimmering colors, were facilitated by the loom of the Lyon-based weaver Joseph Marie

Jacquard, which made the complex series of operations needed to integrate a pattern into the weave simpler. Between 1801 and 1811 more than 10,000 looms were introduced, becoming widespread in the 1860s. In the nineteenth century, industrialists concentrated on the manufacture of substitute products by using mechanization,²³ and the new looms perfectly imitated the patterns of Indian cashmere shawls. The sewing machine had a direct impact on mechanization in factories, in the manufacture of garments in the home, and on the spread of subcontracted work.²⁴ Building on the developments of Barthélemy Thimonnier, Walter Hunt, Elias Howe, and Isaac Singer, Nathan Wheeler and Allen B. Wilson succeeded in marketing an efficient machine with interchangeable parts, operated by the worker's foot and hand. It allowed increased specialization and reduced the need for skilled labor. By the 1870s, steam sewing machines were making the entire wardrobe. In practice, the time needed to make a coat was reduced from six to three days.²⁵ To increase the efficiency of the production line, standard sizes were introduced. During the American Civil War, the sewing machine and the concept of the ready-made garment fulfilled the enormous demand for uniforms for the Union Army (1.5 million per year);²⁶ subsequently, manufacturers standardized civilian clothing based on army statistics, while drawing on anthropometric research and the development of international units of measurement. The speed of the machine and the standardized measurements made garments available and affordable.²⁷

The automation of textile manufacturing made it possible to speed up the production of fabrics and sell more of them at lower prices. Mechanization seemed to be a real economic incentive. The second Industrial Revolution impacted numerous industrial sectors, and the fashion industry's production chain was inspired by some of them to transfer, adapt and/or adopt new techniques. The invention of the mackintosh, the zipper and the training shoe, for instance, are very revealing of these inter-sector technical exchanges. The clothing industrialist Charles Macintosh (1766–1843) was inspired by the chemical industry to make the first Mackintosh from cotton and Indian rubber. His waterproofing process, developed in 1824, was revolutionary.²⁸ The zipper was inspired by metallurgy. A Swedish electrical engineer, Gideon Sundback, after much experimentation, invented the modern metal zip and the machinery for its mass production in 1913. The Hookless Fastener Company then marketed the clever, practical, and reliable devices.²⁹ However, the product most representative of the alliance of innovative industries was the trainer. To manufacture this sports shoe, small pieces of material had to be assembled to fit the three-dimensional shape of the foot, which made the manufacturing process more complex. A sewing machine was needed to replace the experienced and skilled hands that folded, shaped, sewed the pieces together, and combined them with the sole. Jan Matzeliger solved the problem with a machine that attached the sole to the fabric in just one minute. Patented in 1883, it could produce hundreds of pairs a day.³⁰ The model thus produced became very popular for the flexibility and comfort offered by the vulcanized rubber used in its production,³¹ and the rubber industry, including the British company Dunlop, immediately took over the manufacture and marketing of trainers. The production chain was thus transformed in part by innovations, but the race for performance came at a very high human cost.

Until the end of Civil War in 1865, slavery was the most significant policy in the southern states of the United States, as it protected cotton farmers from the dangers of a competitive market. Abolitionists had already won battles, however. Other laws hid this system of exploitation. In Great Britain, for example, the Vagrancy Act (1824) served to tie the tenant farmer to the land. Finally, in 1833, the British House of Commons passed

an act for the gradual abolition of slavery in all British colonies. In the nineteenth century, growing cotton required almost unbearable physical labor. From mid-spring onwards the soil was prepared with hoes and, later, mule ploughs. After planting, the war on weed begins, as the fragile cotton is unable to withstand them. The workers therefore constantly protect the young plants. For four months, weeding was the planters' greatest concern and the most physically demanding work. The harvest season starts in late summer. On a large plantation, one worker could prepare, plant, weed, and harvest about nine hectares of cotton alone.³² These labor requirements are impossible to meet if you are dependent on the market. Indeed, in order to develop consumption, it was necessary to lower prices. Early on, the human being—the slave—was the means to achieve this. However, if captive or precarious labor is part of the puzzle of capitalism, it is not the engine of capitalism alone. Equally important are the economic and political structures and the different actors—agents of commerce as well as consumers—men and women, activists and abolitionists.³³ Following the abolition of slavery in 1865, with the vote of the Thirteenth Amendment, other systems that imposed violence and coercion on large numbers of workers were instituted. The abolition of slavery had to be compensated for by tying workers to the land.³⁴ In exchange for their labor, the landowner provided them with accommodation and food, as well as the right to hunt and fish. By paying in kind rather than with money, the landowner ensured that labor was available at critical times. The crop privilege laws then closed the access of the tenant farm to the capital market, while expanding that of the landowners.³⁵ At the same time, planters opposed public schooling for poor blacks and whites, so that illiteracy and lack of education kept the balance of power heavily in favor of the planter and limited the workers' alternatives. But while these arrangements continued in most of the southern states, a new type of cotton mill developed in the Southwest.³⁶ These mills were highly mechanized and their owners imposed the division of labor. As a result, by the early 1900s, Texas was the largest cotton state in the country and a model of efficiency and productivity. Its success depended on the ability to avoid the labor market and bypass the competition. The use of European and Mexican migrants allowed business owners to pay them less in comparison to market wages. In Texas, productivity was the result not only of technical innovations but also of human dependency, which extended beyond the cotton fields to the cottage industries and sweatshops as workers' daily lives, their homes, and their children's schools, were also tied to the willingness of their employers to ease the conditions of labor of their employers.

In Britain, the clothing industry also has its own specificities.³⁷ The networks of tailors and seamstresses were gradually transformed into garment factories, but home work and subcontracting did not immediately disappear. In 1843, Thomas Hood's "The Song of the Shirt" in *Punch* drew attention to the situation of the workers. The poem depicts the miserable life of Mrs. Biddell, a widow and seamstress. In her home, she sewed clothes—trousers and shirts—from fabrics supplied by her boss but for which she had to pay a £2 deposit. To feed her children, she accumulates debt by pawning the clothes she makes. The story is very revealing of the misery of homeworkers in England.³⁸ The introduction of the sewing machine also encouraged piecework production.³⁹ The concentration and division of labor also served the efficiency of the production chain. In the mid-1890s, there were 80,000 seamstresses in Paris, a city of 2.7 million inhabitants.⁴⁰ In New York, more than 18,000 workers were employed in the manufacture of blouses in 1900. In the United States, the working conditions were similar to those of English women.⁴¹ The rapid shift from made-to-measure to ready-to-wear during

industrialization was stimulated by a sharp increase in foreign labor in the manufacturing centers. Small scattered workshops and large factories welcomed European migrants of Italian, Polish, or of Jewish descent; men, women, and children seeking work.⁴² Sweatshops are often seen as a particularly demeaning way of organizing work, morally and politically distinct from other legal forms of low-paid work that seem acceptable in comparison.⁴³ These types of workshop, which already existed in other sectors, were the basis for the manufacture of consumer goods, such as clothing or jewelry. They are defined not necessarily by the size of the workshops, which can be variable, but by the type of work involved, such as sewing, polishing stones for jewelry, or dyeing leather. When an employee produces more value for the company than the company pays him, he is exploited.⁴⁴ Exploitation refers to an unjust social relationship based on an asymmetry of power or an unequal exchange of value between workers, considered to be inferior, and their employers, considered to be superior.⁴⁵ The development of the textile industry was based on aggressive pricing strategies from the nineteenth century, which helped to reduce expenses. This pressure on the costs of production worsened the conditions of production. Working conditions deteriorated as manufacturers took advantage of the increase in the number of immigrants, which influenced both the rise of sweatshops and the movement to unionize workers.⁴⁶ To illustrate the rising misery that accompanied sweatshops, the 1911 fire at the Triangle Shirtwaist Factory is particularly damning. Locked up on the eighth, ninth, and tenth floors to prevent theft or absences from work, 146 workers, mainly Italian and Jewish, died of burns, poisoning, or as a result of falling from windows.⁴⁷ The inescapable logic of the low-cost market dictated that costs should be reduced as much as possible, and industrialists cut back on safety and working conditions in order to “balance” the books.

Mechanization made it possible to produce fabrics at a lower cost, allowing a wider customer base. Connections of the textile industry with other sectors, such as the chemical industry, have allowed technical transfers to meet consumer demands, such as comfort and well-being. Nevertheless, production and manufacturing still relied on human labor, which was under increasing pressure. The exploitation of labor allowed industrialists to keep up with increased competition in a globalized economy seeking to drive down prices, regardless of the human cost. This dynamic continued throughout the first part of the twentieth century.

From the Laboratory to the Globe

In the 1930s, the impact of economic crisis and changes in morals altered the industry’s approach to clothing. Beaded dresses were a distant memory. Comfort became a watchword of the twentieth century, while mass consumption became the norm. Manufacturers therefore had to offer new products on a regular basis to satisfy growing demand. They turned to the chemical sector, which profoundly modified the production chain. For a long time, cotton, linen, wool, and silk were the only materials available. New fibers had to fulfill a set of specifications: low cost, strength, flexibility, and ease of care.

Among the first synthetic fibers, nylon is a good example of the use of petrochemicals in clothing. From parachutes to women’s stockings, it seemed to be the answer to every need. The formula was created in 1931 by the American chemist Wallace Carothers of the DuPont company, who named it “66.” Paul Schlack, a German chemist at IG Farben, developed another type of fiber, “nylon 6,” in 1938. Nylon heralded a new

revolution in the textile industry. DuPont started commercial production in 1939, focusing mainly on stockings, which were officially presented at the San Francisco exhibition. Customers were immediately convinced, as the tights combined durability, beauty, and relatively lower cost than silks. The American company was able to meet the needs of its time thanks to the prevailing technical, scientific culture. The “miracle fiber”⁴⁸ dominated until the 1980s, when it was finally replaced by polyester. The science laboratory thus became an essential step in the production and creation of clothing. With more women working outside the home, the spread of public transport, and increased ease of travel, fabric care became an obsession of twentieth-century consumers and manufacturers. The mixture of natural fibers, wool or cotton, with polyester increased resistance to creasing and staining and made washing easier. The development of synthetic fibers even influenced the US Congress in passing a law on textile labeling to indicate to consumers the percentage of natural and synthetic fibers, as they could no longer identify them with the naked eye.⁴⁹ In the second half of the twentieth century, manufacturers continued to invest in advanced techniques to reduce the price of the finished product.

So-called high-tech fabrics are the result of scientific and technical advances. The most recent textiles are borrowed from the fields of chemistry, computer science, aerospace engineering, and the automotive industry. Most synthetic products mimic natural fibers but with the advantages of being stronger, lighter, more transparent, or more elastic. While techno-materials have emerged without replacing traditional manufacturing methods, such as weaving and knitting, experimentation with various finishing techniques for non-woven fabrics has introduced a new aesthetic option. This is the case with Tyvek, a non-woven fabric composed of high-density polyethylene (HDPE) fibers with a thickness between 0.5 and 10 μm , developed by DuPont de Nemours. After extrusion, the fibers are randomly and non-directionally arranged and then consolidated under pressure by a thermal process. Tyvek was marketed in 1967 as nontoxic and recyclable sheets or rolls of various sizes in the United States, Luxembourg, and Malaysia.⁵⁰ Laboratories such as Media, Starlab, Charmed Technology, and International Fashion Machines at the Massachusetts Institute of Technology are now entirely dedicated to this type of research. The aim of these groups is to develop prototypes of marketable, user-friendly, and wearable electronic products and explore synergies between computing, textiles, health, and defense.⁵¹ The modern textile industry is both driven and transformed by social and economic changes, but in some respects it has gained a bad reputation in the process, being accused of exploiting workers, polluting the environment and poisoning workers and consumers because of the toxic, carcinogenic and mutagenic products contained in the clothes.⁵² The technical transformations that have profoundly changed the nature of clothing have also been accompanied by a change in the geographies of production, as the consumer West outsources part of the production chain to Asia.

For consumers in the West, globalization is visible via the abundance of fashions sold by multinational retailers, who can update their stocks, enter into transnational trade agreements, and co-ordinate the worldwide distribution of goods at the click of a mouse. We consume images and logos that reflect an affluent Western civilization, rather than a garment made in developing countries.⁵³ The geography of manufacturing is undergoing a radical shift, with consequences for the production chain.

Companies no longer manufacture their own goods, but source them from low-wage countries with weak or non-existent environmental legislation. Internal competition in

underdeveloped countries allows companies to cut costs and take advantage of exemptions in free ports.⁵⁴ Local manufacturers subcontract much of the sewing, and even cutting, to sweatshops in countries such as Mexico, China, Thailand, Romania, and Vietnam in order to increase their profits. Behind the image and reputation of the big companies there are underground economies that exploit tens of thousands of workers. However, the shift of worker exploitation to underdeveloped countries is not complete. Los Angeles and New York (USA), Leicester and London (UK) and Prato (Italy) are well known for their vast underground economies made up of immigrant communities.⁵⁵ The glamour of the fashion industry thus finds its reverse side in the shadows of the production line, where slavery, child labor, exploitation, and physical, sexual, and moral harassment are rife.⁵⁶ The jobs are not accompanied by even the most basic guarantees and benefits for the workers. This situation has worsened since the end of the Multifiber Arrangement (MFA) in 2005.

Since the 1970s, the MFA limited trade in clothing and textiles at a time when most trade was becoming increasingly liberalized. It set quotas on exports of clothing and textiles from “developing” to “developed” countries, so that the former would not compete with the latter through low wages. As the MFA covered the volume rather than the value of imports, some countries circumvented it by diversifying and improving the quality of their exports.⁵⁷ South Korea, for example, began outsourcing to countries that were not subject to the quotas. But for a country like Bangladesh, which is too poor to diversify its economy and whose workforce remains mainly low-skilled, the MFA had devastating effects. It is estimated to have cost the country millions of jobs and billions of dollars in exports. When the MFA ended, developing countries were 30 years behind their Western competitors, and it was difficult for them to adapt to the dramatic change in the geography of fashion and to participate in the global game. With the lifting of the quotas, however, Southeast Asia became the hotbed of the garment industry. In 2005, the island of Saipan, the largest of the Northern Mariana Islands (Pacific Ocean), a US commonwealth, had 34 garment factories employing mostly Asian workers. In 2013, the factories were all abandoned: the machines were moved to Asia, to countries with cheaper labor. Only the clothing labels that run through the dilapidated buildings still bear witness to this vanished industry. The young women workers in Saipan who could not afford to return home have turned to work in the sex trade.⁵⁸ Discussions on the consequences of the MFA agreements are still ongoing. MEP Saskia Bricmont is currently investigating the possibility of selecting the products imported into Europe, including a ban on dangerous and particularly toxic products. Products resulting from slavery are already prohibited in some countries. However, proposals to regulate free trade are strongly opposed.⁵⁹

After the end of the MFA, textiles and clothing fell under the jurisdiction of the World Trade Organization (WTO). The predictable trade war between China and the EU resulted in millions of products being seized and held in EU harbor warehouses in the summer of 2005. New tariffs were then negotiated and imposed on China. But the economic crisis of 2008 had a serious impact on garment production. Imports to the United States fell by 15.7 percent in 2009 and all the world’s major clothing suppliers reported a decline. A third of China’s 30 million textile and garment workers, 1 million Indian workers, and 20 percent of the Cambodian garment workforce lost their jobs.⁶⁰ According to World Bank economists, who point to improved working conditions and higher wages, China is nevertheless “the big winner” in the global garment export race over the last 15 years.⁶¹ The country has diversified by producing higher-value-added

items. It provides a guarantee of quality and benefits from a growing domestic market, a very industry-friendly government, established supply chains and a truly huge labor pool. This trade liberalization has changed production processes, some of which have become, at various levels, markers of integration with capitalism.⁶²

Nevertheless, the second half of the twentieth century has revealed the perils of fashion industry production methods. The technology releases numerous chemicals into the environment and into human bodies, and the ever-changing trends are a marketing device that show a homogenization of design around the world and environmental and human costs seem to be the indicators of a production mode that has run out of steam. Every step of the chain needs to be revised.⁶³

New Challenges: Freedom and Environmental, Social, and Economic Sustainability

The excessive influence of technology in the clothing industry is regularly criticized for facilitating high-replicability, homogenizing appearances, and using too many chemicals. In the Japanese clothing industry, for example, some producers try to keep a balance between new technologies and traditional crafts such as pleating, shibori, and resistance dyeing. The strength of the Japanese textile industry lies precisely in the combination of new technologies with traditional crafts such as pleating, shibori, and resist dyeing.⁶⁴ Rei Kawakubo, Issey Miyake, and Yohji Yamamoto were the leaders of this trend, which brought together the creative textile industry and the fashion sector. They called for a more balanced perspective between tradition and modernity. But, above all, they blamed an economic and social system based on the race for technical innovations.

The production chain must respect fundamental human rights. This issue is also a geopolitical one. Companies are aware that rights are less respected in some, particularly underdeveloped, countries, and yet choose to locate production in those countries. A map of clothing manufacturing locations would include dictatorships such as Myanmar and China. A Chinese minority, the Uyghurs, who are Muslims, are victims of a policy of confinement, harassment, and oppression by the Chinese government. Numbering more than 12 million, the Uyghurs are particularly present in the autonomous province of Xinjiang (northwest China). On 19 September 2004, the “Government-in-Exile of East Turkestan [another name for Xinjiang]” was founded in Washington, D.C., with a parliamentary system of government and Anwar Yusuf Turani as prime minister. A constitution has been proclaimed and translated into Turkish, English, Chinese, and Japanese. The Chinese Communist Party is therefore suspicious of this minority and its activism and protests, and has placed the Uyghurs under permanent surveillance. The province is cordoned off and surrounded by checkpoints and watchtowers, and people are searched in shops, buses, and schools.⁶⁵ Around 1,200 camps internment camps and 1 million prisoners are currently open in Xinjiang province, explained by the Chinese government as re-education camps where patriotism is instilled into the occupants.⁶⁶ However, it is alleged that occupants are also tortured, sterilized, raped, and drugged.⁶⁷ Picked up during raids, without clear reason or trial, Uyghurs are interned and families remain without news of them. In particular, *Le Figaro* quotes the recent reports of German researcher Adrian Zenz, based on Chinese administrative documents and interviews with local women. “In the two major prefectures of the region where the Uyghurs are in the majority, the number of births has thus drastically dropped since 2016.”⁶⁸ There is a great deal of reportage on the subject, which will be the topic of a

separate publication. It can be noted, however, that the Institut National de l'Audiovisuel (INA) archives feature documents on the sterilization of Uighur people that date back to 1999.⁶⁹

What does this have to do with the garment industry? China uses Uyghurs as cheap labor to work in the cotton fields and textile factories. The opportunity is too good: a workforce that cannot fight back. On March 1, 2020, the Australian Strategic Policy Institute published a detailed report denouncing the forced labor of tens of thousands of Uyghurs in the service of major international brands such as Zara, Uniqlo, Nike, Adidas, and Gap. Between 2017 and 2019, more than 80,000 detainees in the Xinjiang region were transferred to factories “belonging to the supply chains of world-renowned technology, textile and automotive brands.”⁷⁰ Eighty-three brands were involved,⁷¹ most of which denied any knowledge of the subcontractors concerned when questioned and consider that they are not responsible for subcontracting. However, they had already promised to examine their production chain more closely and to improve on transparency after the Rana Plaza disaster. On April 24, 2013, the collapse of the Rana Plaza, a building located in Dhaka, Bangladesh, caused at least 1,130 deaths for about 2,500 survivors among the seamstresses who worked there for major Western brands.

The textile and clothing industry's lack of interest in environmental and social issues is regularly reported in the media. Concern for sustainability is growing in the textile and clothing sector, as suggested by the 1987 Brundtland Report: “Sustainable development is the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”⁷² Consequently, definitions differ according to the contexts, geography, and industry sectors involved. However, one can be certain that the preferred approach is holistic. There are three pillars to consider: environment, society, and economy. “Sustainability” is now integrated into the business operations of companies. It is a way of buying a green conscience in the face of increasing criticism.⁷³ Corporate social responsibility (CSR) has been defined as “the responsibility of companies for their impact on society.” The origins of CSR date back to the nineteenth century, when employers were called upon by the press and the public to improve the living conditions of workers. Since then, CSR has become a marketing and reputation tool.⁷⁴

In the age of industrialization, it is impossible to manufacture a product without environmental constraints.⁷⁵ However, these can be kept to a minimum. A sustainable textile product is one that is manufactured taking into account the three pillars throughout its life cycle. From birth to grave, products have an impact on the environment, society, and the economy. Each product starts its life cycle with the extraction of raw materials and goes through manufacturing, distribution, and use, before the cycle ends at the stage of disposal through incineration or landfill.⁷⁶

Environmental sustainability is about reducing the consumption of all resources, such as raw materials, energy, and water. It also includes the use of renewable resources. However, pesticides, dyestuffs, and a lack of worker protection are implicated in the poisoning of workers, possibly leading to drastically compromised health: infertility problems, cancers, and autism are on the rise in producing countries.⁷⁷ In fact, rather than shifting from the West to the East, we can see health disasters spreading throughout the world; industrialized countries are not left behind in this respect. From the retailer who became sterile after coming into contact with chromium contamination in clothing to the workers poisoned by phosphine in port warehouses to the consumer burned after being contaminated by DFMU, an anti-mold chemical placed in shoeboxes in the form of

a small white sachet, the list of victims of the textile industry continues to grow.⁷⁸ The main concerns when it comes to environmental sustainability are raw materials, energy consumption, water consumption, wastewater discharge or water pollution, soil or land pollution, air emissions, greenhouse gas (GHG) emissions or carbon footprint, hazardous waste management and toxic and hazardous chemical management,⁷⁹ and these should be considered at every stage throughout the life cycle of a product.

Finally, the human cost of most textile and clothing industries in the world is largely underestimated or hidden. Social sustainability therefore also needs to be a priority. First, technical progress and mechanization have not always served to improve the lives of workers. Although recent voices have called for a “reshoring,” for example in the case of sports shoes or in the Chinese clothing industry, where large companies produce for Western customers,⁸⁰ clothing companies have in general relocated production facilities to the poorest countries, where workers receive less than a living wage and are at constant risk of industrial disasters.⁸¹ Southeast Asia and, more recently, sub-Saharan Africa have become notorious as places where modern slavery continues, fuelling the garment economy and consumer desire. In 2018, the monthly wage for textile workers was 23 euros in Ethiopia and 85 euros in Bangladesh and Myanmar. Turkey, China, and Thailand, places with higher monthly wages—respectively, 304, 291, and 276 euros—have become less attractive to investors.⁸² Although the production chain has been based on the lowering of the cost of clothing for two centuries, the decline is not linear. The New Deal (1933–1939), a policy US President Franklin Roosevelt implemented to combat the effects of the Great Depression in the United States, notably through state aid programs, and the major social reforms of the Front Populaire-led government (1936–1938) in France show notable wage gains and a strong welfare state—even if the gains are incomplete. Social sustainability is therefore a very broad field. People’s well-being and basic needs are at the center of the issue, and may be manifested through labor practices, gender bias, harassment, equal opportunities, education, child labor, health and safety, protection, human rights, and welfare. Positive sustainability practices are being implemented at company level in all industry sectors and most companies now have a corporate social responsibility division.

The primary purpose of companies is to make a profit. However, economic sustainability cannot be reduced to profit alone. It is linked to environmental and social sustainability. The manufacture of products must be seen in the long term, questioning cost savings, productivity, cost of living, development, and smart growth.⁸³ The economy should not be based on profit at all costs. For a long time, researchers have been working on alternative models. The Doughnut model, developed by the economist Kate Raworth for the NGO Oxfam, integrates two essential concepts: that of planetary limits crossed with that of social borders.⁸⁴ For David Harvey, the essence of capitalism is its amorality and lawlessness, and to speak of a regulated ethical capitalism is to commit a fundamental error.⁸⁵

Conclusion

The development of the textile industry since the nineteenth century has made it possible to offer clothes that are more comfortable, suitable for different types of activity, and less expensive for the consumer. Technology has changed the way we design fabrics and now manufacturers must anticipate consumer desires. The well-rehearsed discourse of corporate communication units and the difficulties of traceability in the manufacturing

chain hide the dangers incurred by workers and consumers, however. The supply chain has become globalized, giving the impression that the tide is turning from industrialized to less developed countries. This image is false. Chemical advances, technical innovations, and mechanization regularly clash with social welfare. Behind innovations, progress, and industrial organizations, it is the performance of corporate conglomerates that drives the location of work and the choice of components; in short, the ever-increasing consumption of fabrics has just created the illusion of the democratization of this sector. The search for the lowest price, which has motivated technical research since the nineteenth century, has been to the detriment of the worker and, ultimately, the consumer. Finally, by relying on countries that are least developed, both industrially and in terms of social protection, companies circumvent human rights by introducing modern slavery in plain sight in order to feed hyper-consumption.⁸⁶ The fashion supply chain is a risk to health and a social hazard at every stage. It is estimated that only 1 percent of the world's clothing is produced responsibly.⁸⁷ While Mexican sweatshops and poisoned workers in Southeast Asian dye houses may seem far away, they are in fact the foundations of a fashion system that exploits all workers and consumers around the globe. The belief in a continuous and linear progress should be questioned. Indeed, the capitalist system of predation of resources, human and environmental, now shows its limits. However, the concept of degrowth is often poorly perceived, as the current economic model has been based on the production and consumption of objects for more than 150 years. The triumph of numbers symbolizes the triumph of growth. Among new industrial innovations to be considered, the decrease of production and the tempering of consumption now seem to be the most important.

Notes

- 1 James Watson, *Textiles and the environment in Economist Intelligence Unit*, Special Report No. 2150 (London: Business International, 1991), 1–7.
- 2 Audrey Millet, *Le livre noir de la mode. Création, production, manipulation* (Paris: Les Pérégrines, 2021), 8–10.
- 3 Pietra Rivoli, *The Travels of a T-Shirt in the Global Economy* (Hoboken: John Wiley & Sons, 2005).
- 4 Millet, *Le livre noir de la mode*, 87–136.
- 5 Jacq Wright, “The REAL price of your throwaway fast fashion,” *Daily Mail*, February 26, 2022. Accessed January 29, 2023. <https://www.dailymail.co.uk/news/article-10442745/Britain-responsibility-Chiles-vast-fast-fashion-mountains.html>.
- 6 Giorgio Riello and Tirthankar Roy (eds), *How India Clothed the World. The World of South Asian Textiles, 1500–1850* (Leiden: Brill, 2019), 1–27.
- 7 Giorgio Riello, *Cotton: The Fabric that made the Modern World* (Cambridge: Cambridge University Press, 2013), 1–13.
- 8 Gilles Lipovetsky, *Le Bonheur paradoxal: essai sur la société d'hyperconsommation* (Paris: Gallimard, 2006), 14–27.
- 9 David Birnbaum, *Birnbaum's Global Guide to Winning the Great Garment War* (Hong Kong: Third Horizon Press, 2005), 25–46, 65–89; Nicolas Anguelov, *The Dirty Side of the Garment Industry: Fast Fashion and Its Negative Impact on Environment and Society* (New York: CRC Press, 2015), ix–xii.
- 10 Guillermo C. Jimenez and Barbara Kolsun, *Fashion Law: A Guide for Designers, Fashion Executives and Attorneys* (New York: Bloomsbury, 2014), 2–24. Millet, *Le livre noir de la mode*, 15–50.
- 11 Daniel Roche, *La culture des apparences. Une histoire du vêtement (XVIIe–XVIIIe siècles)* (Paris: Fayard, 1990).
- 12 Riello, *Cotton*.

- 13 Liliane Hilaire-Pérez, *La pièce et le geste: artisans, marchands et savoir technique à Londres au XVIIIe siècle* (Paris: Albin Michel, 2013).
- 14 Lucien Febvre, "Réflexions sur l'histoire des techniques," *Annales d'histoire économique et sociale* 36 (1935): 531–5.
- 15 Audrey Millet and Sébastien Pautet, *Sciences et techniques, 1500–1789* (Paris: Atlande, 2006), 6–9.
- 16 David Harvey, *The Enigma of Capital and the Crises of Capitalism* (Oxford: Oxford University Press, 2010); Howard Bowen, *Social Responsibilities of the Businessman* (Iowa City: University of Iowa Press, 1953).
- 17 Mohamed Haïssoune, "GATT-AMF: Les accords multifibres, des origines au démantèlement," *L'Économiste*, May 12, 1994.
- 18 Alessandro Stanziani, *Les métamorphoses du travail contraint. Une histoire globale (XVIIIe–XIXe siècles)* (Paris: Presses de Sciences Po, 2020).
- 19 Thorstein Veblen, *The Theory of the Leisure Class – An Economic Study of Institutions* (New York: Macmillan, 1899). Accessed January 29, 2023. <http://moglen.law.columbia.edu/LCS/theoryleisureclass.pdf>; Walter Benjamin, *La capitalisme comme religion* (Paris: Payot, (1921) 2019).
- 20 Carlo M. Cipolla and Derek Birdsall, *The Technology of Man: A Visual History* (London: Wildwood House, 1979).
- 21 Millet, *Le livre noir de la mode*.
- 22 Friedrich Engels, *The Condition of the Working-Class in England In 1844* (New York: CosimoClassics, 2008), 1, 7.
- 23 Maxine Berg, "From Imitation to Invention: Creating Commodities in Eighteenth-Century Britain," *The Economic History Review* 55, no. 1 (2002): 1–30. Accessed January 29, 2023. <http://www.jstor.org/stable/3091813>.
- 24 Michel Cordillot (dir.), *La révolution de la machine à coudre. Les Cahiers d'Adiamos* 89, no. 16 (2018).
- 25 Frank P. Godfrey, *An International History of the Sewing Machine* (London: Robert Hale, 1982), 7–12.
- 26 Claudia B. Kidwell and Margaret C. Christman, *Suiting Everyone: The Democratization of Clothing in America* (Washington, D.C.: The Smithsonian Institution Press, 1974).
- 27 Audrey Millet, "Le corps de la mode. Histoire sociale de la mesure de l'Homme (Europe, 16^e–19^e siècle)," *dObras*] – revista da Associação Brasileira de Estudos de Pesquisas em Moda 30 (2020): 218. <https://dialnet.unirioja.es/servlet/articulo?codigo=8107460>
- 28 Paul Keers, *A Gentleman's Wardrobe* (London: Weidenfeld and Nicolson, 1987), 14–15.
- 29 Robert Friedel, *Zipper: An Exploration in Novelty* (New York: W. W. Norton, 1994), 9.
- 30 Edward Tenner, "Lasting Impressions: An Ancient Craft's Surprising Legacy in Harvard's Museums and Laboratories," *Harvard Magazine* 103, no. 1 (2000): 37.
- 31 Dale Coye, "The Sneakers/Tennis Shoes Boundary," *American Speech* 61 (1986): 366–9; Tom Vanderbilt, *The Sneaker Book: Anatomy of an Industry and an Icon* (New York: The New Press, 1998), 5–17.
- 32 Carl H. Moneyhon, "The Impact of the Civil War in Arkansas: The Mississippi River Plantation Counties," *Arkansas Historical Quarterly*, vol. 51, no. 2 (1992): 105–18.
- 33 Trevor Burnard and Giorgio Riello, "Slavery and the new history of capitalism," *Journal of Global History* 15, no. 2 (2020): 228–31. doi: 10.1017/S1740022820000029.
- 34 Stanziani, *Les métamorphoses du travail contraint*, 5–16.
- 35 Guy S. Callender, "The early transportation and banking enterprises of the States in relation to the growth of corporations," *The Quarterly Journal of Economics* 17, no. 1 (1902): 118.
- 36 Rivoli, *The Travels of a T-Shirt*, 1–73.
- 37 Andrew Godley, *Jewish Immigrant Entrepreneurship in New York and London 1880–1914. Enterprise and Culture* (New York: Palgrave Macmillan, 2001).
- 38 *Punch*, 16 December 1843.
- 39 Barbara Burman (ed.), *The Culture of Sewing: Gender, Consumption and Home Dressmaking* (Oxford and New York: Berg, 1999), 1–18.
- 40 Charles Benoist, *Les ouvrières de l'aiguille à Paris: notes pour l'étude de la question sociale* (Paris: L. Chailley, 1895).
- 41 Giorgio Riello, "Les consommateurs britanniques et la qualité des produits à la fin du XIX^e siècle," *Revue d'histoire moderne & contemporaine* 3, no. 67 (2020): 59–89.

- 42 Nancy L. Green, *Du Sentier à la 7^e Avenue. La confection et les immigrés, Paris–New York (1880–1980)*. Translated by Pap Ndiaye (Paris: Le Seuil, 1998), 7–16. Nancy L. Green, “La confection et les immigrés à Paris,” *Hommes & migrations* 1013 (2015): 7–12. Accessed January 29, 2023. doi: 10.4000/hommesmigrations.3140.
- 43 Tansy E. Hoskins, *Stitched Up: The Anti-capitalist Book of Fashion* (Winnipeg, Manitoba: Fernwood Publishing, 2014), 70–2.
- 44 Green, *Du sentier à la 7^e avenue*, 189–222.
- 45 Keith Dowding, “Exploitation,” *Encyclopedia of Power*. SAGE Publications (2011): 232–5.
- 46 Ellen Israel Rosen, *Making Sweatshop. The Globalization of the U.S. Apparel Industry* (Berkeley: University of California Press, 2002), 13–26; Jill Esbenshade, *Monitoring Sweatshops. Workers, Consumers, and the Global Apparel Industry* (Philadelphia, PA: Temple University Press, 2004), 1–12. Daniel E. Bender and Richard A. Greenwald (eds), *Sweatshop USA: the American sweatshop in historical and global perspective* (New York and Abingdon: Routledge, 2003).
- 47 Liesbeth Sluiter, *Clean Clothes: A Global Movement to End Sweatshops* (New York: Pluto Press, 2009), 1–5.
- 48 Sara J. Kadolph, *Textiles* (Boston, MA: Pearson, 2002), 168–77.
- 49 Martin Bide, Billie J. Collier, and Phyllis G. Tortora, *Understanding Textile* (New York: Macmillan, 2000), 5–13.
- 50 Product Handbook for DuPont™ Tyvek, 2002, 1. Accessed January 29, 2023. <https://www.dupontdenemours.fr/products/tyvek-housewrap.html>.
- 51 Sarah E. Braddock and Mary O’Mahony, *Sportstech: Revolutionary Fabrics, Fashion and Design* (London: Thames and Hudson, 2002), 39–84.
- 52 Audrey Millet, *How toxic are the textiles we consume? And how can the EU trade tools tackle it?* Report for Bricmont, Saskia, Green member of the European Parliament, January 2023.
- 53 Naomi Klein, *No Logo. La tyrannie des marques*. Actes Sud, 2001.
- 54 Green, *Du Sentier à la 7^e avenue*, 59–60.
- 55 Euronews. “Exploitation and sweatshops are at the core of fast fashion: It’s time to dismantle the system.” 2020. Accessed January 29, 2023. <https://www.euronews.com/living/2020/07/10/exploitation-and-sweatshops-are-at-the-core-of-fast-fashion-it-s-time-to-dismantle-the-sys>; Cynthia Martens, “Made in Italy: The Prato Challenge,” *Women’s Wear Daily*, September 14, 2014, SII20.
- 56 Millet, *Le livre noir de la mode*, 137–78. Robert J.S. Ross, *Slaves to fashion: poverty and abuse in the new sweatshops* (Ann Arbor: University of Michigan Press, 2004), 1–9.
- 57 Kala Marathe Krishna and Ling Hui Tan, *Rags and Riches: Implementing Apparel Quotas under the Multi-Fibre Arrangement* (Ann Arbor: University of Michigan Press, 1998).
- 58 Hoskins, *Stitched Up*, 79–80.
- 59 Terms of reference for a study – Towards a mirror clause in the textile sector to tackle dangerous chemicals?
- 60 WTO, *International Trade Statistics 2009* (Geneva: World Trade Organization, 2009).
- 61 Gary Gereffi and Stacey Frederick, *The Global Apparel Value Chain, Trade and the Crisis: Challenges and Opportunities for Developing Countries*. The World Bank, Policy Research Working Paper Series (2010), 24.
- 62 Olivier Cattaneo, Gary Gereffi, and Cornelia Staritz (eds), *Global Value Chains in a Post-Crisis World. A Development Perspective* (Washington: World Bank, 2010), 1–19, 157; Lisa Rofel and Sylvia J. Yanagisako, *Fabricating Transnational Capitalism. A Collaborative Ethnography of Italian-Chinese Global Fashion* (Durham, NC: Duke University Press, 2019), 2–33.
- 63 Audrey Millet, “Capitalism of Bodies: The Colonisation of Digital Beauty,” *Dimensioni e problemi della ricerca storica* 1 (2022): 27–42.
- 64 Yoshiko I. Wada, Mary K. Rice, and Jane Barton. *Shibori: The Inventive Art of Japanese Shaped Resist Dyeing* (Tokyo: Kodansha International, 1983).
- 65 Gardner Bovingdon, *The Uyghurs: strangers in their own land* (New York: Columbia University Press, 2010).
- 66 “Chine. Les familles d’un million de personnes détenues dans le cadre d’une campagne massive de « rééducation » demandent des réponses,” *Amnesty International*, 24 septembre 2018. “China finally admits it is building a new archipelago of concentration camps. Will the world respond?,” *The Washington Post*, October 11, 2018.

- 67 Peter Stubley, “Muslim women ‘sterilised’ in China detention camps, say former detainees,” independent.co.uk, August 12 2019.
- 68 AFP, “La Chine accusée de stériliser de force des Ouïghours,” *Le Figaro*, June 29, 2020. <https://www.lefigaro.fr/international/washington-appelle-pekin-a-cesser-immEDIATEMENT-de-steriliser-de-force-les-ouighours-20200629>.
- 69 Agence Reuters, “La Chine détiendrait un million d’Ouïghours dans des camps d’internement,” Mediapart/Reuters, August 10, 2018. <https://www.mediapart.fr/journal/international/100818/la-chine-detiendrait-un-million-douighours-dans-des-camps-dinternement?onglet=full>.
- 70 Vicky Xiuzhong Xu *et al.*, “Uyghurs for sale. ‘Re-education’, forced labour and surveillance beyond Xinjiang,” Australian Strategic Policy Institute, March 2020. <https://www.aspi.org.au/report/uyghurs-sale>.
- 71 The 83 brands are: Abercrombie & Fitch, Acer, Adidas, Alstom, Amazon, Apple, Asus, BAIC Motor, BMW, Bombardier, Bosch, BYD, Calvin Klein, Candy, Carter’s, Cerruti 1881, Changan Automobile, Cisco, CRRC, Dell, Electrolux, Fila, Founder Group, GAC Group, Gap, Geely Auto, General Motors, Google, GoerTek, H&M, Haier, Hart Schaffner Marx, Hisense, Hitachi, HP, HTC, Huawei, iFlytek, Jack & Jones, Jaguar, Japan Display Inc., L.L.Bean, Lacoste, Land Rover, Lenovo, LG, Li-Ning, Mayor, Meizu, Mercedes-Benz, MG, Microsoft, Mitsubishi, Mitsumi, Nike, Nintendo, Nokia, Oculus, Oppo, Panasonic, Polo Ralph Lauren, Puma, Roewe, SAIC Motor, Samsung, SGMW, Sharp, Siemens, Skechers, Sony, TDK, Tommy Hilfiger, Toshiba, Tsinghua Tongfang, Uniqlo, Victoria’s Secret, Vivo, Volkswagen, Xiaomi, Zara, Zegna, and ZTE.
- 72 World Commission on Environment and Development, *Our Common Future* (Oxford: Oxford University Press, 1987), 27.
- 73 Jeremy Moon, *Corporate Social Responsibility: Very Short Introduction* (Oxford: Oxford University Press, 2014). <https://doi.org/10.1093/actrade/9780199671816.001.0001>.
- 74 Carl Rhodes, *Woke Capitalism. How Corporate Morality is Sabotaging Democracy* (Bristol University Press, 2021), 44; Bowen, *Social Responsibilities of the Businessman*; William J. Ghent, *Our Benevolent Feudalism* (New York: Macmillan, 1902); Audrey Millet, *Woke Washing. Capitalisme, consumérisme, opportunisme* (Paris: Les Pégrines, March 2023).
- 75 François Jarrige and Thomas Le Roux, *La Contamination du monde. Une histoire des pollutions à l’âge industriel* (Paris: Seuil, 2017).
- 76 Subramanian S. Muthu, *Textiles and Clothing Sustainability: Sustainable Fashion and Consumption* (Singapore: Springer Verlag, 2016).
- 77 James B. Adams, *et al.* “Toxicological Status of Children with Autism vs. Neurotypical Children and the Association with Autism Severity,” *Biological Trace Element Research* 51 (2012): 171–80. Shikha Nanda, *et al.*, “Malwa region, the focal point of cancer cases in Punjab: A review study,” *International Journal of Current Research in Multidisciplinary* 1, no. 3 (2016): 44.
- 78 Greenpeace, *Dirty Laundry 2. Hung Out to Dry. Unravelling the toxic trail from pipes to products*, August 2011. <https://www.greenpeace.org/static/planet4-international-stateless/2018/01/f84f320c-dirty-laundry-report-2.pdf>; Millet, *Le livre noir de la mode*, 64; Comité de coordination de toxico-vigilance, “Risques liés à la présence de diméthylfumarate,” bilan consolidé au 10 janvier 2009.
- 79 Subramanian S. Muthu, *Assessing the Environmental Impact of Textiles and the Clothing Supply Chain* (New York: Woodhead Publishing, 2020), 1–32.
- 80 Gilles Guiheux, “La sous-traitance en Chine contemporaine: des chaînes de valeurs globales aux réseaux d’entreprises familiales. Subordination et collaboration,” *Pratiques du travail au forfait. Métiers, techniques et sous-traitance dans une perspective euro-asiatique, XVIIIe–XXIe siècle. Revue de Synthèse* 40 (2019): 239–57.
- 81 Hoskins, *Stitched Up*, 170–2.
- 82 <https://fr.statista.com/infographie/18006/salaires-ouvriers-industrie-textile-dans-le-monde/>
- 83 Muthu, *Assessing the Environmental Impact*, 3–8.
- 84 Kate Raworth, *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist* (London: Random House Business Books, 2017). Kate Raworth, *A safe and just space for humanity: Can we live within the doughnut?* (Oxfam Discussion Papers, 2012), https://www-cdn.oxfam.org/s3fs-public/file_attachments/dp-a-safe-and-just-space-for-humanity-130212-en_5.pdf.
- 85 Harvey, *The Enigma of Capital*.

- 86 Gilles Lipovetsky, *Plaire et toucher. Essai sur la société de séduction* (Paris: Gallimard, 2017).
- 87 Shanthy Radhakrishnan, “Sustainable Consumption and Production Patterns in Fashion,” in *The UN Sustainable Development Goals for the Textile and Fashion Industry*, Edited by Miguel Angel Gardetti and Subramanian Senthilkannan Muthu (Singapore: Springer, 2020), 75.

Bibliography

- Adams, James B. *et al.* “Toxicological Status of Children with Autism vs. Neurotypical Children and the Association with Autism Severity.” *Biological Trace Element Research* 51 (2012): 171–180.
- AFP. “La Chine accusée de stériliser de force des Ouïghours.” *Le Figaro*, June 29, 2020. <https://www.lefigaro.fr/international/washington-appelle-pekkin-a-cesser-immEDIATEMENT-de-steriliser-de-force-les-ouighours-20200629>.
- Agence Reuters, “La Chine détiendrait un million d’Ouïghours dans des camps d’internement.” *Mediapart/Reuters*, August 10, 2018. <https://www.mediapart.fr/journal/international/100818/la-chine-detiendrait-un-million-douighours-dans-des-camps-dinternement?onglet=full>.
- Anguelov, Nicolas. *The Dirty Side of the Garment Industry: Fast Fashion and Its Negative Impact on Environment and Society*. New York: CRC Press, 2015.
- Bender, Daniel E., and Greenwald, Richard A. (eds). *Sweatshop USA: the American Sweatshop in Historical and Global Perspective*. New York and Abingdon: Routledge, 2003.
- Benjamin, Walter. *Le capitalisme comme religion*. Paris: Payot, (1921) 2019.
- Benoist, Charles. *Les ouvrières de l’aiguille à Paris: notes pour l’étude de la question sociale*. Paris: L. Chaillay, 1895.
- Berg, Maxine. “From Imitation to Invention: Creating Commodities in Eighteenth-Century Britain,” *The Economic History Review* 55, no. 1 (2002): 1–30. <http://www.jstor.org/stable/3091813>.
- Bide, Martin, Collier, Billie J., and Phyllis G. Tortora. *Understanding Textile*. New York: Macmillan, 2000.
- Birnbaum, David. *Birnbaum’s Global Guide to Winning the Great Garment War*. Hong Kong: Third Horizon Press, 2005.
- Bovingdon, Gardner. *The Uygurs: strangers in their own land*. New York: Columbia University Press, 2010.
- Bowen, Howard. *Social Responsibilities of the Businessman*. Iowa City: University of Iowa Press, 1953.
- Braddock, Sarah E., and O’Mahony, Mary. *Sportstech: Revolutionary Fabrics, Fashion and Design*. London: Thames and Hudson, 2002.
- Burman, Barbara, ed. *The Culture of Sewing: Gender, Consumption and Home Dressmaking*. Oxford and New York: Berg, 1999.
- Burnard, Trevor, and Riello, Giorgio. “Slavery and the New History of Capitalism.” *Journal of Global History* 15, no. 2 (2020): 225–244. DOI:10.1017/S1740022820000029.
- Callender, Guy S. “The Early Transportation and Banking Enterprises of the States in Relation to the Growth of Corporations.” *The Quarterly Journal of Economics* 17, no. 1 (1902): 118.
- Cattaneo, Olivier, Gereffi, Gary, and Staritz, Cornelia, ed. *Global Value Chains in a Post-Crisis World. A Development Perspective*. Washington: World Bank, 2010.
- Cipolla, Carlo M., and Birdsall, Derek. *The Technology of Man: A Visual History*. London: Wildwood House, 1979.
- Comité de coordination de toxico-vigilance, “Risques liés à la présence de diméthylfumarate”, bilan consolidé au 10 janvier 2009.
- Cordillot, Michel, dir. *La révolution de la machine à coudre. Les Cahiers d’Adiamos* 89, no. 16 (2018): 359–362.
- Coye, Dale. “The Sneakers/Tennis Shoes Boundary.” *American Speech* 61 (1986): 366–369.

- Dowding, Keith. "Exploitation." *Encyclopedia of Power*. SAGE Publications (2011): 232–235.
- Engels, Friedrich. *The Condition of the Working-Class in England In 1844*. New York: CosimoClassics, 2008.
- Esbenshade, Jill. *Monitoring Sweatshops. Workers, Consumers, and the Global Apparel Industry*. Philadelphia, PA: Temple University Press, 2004.
- Euronews. "Exploitation and sweatshops are at the core of fast fashion: It's time to dismantle the system." 2020. <https://www.euronews.com/living/2020/07/10/exploitation-and-sweatshops-are-at-the-core-of-fast-fashion-it-s-time-to-dismantle-the-sys>.
- Febvre, Lucien. "Réflexions sur l'histoire des techniques." *Annales d'histoire économique et sociale* 36 (1935): 531–535.
- Friedel, Robert. *Zipper: An Exploration in Novelty*. New York: W. W. Norton, 1994.
- Gereffi, Gary, and Frederick, Stacey. *The Global Apparel Value Chain, Trade and the Crisis: Challenges and Opportunities for Developing Countries*. The World Bank, Policy Research Working Paper Series (2010).
- Ghent, William J. *Our Benevolent Feudalism*. New York: Macmillan, 1902.
- Godfrey, Frank P. *An International History of the Sewing Machine*. London: Robert Hale, 1982.
- Godley, Andrew. *Jewish Immigrant Entrepreneurship in New York and London 1880–1914. Enterprise and Culture*. New York: Palgrave Macmillan, 2001.
- Green, Nancy L. *Du Sentier à la 7^e Avenue. La confection et les immigrés, Paris–New York (1880–1980)*. Translated by Pap Ndiaye. Paris: Le Seuil, 1998.
- Green, Nancy L. "La confection et les immigrés à Paris." *Hommes & migrations* 1013 (2015): 7–12. DOI: 10.4000/hommesmigrations.3140.
- Greenpeace. *Dirty Laundry 2: Hung Out to Dry. Unravelling the toxic trail from pipes to products*. August 2011. <https://www.greenpeace.org/static/planet4-international-stateless/2018/01/f84f320c-dirty-laundry-report-2.pdf>.
- Guiheux, Gilles. "La sous-traitance en Chine contemporaine: des chaînes de valeurs globales aux réseaux d'entreprises familiales. Subordination et collaboration." *Pratiques du travail au forfait. Métiers, techniques et sous-traitance dans une perspective euro-asiatique, xviii^e–xxi^e siècle. Revue de Synthèse* 40 (2019): 239–257.
- Haïssoune, Mohamed, "GATT-AMF: Les accords multifibres, des origines au démantèlement." *L'Économiste*, May 12, 1994.
- Harvey, David. *The Enigma of Capital and the Crises of Capitalism*. Oxford: Oxford University Press, 2010.
- Hilaire-Pérez, Liliane. *La pièce et le geste: artisans, marchands et savoir technique à Londres au XVIII^e siècle*. Paris: Albin Michel, 2013.
- Hoskins, Tansy E. *Stitched Up: The Anti-capitalist Book of Fashion*. Winnipeg, Manitoba: Fernwood Publishing, 2014.
- Jarrige, François, and Le Roux, Thomas. *La Contamination du monde. Une histoire des pollutions à l'âge industriel*. Paris: Seuil, 2017.
- Jimenez, Guillermo C., and Kolsun, Barbara. *Fashion Law: A Guide for Designers, Fashion Executives and Attorneys*. New York: Bloomsbury, 2014.
- Kadolph, Sara J. *Textiles*. Boston, MA: Pearson, 2002.
- Keers, Paul. *A Gentleman's Wardrobe*. London: Weidenfeld and Nicolson, 1987.
- Kidwell, Claudia B., and Christman, Margaret C. *Suiting Everyone: The Democratization of Clothing in America*. Washington, D.C.: The Smithsonian Institution Press, 1974.
- Klein, Naomi. *No Logo. La tyrannie des marques*. Paris: Actes Sud, 2001.
- Krishna, Kala Marathe, and Tan, Ling Hui. *Rags and Riches: Implementing Apparel Quotas under the Multi-Fibre Arrangement*. Ann Arbor: University of Michigan Press, 1998.
- Lipovetsky, Gilles. *Le Bonheur paradoxal: essai sur la société d'hyperconsommation*. Paris: Gallimard, 2006.
- Lipovetsky, Gilles. *Plaire et toucher. Essai sur la société de séduction*. Paris: Gallimard, 2017.

- Martens, Cynthia. "Made in Italy: The Prato Challenge." *Women's Wear Daily*, September 14, 2014, p. SII20.
- Millet, Audrey, *How toxic are the textiles we consume? And how can the EU trade tools tackle it?* Report for Bricmont, Saskia, Green member of the European Parliament, January 2023.
- Millet, Audrey. "Capitalism of Bodies: The Colonisation of Digital Beauty." *Dimensioni e problemi della ricerca storica* 1 (2022): 27–42.
- Millet, Audrey. "Le corps de la mode. Histoire sociale de la mesure de l'Homme (Europe, 16^e–19^e siècle)." *dObras] – revista da Associação Brasileira de Estudos de Pesquisas em Moda* 30 (2020): 204–222.
- Millet, Audrey. *Le livre noir de la mode. Création, production, manipulation*. Paris: Les Pélagrines, 2021.
- Millet, Audrey. *Woke Washing. Capitalisme, consumérisme, opportunisme*. Paris: Les Pélagrines, March 2023.
- Millet, Audrey, and Pautet, Sébastien. *Sciences et techniques, 1500–1789*. Paris: Atlande, 2006.
- Moneyhon, Carl H. "The Impact of the Civil War in Arkansas: The Mississippi River Plantation Counties," *Arkansas Historical Quarterly* 51, no. 2 (1992): 105–118.
- Moon, Jeremy. *Corporate Social Responsibility: Very Short Introduction*. Oxford: Oxford University Press, 2014.
- Muthu, Subramanian S. *Assessing the Environmental Impact of Textiles and the Clothing Supply Chain*. New York: Woodhead Publishing, 2020.
- Muthu, Subramanian S. *Textiles and Clothing Sustainability: Sustainable Fashion and Consumption*. Singapore: Springer Verlag, 2016.
- Nanda, Shikha et al. "Malwa Region, the Focal Point of Cancer Cases in Punjab: A Review Study." *International Journal of Current Research in Multidisciplinary* 1, no. 3 (2016): 41–45.
- Product Handbook for DuPont™ Tyvek, 2002. <https://www.dupontdenemours.fr/products/tyvek-housewrap.html>.
- Radhakrishnan, Shanthi. "Sustainable Consumption and Production Patterns in Fashion." In *The UN Sustainable Development Goals for the Textile and Fashion Industry*, edited by Miguel Angel Gardetti and Subramanian Senthilkannan Muthu, 59–75. Singapore: Springer, 2020.
- Raworth, Kate. *Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist*. London: Random House Business Books, 2017.
- Raworth, Kate. A safe and just space for humanity: Can we live within the doughnut? Oxfam Discussion Papers, 2012. https://www-cdn.oxfam.org/s3fs-public/file_attachments/dp-a-safe-and-just-space-for-humanity-130212-en_5.pdf.
- Rhodes, Carl. *Woke Capitalism. How Corporate Morality is Sabotaging Democracy*. Bristol University Press, 2021.
- Riello, Giorgio. *Cotton: The Fabric that made the Modern World*. Cambridge: Cambridge University Press, 2013.
- Riello, Giorgio. "Les consommateurs britanniques et la qualité des produits à la fin du XIX^e siècle." *Revue d'histoire moderne & contemporaine* 3, no. 67 (2020): 59–89.
- Riello, Giorgio, and Roy, Tirthankar, ed. *How India Clothed the World. The World of South Asian Textiles, 1500–1850*. Leiden: Brill, 2019.
- Rivoli, Pietra. *The Travels of a T-Shirt in the Global Economy*. Hoboken: John Wiley & Sons, 2005.
- Roche, Daniel, *La culture des apparences. Une histoire du vêtement (XVII^e–XVIII^e siècles)*. Paris: Fayard, 1990.
- Rofel, Lisa, and Yanagisako, Sylvia J. *Fabricating Transnational Capitalism. A Collaborative Ethnography of Italian-Chinese Global Fashion*. Durham, NC: Duke University Press, 2019.
- Rosen, Ellen Israel. *Making Sweatshops. The Globalization of the U.S. Apparel Industry*. Berkeley: University of California Press, 2002.
- Ross, Robert J.S. *Slaves to fashion: poverty and abuse in the new sweatshops*. Ann Arbor: University of Michigan Press, 2004.

- Sluiter, Liesbeth. *Clean Clothes: A Global Movement to End Sweatshops*. New York: Pluto Press, 2009.
- Stanziani, Alessandro. *Les métamorphoses du travail contraint. Une histoire globale (xviii^e–xix^e siècles)*. Paris: Presses de Sciences Po, 2020.
- Stubley, Peter, “Muslim women ‘sterilised’ in China detention camps, say former detainees”. independent.co.uk, August 12, 2019
- Tenner, Edward. “Lasting Impressions: An Ancient Craft’s Surprising Legacy in Harvard’s Museums and Laboratories.” *Harvard Magazine* 103, no. 1 (2000): 37.
- Vanderbilt, Tom. *The Sneaker Book: Anatomy of an Industry and an Icon*. New York: The New Press, 1998.
- Veblen, Thorstein. *The Theory of the Leisure Class – An Economic Study of Institutions*. New York: Macmillan, 1899. <http://moglen.law.columbia.edu/LCS/theoryleisureclass.pdf>.
- Wada, Yoshiko I., Rice, Mary K., and Barton, Jane. *Shibori: The Inventive Art of Japanese Shaped Resist Dyeing*. Tokyo: Kodansha International, 1983.
- Watson, James. *Textiles and the Environment in Economist Intelligence Unit*, Special Report No. 2150. London: Business International, 1991.
- World Commission on Environment and Development. *Our Common Future*. Oxford: Oxford University Press, 1987.
- Wright, Jacq. “The REAL price of your throwaway fast fashion.” *Daily Mail*, February 26, 2022. <https://www.dailymail.co.uk/news/article-10442745/Britain-responsibility-Chiles-vast-fast-fashion-mountains.html>.
- WTO. *International Trade Statistics 2009*. Geneva: World Trade Organization, 2009.
- Xiuzhong Xu, Vicky, with Cave, Danielle, Leibold, James, Munro, Kelsey, and Ruser, Nathan. “Uyghurs for sale. ‘Re-education’, forced labour and surveillance beyond Xinjiang.” *Australian Strategic Policy Institute*, March 2020. <https://www.aspi.org.au/report/uyghurs-sale>.