The Latest Fashion Trend:

Water Sustainability and Social Ethics

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ABSTRACT

THE LATEST FASHION TREND:
WATER SUSTAINABILITY AND SOCIAL ETHICS

This thesis seeks to present the current state of the fast fashion industry, focusing on water and social ethics to discuss the various health effects and environmental implications stimulated by global fashion trade, while proposing valuable solutions for both consumers and producers. The research breaks down only some of the industry's main inputs by material selection and hazardous chemical usage found in clothing purchased by consumers. The paper can be further embellished with more recent industrial shifts, as the current market is experiencing drastic changes. It is with tremendous hope that much of this research is to become history, as creative solutions continue to surface upon the world epidemic that is fast fashion.

To better answer the questions of the heavy implications brought out by the fashion trade, individual and holistic viewpoints on sustainable development have been used, supported by natural resource depletion levels (which clearly depict the capacity of our ecosystems) to discuss the future of fashion. Businesses and governments must meet with the ultimate goal of implementing conscious consumerism and improving the quality of human life. Looking good and feeling good should not be mutually exclusive from doing good.

KEYWORDS: International business, fashion marketing, sustainable development

INTRODUCTION

Beauty is pain is often used to refer to the widely accepted notion that there's a harmful price to pay when it comes to staying fashionable. Among the many things we take for granted is the ease of access to the latest fashion trends. Fast fashion has changed modern consumer culture to buy more and more clothing, regardless of its necessity. Meanwhile, we don't realize where it all comes from or what it all stands for. The high cost of cheap retail is arguably more taxing on the impoverished factory job "thieves" than it is on the developing nations importing their wardrobes. In the current consumption model of quick and cheap retail, consumers are often left in the dark about the dangers that come from partaking in the detrimental fast fashion cycle, often because the realities of human suffering and environmental crimes are hidden from view.

The clothing we buy may not be the first thing that comes to mind when it comes to reducing one's carbon emissions, however the fashion industry is the second largest polluter in the world, after big oil (Sweeny, 2017). The global textile and garment industry (comprised of textile, clothing, footwear, and luxury fashion) is worth 3 trillion dollars, making up 2 percent of the world's Gross Domestic Product (GDP). The fashion industry is highly complex, as it involves various sources of labor and materials from different countries, with differing regulations of international trade and no standardized mechanisms of accountability, the rise of modern apparel consumption may just be the fall of society as we know it today.

According to the United Nations' 1987 Report of the World Commission on Environment and Development: Our Common Future, sustainable practices must meet the needs of the present, indefinitely, without harming or compromising the well-being of future generations. Sustainability is far vaster than implementing recycling programs. Sustainability is about "doing unto others as you would have them do unto you; involving complex and changing

environmental dynamics that affect human livelihoods and well-being, with intersecting ecological, economic, and sociopolitical dimensions, both globally and locally" (UN-documents).

Fast fashion is changing modern consumer culture. As the speed of which we rotate our wardrobes increases, so does the amount of clothing piling up in landfills. "In the US alone more than 10.5 million tons of clothes end up in landfills each year, and even natural fibers may not break down easily" (UN-documents). Textile waste is an unintended consequence of fast fashion, as more people buy more clothes and don't keep them as long as they used to. The international expansion of fast fashion retailers exacerbates the problem on a global scale. Wardrobes in developed nations are saturated, so in order to sell more products, retailers must tempt shoppers with constant newness and convince them the items they already have are no longer fashionable. In order to overcome the complex challenges involving fast-growing demand with limited recycling, the livestock sector needs to simultaneously grow to address key environmental, social, and economic challenges: growing natural resources scarcity, climate change, food insecurity, widespread poverty and global threats to animal and human rights.

SOCIAL ETHICS

Pay discriminations and deductions are among the many ways the fast fashion industry encourages the ethical mistreatment of its factory workers. Human rights treaties in some countries have made distinctions between the rights of nationals and non-nationals which make slavery legal today. Sweatshops in Turkey for example heavily depend on the labor of Syrian refugees, often paying half the minimum wage to documented workers. In China, many people from rural villages migrate to textile factories and have little access to social welfare. Burmese

migrant workers in Thailand struggle with language barriers and are often unable to obtain work permits, so they receive illegally low wages for working. Labor schemes in India trap workers under forced employment where workers are housed in factories unable to escape or contact their families. One out of six people work in the garment industry, 80% of whom are women. 98% of garment workers do not earn a living wage and are locked into a channel of poverty. Proper living wages and regulations are 'ethical' terms proven difficult to follow in practice so far.

The Rana Plaza collapse was a major disaster in Bangladesh in 2013 which killed over 1,100 sweatshop laborers who were producing clothing for the West. These textile workers had reported serious health safety violations, but their complaints of cracked walls and weak infrastructure were overlooked by management. What is almost more shocking about the horrific event is the passive attitude of consumers who either didn't know, or care, about how their affordable clothes were being made. Workers should always have the right to speak up against unfair work practices by forming and joining trade unions and to bargain collectively, defend rights, voice grievances, negotiate recruitment, etc. Buying companies need to adopt policies of transparency and urge suppliers to do the same in order to implement proper human rights throughout the whole chain of command.

Over the past 15 to 20 years, companies from all over the world have been taking advantage of Asia's cheap manufacturing costs. Due to the increased population of skilled laborers among the rising middle class, over time rising labor costs will push more businesses to East Asian countries (Morris 2015). Amazon and Apple Inc. for example, previously settled into Chinese factories because of the country's seductive labor prices and abundant material incentives, further contributing to the increasing electricity costs in the country. Over time, the Chinese middle class has grown exponentially, resulting in rising labor costs, meaning that in

order to keep a global competitive price strategy, companies must hinder away from an all-out trade war and relocate facilities.

Companies are racing to the bottom with low prices, short lead times, last-minute changes and inadequate monitoring. However, The Modern Slavery Act requires that companies report human trafficking in supply chains through a due diligence process. Weak legal protections make undocumented migrant workers are more vulnerable to industry injustices. Migrant workers rely on their employers to renew work permits, along with the critical decision on whether or not to allow said migrant worker to stay in country with legal status.

Similarly, many Bolivian migrants find themselves working in informal Argentinian sweatshops without papers, “lured by traffickers promising wages in dollars, housing, food, and an eight-hour working day” (SOMO, 2016). These workers are forced to sew for 12-17 hours a day, often living in the same room in which they work. Even undocumented migrants deserve to have their fundamental human rights respected and to be treated with dignity. Modern slavery takes the form of forced labor via human trafficking and debt bondage. In many countries, young women are often compelled to migrate in order to support their families and face gender discriminations, sometimes in the form of forced medical checks (SOMO, 2016). Employers abuse their powers by retention worker documents, inflicting financial penalties, along with inflicting sexual harassment and violence.

When manufacturers are willing to invest in building long-term, stable buyer-supplier relationships, suppliers will in turn be more likely to invest in efficiency improvements. Good production planning incorporates responsible lead times to plan realistically to market demands, this is sometimes called ‘collaborative planning,’ where buyers share calendars with the factory and vice versa. Furthermore, this allows for pricing policies to be developed that take social and

environmental quality standards into account, so that financial burdens don't totally fall onto the consumer.

Companies have already realized that affordable and trend-sensitive fashion, while typically highly profitable, also raises ethical issues (Aspers and Skov 2006). Recent business trends show successful results from businesses that take the needs of all stakeholders to higher regard. Trends over the past decade have shown a valuable increase in sustainability and ethical practices in the fashion industry (Joy A. 2012). Putting ahead the needs of the consumer, workers, suppliers, and local communities will surly churning higher facilities returns as well.

WATER

Water waste is of insurmountable concern, as we are soon to face a serious epidemic. 97 percent of Earth's water is salty, and nearly 2 percent is locked in snow and ice, leaving less than 1 percent of Earth's water that we can access. Half of this water is used for agriculture alone. Climate change has been the most discussed scientific topic of the past two centuries. At this point in time, it is undeniable that the planet is warming up and the consequences are widespread. According to the International Panel on Climate Change's (IPCC), "conservative estimates indicate that sea levels may rise on average at about 4 millimeters per year." The rising of water levels can be noticed in most recent tidal flooding along the Atlantic Coast for example. If we stay on this path, the global temperature will increase by 2 degrees Celsius and completely melt Greenland and the Antarctic, which would cause the sea level to raise by 250 feet, which is like imagining a 25-30 story building in New York City completely covered by water. The trend is worsening as our society constantly increases energy usage along with birth rates, so more and more people being born are using more energy than previous generations. However, the longer

we delay cutting emissions at their peak, then the steeper (and more difficult) the change will be (Pollack, H., 2018).

The United Nations' sixth Sustainable development goal is for "access to safe water and sanitation and sound management of freshwater ecosystems...essential to human health and [for] environmental sustainability and economic prosperity." The fashion industry is the second biggest polluter of freshwater resources on the planet. Plastic microfibers shed from synthetic clothing into the water supply, accounting for 85 percent of the human-made material found along ocean shores, threatening marine wildlife and end up in our food supply. If water is essential for all living life forms, then sustainable water management and accessibility should be a human right.

It is estimated that by 2050, 250 million poor rural people in the Southeast Asia will be critically affected by raised sea levels in the low-lying river mega deltas of Bangladesh, India, Myanmar, Thailand, Cambodia, and Vietnam. "The Ganges-Brahmaputra-Meghna delta in Bangladesh could directly displace over 3 million of the 111 million people living there, and up to 7 of the 18 million people living along the Mekong delta in Vietnam. Bangladesh could lose nearly one-quarter of the land area it had in 1989, in a worst-case scenario, displacing up to 13 million people total by 2100" (Brown, 2014).

The Ganga River in India is polluted with mixed sewage water and untreated wastewater containing dangerous levels of chromium, lead and arsenic. Chromium infected water spreads to fields, killing agriculture and infecting water drinkers with asthma and skin disease. "The Citarum River is considered one of the most polluted rivers in the world due in great part to the hundreds of textile factories lining its shores. According to Greenpeace, with 68 percent of the industrial facilities on the Upper Citarum producing textiles, the adverse health effects to the 5

million people living in the river basin and wildlife are alarming" (Sweeny 2017). An industry that generates nearly $600 million annually should be financially able to enforce better worker treatment and set higher standards.

According to the Blacksmith Institute, 90 percent of all exports come from Hazaribagh, a neighborhood of Dhaka, one of the 5 most toxic and heavily-polluted sites on the entire planet. Unfortunately, it's often the little guys that get the worse end of the bargain. Nations need to quickly adapt to climate related risks and pollution dumped onto poor areas by several industrial countries. A key instance of this is when offshore companies employee tannery workers to treat animal hide with chromium to make fashion materials, without providing their workers with proper protection from such toxic materials. This causes numerous malignancies among the direct workers handling materials like bronchitis and pneumonia, along with people affected by the improper discharge of the same cancerous chemicals in waterways and in agricultural fields.

According to the World Economic Forum, the biggest risks facing companies in 2017 were extreme weather events and natural disasters (World Economic Forum, 2018). Unpredictable weather patterns due to climate change result in uncertain resource depletion and raise variable costs for suppliers. Many businesses have increased flexibility of critical input materials, proving that the outdated linear economy model is no longer tangible within Earth's given state. As large-scale corporate actions are sure to make ripple effects and have repercussions, "[business] sustainability is about much more than our relationship with the environment; it's about our relationship with ourselves, our communities, and our institutions" (Joy A. 2012). The degradation of ecosystems and destruction of habitats, water and air pollution, along with inhumane animal suffering, immense food insecurity and human rights abuses are all at the mercy of corporations to make sustainable business decisions.

The largest exporters of apparel in the world in descending order are: China, India, Italy, Turkey, and Bangladesh (as of 2014), supplying 54.4 percent of the total worldwide apparel trade. In the last fifty years, the United States of America reduced its clothing production level of 95 percent to only 3 percent. Today, nearly 40 percent of apparel products sold in the US are imported from largest producer of cotton shirts worldwide (China alone is responsible for 36.5 percent). China overseas nearly 4,700 acres of cotton farms which produces 90 million yards of high-quality cotton fabric annually and has an output of 60 million garments a year (B2C.com 2015). China's primary source of energy production comes from burning coal. Buying more fashion means burning more coal, too much energy equating to fashion being responsible for 10 percent of the Earth's total annual carbon emissions, 5 percent more than the annual airline's impact (Conca, 2015). China's textile industry is also responsible for discharging over 2.5 billion tons of wastewater every year, making fashion among top 3 water wasting industries in the country (B2C.com, 2015).

It is estimated that the average American household spends nearly $2,000 on apparel, footwear and related products and services every year. People who live in Manhattan, in particular, spend the most on clothing at $362 per person per month. These starling facts attribute to the undeniable reality that the United States of America is the largest importer of garments in the world, however little responsibility has been claimed.

The average customer assesses their purchase by price and quality of the good, not necessarily by who made the piece or what chemicals were used to treat the materials, or even which regulations manufacturing companies follow. When walking into an international teen retail store like Forever 21, a brand known for its constant influx of new merchandise combined

with a very low price point strategy. Combining online and offline price tactics to keep prices low, the average consumer is heavily encouraged to buy out of impulse, rather than need for a product. And now, the brand has just increased its pay options and loosened their return policy, allowing for more impulse shopping of low-cost items.

Consumers are constantly tempted by the idea of newness and follow a tendency to push the old out. Our fast fashion fix applies pressures to manufacturers to reduce production time and costs by cutting environmental and ethical corners. With high concern on delivering frequent new collections inspired by catwalk looks or celebrity styles, and little regard for the environment. Shortening the time it takes to get a product from design to shop floor results in negative environmental impacts and poor social ethics.

Fast-fashion speeds up trends and shortens fashion seasons, ever increasing the release of toxic chemicals into the environment, through gases released into the atmosphere, leakage of waterways, landfill expansion, overuse of toxic pesticides, etc. Beginning in 2011, Greenpeace's 'Detox Campaign' exposed the high levels of toxic chemicals present in clothing from some of the world's largest apparel retailers, including Armani, Benetton, Calvin Klein, Diesel, Esprit, Gap, Levi Strauss, Victoria's Secret, and Zara (the largest offender of them all). To put this into perspective of scale, "Zara alone churns out 850 million clothing items a year. You can imagine the size of the toxic footprint it has left on this planet, particularly in developing countries like China where many of its products are made," said by Li Yifang, a toxics campaigner at Greenpeace East Asia, (Hogarth, 2015). Rather than restocking new designs once or twice a season, this Spanish fast-fashion retailer restocks new designs twice a week (Logisticsbureau.com, 2003). This shift upended the entire fashion business model, causing

others to follow in order to stay competitive. Further causing clothing to move through the system faster and faster, creating a more difficult environmental crisis.

Part of America's textile-waste problem is that fast-fashion deems clothing over a year old is considered outdated. Americans buy five times as much clothing now than they did in 1980. Goodwill only began accepting clothing donations in the early 1940s, a time when pre-consumerist America did not have a waste crisis (Cline, E. 2014). So, what happens with all our old clothes that 'expire'? According to the Council for Textile Recycling, charities overall only sell 20 percent of the clothing donated to them at their retail outlets. Fast fashion forces charities to process high volume of donations in short time in order to resell and receive "the same amount of revenue, like an even more down-market fast-fashion retailer" (Cline, E. 2014). Many second hand stores also reject inexpensive clothing items from fast-fashion chains like Forever 21, H&M, Zara and Topshop because of the poor quality has low resale value, and because of the simple overflow of donations (Hogarth, 2015).

REGULATIONS

Globalization of the fashion industry is intricately fragmented, making it difficult to see how all the suppliers of the individual components can be ethically secured and accounted for. Behind the scenes of business is actually very ugly. In many developing countries where cheap garments are made, price pressures reach the end of the supply chain: human labor. Since regulations are easy to bribe in many apparel producing countries, workers' health and living conditions are often ignored. There is often little or no regulation for the industry's footprint on the environment or on the health of stakeholders. After recent reasons for investigation, scientists have found alarming amounts of toxic metals like "lead, cadmium, chromium, mercury, and

arsenic among other highly toxic chemicals...in over half the 99 items taken from branches of Claire's, Forever 21 and H&M and other retailers across the United States," (Wellman). Brands specifically targeted at young consumers have a moral obligation to take a leading stance on this platform. Retailers who partake in the cost effective practice of outsourcing their clothing production to underdeveloped countries accept that their products don't have to comply with certain production safety regulations.

More attention to pre-purchase regulation of fashion items is duly needed towards the disposal of human-made materials. Hazardous chemicals are improperly sealed in landfills and then leach from the textiles into groundwater. Burning the items in incinerators can release the toxins into the air. The truth of the matter is, our discarded clothing is becoming more expensive to toss out.

DONATIONS AND DISPOSAL

As we all know, in fashion, styles come and go, and soon enough they return again. The cycle of manufacturing pre-existing models, repurchasing already existing designs, and disposing of clothing to keep up with hyper trends is clearly not efficient. Clothing donations can only go so far. On average, each American donates/recycles 12 pounds of apparel. 10-20 percent gets sold at thrift stores, the other 80 percent presumably gets resold. 45 percent of what remains are salvageable to recyclers is exported as second hand clothing and is sold by the pound (Council-for-Textile-Recycling). Majority of the world however, has had enough of our second hand fashion, which is majority low quality clothing. In New York City, residents discard 193,000 tons of textiles every year, at a high cost to taxpayers and our environment (grownyc.org).

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According to a recent report by the Ellen MacArthur Foundation, each year an estimated $500 billion is wasted in “barely worn and rarely recycled,” industry textile production, which is estimated to account for a quarter of the world’s carbon budget by 2050. The fashion industry is responsible for more than 1 million tons of wasted materials each year, so much so that “85 percent of all the clothing sold each year ends up in landfills” (Northam 2013). According to the Environmental Protection Agency (EPA), 84 percent of unwanted clothes in the United States in 2012 either went into a landfill or an incinerator (Hogarth, 2015), which averages to 82 pounds of textile waste per American. The clothing left in landfills that partially disintegrate are the clothing made from natural fibers, like cotton, linen and silk or semi-synthetic fibers, producing the potent greenhouse gas methane as they disintegrate. However, clothing materials do not compost in soil. This means that the hyper-producing industry’s footprint is only growing. When the things we produce do not leave the face of the earth, they pollute neighboring villages to landfills, pollute drinking and agricultural waters, release toxic gases into the environment, and so on.

Wrinkle-free, stain resistant and insect repellent fabrics require the input of hazardous chemicals that cause these fabrics to toxic, causing serious health effects to human health and to the environment. Cheap, synthetic fibers, like polyester, nylon and acrylic are essentially a type of plastic made from petroleum, which take hundreds of years to biodegrade as well as emit gases like N2O, which is 300 times more damaging than carbon dioxide pollution (Hogarth, 2015). Natural fibers do not decompose the same way we normally think, since they undergo a series of stressful fabric treatment procedures, like being “bleached, dyed, printed on, scoured in chemical baths” before becoming clothing. This is often overlooked by maintenance inspectors, giving way to irresponsible disposal of factory chemicals into

Commented [2]: http://ecosalon.com/synthetic-fabrics-made-from-fossil-fuels/

surrounding bodies of water. It is estimated that 90 percent of dye houses release dirty water from operations into bodies of water, making fabric chemical dyes are the second greatest polluter of freshwater in the world.

The quality of modern fashion as we know it continues to decline as we speed up the industry cycle to pump out more cheap clothing. As the speed of which we rotate our wardrobes increases, so does the amount of clothing piling up in landfills. In the US alone, more than 10.5 million tons of clothes end up in landfills annually.

Despite these alarming statistics, Americans are throwing away more clothes than ever before. “In less than 20 years, the volume of clothing Americans toss each year has doubled from 7 million to 14 million tons, or an astounding 80 pounds per person. The EPA estimates that diverting all of those often-toxic trashed textiles into a recycling program would be the environmental equivalent of taking 7.3 million cars and their carbon dioxide emissions off the road” (Hogarth, 2015). Another statement from the World Bank states that “Unregulated or illegal dumpsites serve about 4 billion people and hold more than 40 percent of the waste worldwide”

“ORGANIC FASHION”

While ‘going organic’ may seem like the sustainable route, “it can still take more than 5,000 gallons of water to manufacture just a T-shirt and a pair of jeans” (National Geographic, 2013). Synthetic, man-made fibers, while not as water-intensive, often have issues with manufacturing pollution and sustainability. And across all textiles, the manufacturing and dyeing of fabrics is chemically intensive” (Sweeny, G 2017). The business model as a whole is not sustainably sound. As the brand makes environmental efficiency efforts, their real goal of

constant annual growth negates their efforts, since more expansion requires them to consume more resources. Cotton is an energy-intensive crop. Regardless if the cotton was grown organically, or sourced in a non-profit exchange, cotton-made clothing still ends up in landfills and costs more to the environment for more than what they're priced at. H&M boasts about being the world's number-one user of organic cotton, which is only 13.7% of the cotton used in its operations in over 3,200 stores in 55 countries (H&M, 2014).

The conscious consumer may wonder what constitutes as an eco-friendly fabric, however there are several pros and cons to each type of fabric, as the complex picture of fiber choice encompasses how fibers are grown or created, spun, knitted or woven, dyed, finished, sewn and transported – all of which have different environmental impacts. For example, choosing organic fabrics is better than choosing non-organic fabrics in terms of the chemicals used to grow the fibers, but organic cotton still requires high amounts of water and the impact of dyeing it is higher than the impact of dyeing polyester.

H&M and Inditex, the parent of Zara are among the top 5 organic cotton users in 2016, however overall organic cotton makes up less than 1 percent of the world's annual cotton crop. Fast fashion brands alleged recycling and donation programs will not suffice. The amount of clothing actually donated to stores in bins is not great enough to offset production inefficiencies. At the end of the day, organic or not, landfills continue to over accumulate. According to the Secondary Materials and Recycled Textiles Association, 85 percent of all used clothing and textiles end up in a landfill. Whereas in actuality, almost all (95 percent) of it can be reused as secondhand clothing, cut down to be recycled as industrial rags (30%) or ground down and reprocessed (20%). Recycled content reduces the pressure on virgin resources and tackles the growing problem of waste management. For example, Patagonia was the first outdoor clothing

brand to make polyester fleece out of plastic bottles. In 2017, it decided to rationalize its T-shirt ranges and from spring 2018, will offer only two fabric options of either 100% organic cotton or a blend of recycled cotton and recycled polyester, recognizing that even organic cotton has a negative environmental impact.

LEATHER

Leather production is one of the most harmful among fashion sectors. Characterized by high quality, hydro-thermal stability, chrome tanned leathers are the most common type of leather tanning in the world, used by most fashion brands to produce high-end leather products that are often worn directly on the customer's skin., since chrome. The leather industry has been criticized for its continual usage of dyes and solvents in the finishing process, that have been linked to bladder and testicular cancer among leather employees (Tarantola, A. 2014), among other ailments.

Chrome waste from leather manufacturing can be found in the form of liquid waste, floating along with other chemicals discharged via drains from tanning and re-tanning facilities. Chrome sludge, resulting from sedimentation of suspended solids and solid tanned waste like shavings, buffing dust and unusable unfinished leather trimmings. When there materials are improperly discarded, they enter the ecosystem via waterways, street animals, family who work in the factories, etc. The toxic pollution issue is not just rest in the hands of the leather purchaser. This disparity cannot be limited by country borders, since the abuse towards the environment is on a global scale.

Specific acids are combined with chrome complexes to target collagen in the standard three steps of the chrome tanning processes: pickling, tanning and basification. "The efficiency

of chrome tanning uptake depends on the concentration in the solution which, in turn, is a decisive factor in diffusion. The higher the chrome concentration in the float, the faster the chrome penetration into the fiber structure," and the lower concentration, the slower the reaction rate between collagen and chrome (Ludvik, 2000). The driving force behind the mass apparel industry is the hyper speed garments can be processed before they hit stores. More concentrated, harsh chemicals can allow a producer to churn out more output, while damaging the environment and the lives of garment workers who directly handle the tanned goods. All tanning recipes take into consideration the level of penetration for different garments, however the problem with the chrome and other chemicals remain in spent floats and water channels.

Although strict regulations around the world are in place to manage chrome exhaust, the concentration of 60 - 140 mg Cr/l in mixed wastewater streams by far surpasses the discharge amount deemed responsible under standard technological conditions, of 3 -7 kg Cr/t w/s hides (Ludvik, 2000). Legislative limits are not consistent worldwide, and since the fashion industry is so competitive, if one South Asian country imposes responsible industrial limitations, brands are likely to switch for better deals. Take raising the minimum wage for example, brands can easily contract manufacturing to a neighboring country with cheaper input variables. High concentrations of chrome in wastewater of some countries must be addressed by maximizing chrome exhaustion treatment post-manufacture, by applying supplementary methods such as recycling chrome-tanning floats and investing in new technologies in chrome recovery and use.

FORMALDEHYDE

Formaldehyde is a strong-smelling chemical commonly used in the production of building materials, glues, permanent-press fabrics, and is also used as a disinfectant and

preservative in mortuaries and medical laboratories. Workers who handle formaldehyde containing products are exposed to the chemical by inhaling it from the air or absorbing formaldehyde containing liquids through the skin. Given that industrial workers may be exposed to higher levels of formaldehyde, permanent-press clothing can actually expose the garment wearer to the same possible illnesses.

Formaldehyde has lymphatic and hematopoietic system effects, making it a brain cancer causing agent. Case control studies depict causes of leukemia brought out by rapid chemical and hormonal changes immediately after absorption into the human body, which the National Cancer Institute (NCI) says mostly affects the upper respiratory tract. The 2009 NCI cohort study extended follow-up investigations concluded that evaluation of risks over time suggest “a possible link between formaldehyde exposure and lymph hematopoietic malignancies, particularly myeloid leukemia but also perhaps Hodgkin lymphoma and multiple myeloma” (Freeman 2009). The observed patterns over time may also be showing a decline in the risk factors of these cancers and diseases due to the decrease of production of formaldehyde products within the United States and the increase of labor exportation. The study claims this is a “causal association within the relatively short induction-incubation periods characteristic of leukemogenesis” and that further epidemiological exploration of potential molecular mechanisms are warranted.

Formaldehyde in the form of a human carcinogen gas, is known as nitrogen. It can be toxic with higher doses over longer periods of time. It's the same chemicals used in fashion items that contain wrinkle free fabric softeners and detergents, to name a few examples (M, M, 2016). Despite the documented hazards associated with them, hazardous product chemicals continue to be used for a variety of purposes in the textiles process or in the product itself. Vibrant colours,

prints and fabric finishes are appealing features of fashion garments, but many of these are achieved with toxic chemicals. Greenpeace's recent Detox campaign has been instrumental in pressuring fashion brands to take action to remove toxic chemicals from their supply chains, after it tested a number of brands' products and confirmed the presence of hazardous chemicals. Many of these are banned or strictly regulated in various countries because they are toxic and bio-accumulate, meaning the substance builds up in an organism faster than the organism can excrete or metabolize it, disrupting hormones and proving to be carcinogenic.

Cancer is characterized by uncontrolled cell mutation, sometimes caused by alternating the chemical makeup of our DNA by chance, or genetics, or even by which clothing brands one buys from. Several research studies have strong evidence to claim that the hormonal imbalance caused by specific fashion brands leads to many cancer cases among children, among other brand stakeholders. A list of over 17,000 potentially dangerous chemicals was compiled together by Greenpeace from various [inter-]governmental, company and NGO lists, which are persistent, toxic, bioaccumulative, carcinogenic and disruptive to human hormones. The hazardous chemicals that cause toxic pollution are difficult to detect, however they are everywhere, "in smartphones, in sunscreens, in the body of factory workers, in rivers, in fish and even in our own bodies" (Greenpeace, 2016). Greenpeace also warned for the potential of more intensive contact with parts of home surroundings within children, especially at the age of crawling. Higher skin surface area relative to body weight, means potential for higher absorption relative to body weight of those chemicals which can be absorbed through the largest organ of our bodies, the skin.

Lax regulation on textile manufacturers permit wastewater discharges of nonylphenol ethoxylates (NPEs) and other chemicals from surfactants, which break down into persistent bio

accumulative and hormone-disrupting nonylphenols (NPs) in rivers, causing NPs to accumulate in sediments and build up in the food chain. Clothes with waterproofing or oil proofing properties are treated with per-/polyfluorinated chemicals with antimony trioxide, which is used as catalyst in the manufacture of polyester (Greenpeace, 2016). This clothing containing residual levels of NPEs are then allowed to be exported to markets where these chemicals have been banned in clothing manufacture. After purchasing such a garment, washing machines release NPEs to water, which results in contaminating water treatment facilities, which are generally ineffective in dealing with NPEs, essentially only speeding up their breakdown to toxic NPs in aquatic systems, even in countries where use of parent compounds (NPEs) is banned.

LEAD

The Ecology Center jewelry, a non-profit environmental safety organization has found links between health issues including acute allergies, birth defects, impaired learning, liver toxicity and cancer to fast fashion as well. By using X-ray fluorescence, scientists have identified items with consistently high levels of toxic chemicals. 25% of the items tested in this study surpassed the Consumer Product Safety Commission's limit of lead allowed in the production of children's products. The report even noted some items which were advertised as being lead free, however tests showed traces of lead and cadmium, both likely carcinogens. This is contrary to false statements released by retailers like Target and Walmart that all jewelry sold is tested according to federal regulations. Consumers must influence government leaders to enter into embargos, which can limit certain products entering a given country.

Cheap and dangerous metals like these are easy to melt and make nice heavy pieces, where the alloy composition is almost the same as the lead acid car batteries (Weidenhamer,

2006). It was also noted that 10% of the items tested contained cadmium, a known carcinogen to where there have been no regulations on its use. A huge issue arises over time from children who put these dangerous metals in their mouths, eroding and wearing away the thin protective coating which is very dangerous.

Lead is known to impact the learning development in children, and the EPA has it listed as a probable human carcinogen. Cadmium is associated with human lung and prostate cancer, also affecting early development like birth weight, delayed sensory-motor development, hormonal effects, and exposure to cadmium can also result in bone loss and increased blood pressure. Chromium can cause birth defects, reproductive problems particularly in males, as well as causing asthma attacks and nasal irritation in people at high levels. All forms of mercury can affect the kidneys, as well as being toxic to the nervous system. Inorganic arsenic has a strong link to lung, skin, and bladder cancer, cardiovascular diseases, irritation to skin, skin color changes, blood disorders, and hormone disruption.

To discover the toxic chemicals were being used in the production of fast-fashion, Greenpeace tested 141 items of clothing, including jeans, trousers, T-shirts, dresses, and underwear made from both natural and synthetic materials, from authorized retailers in 29 countries and regions. Greenpeace's Research Laboratories, as well as independent accredited labs worldwide, found that all the brands had at least several items containing "toxic" and "very toxic" chemicals to aquatic life. Greenpeace noted in their study that the main obstacles for achieving a toxic-free world is the lack of business transparency and information.

The argument that governments should limit levels of hazardous chemicals implies companies can use them, however there is no 'safe' or 'acceptable' level for hazardous chemicals. Companies and governments need to clearly commit to the goal of zero usage as the

only credible basis for taking effective action to eliminate these harmful substances. Consumers must voice their concerns through their investment of spending capital. Consumers must become conscious about their shopping patterns and demand better production quality of clothing.

POLYESTER

The most commonly used fiber in clothing requires nearly 70 million barrels of oil annually and takes more than 200 years to decompose. Over 150 billion polyester containing garments are produced annually, which is enough to provide 20 new garments to every person on the planet, every year (Conca, 2015). When this popular fashion material washes in domestic washing machines, its plastic microfibers shed and enter into water systems and our oceans, interfering with aqua life and ending up on our plates. These microfibers can easily pass through sewage and wastewater treatment plants into our waterways and do not biodegrade, representing a serious threat to aquatic life. Small creatures such as plankton eat the microfibers, which then make their way up the food chain to fish and shellfish eaten by humans.

COTTON

The dark side of this cash crop is reflected in the disproportionately high number of birth defects in rural farming villages of India. Yet again, this is another instance where poorer countries pay the higher price to our quick and cheap retail demands. These same places facing horrible illnesses also must also deal with the high risk of drought throughout the seasons. The devastating impact of toxic chemical use in agriculture, for growing cotton particularly, was shown in *The True Cost*, a documentary which referenced the death of a US cotton farmer from a brain tumor, along with serious health conditions affecting newborns surrounding Indian cotton

farms. Cotton requires high levels of water and pesticides to prevent crop failure, which can be problematic in developing countries that may lack sufficient investment and clean running water.

When taking all energy required to grow, manufacture, transport, but mostly to care for it, cotton products are huge energy consumers. For one, cotton is a very thirsty crop. One t-shirt requires 2,700 liters of water to make, that's enough for 1 person to drink for 900 days (National Geographic, 2013). One load of washing requires 40 gallons of water and drying one load of laundry uses 5 times more energy than washing. Systematic solutions are in order to raise consumer awareness on the environmental costs of laundry efficiency, other than relying on consumer utility bills to pressure lower their energy usage.

Cotton is among one of the largest pesticide-consuming crops, using 24% of all insecticides and 11% of all pesticides globally, adversely affecting soil and water, leading to a quarter of the chemicals produced in the world to be found linked to textiles (Conca 2015). The nutrition of our soil must be held in high regard, as improper disposal of chemical waste enters in everything else growing in the surrounding area. Water vapors evaporate, entering ecologic pathways through rainwater and river spillage, allowing for toxic chemicals to contaminate neighboring clean farms.

PESTICIDES

Down the line, plants build resistances to pesticides and become "super weeds," which will need to be treated with stronger toxins, ever more harmful to livestock and humans. Most cotton grown worldwide is genetically modified to be resistant to the bollworm pest, thereby improving yield and reducing pesticide use. Agriculture is an important component of the

national economy, and the population has some unique characteristics and exposures. The agricultural population is large, with an estimated 2 million farmers, 2.7 million farm laborers, and perhaps 6 million family members, (Merchant, 1992). “Epidemiological studies of cancer suggest that farmers in many countries, including the United States, have higher rates than the general population for Hodgkin’s disease, leukemia, multiple myeloma, non-Hodgkin’s lymphoma, and cancers of the lip, stomach, prostate, skin, brain, and connective tissue (Handson). Farm populations may come into contact with a variety of potentially hazardous substances, including pesticides, fertilizers, fuels and oils, engine exhausts, paints, solvents, welding fumes, dusts, and zoonotic microbes (Blair, 1991).

According to the study ‘Occupational Medicine: Cancer Among Farmers,’ by the National Cancer Institute, farmers experience elevated rates for several cancers, including leukemia, non-Hodgkin’s lymphoma, multiple myeloma, soft-tissue sarcoma, and cancers of the skin, lip, stomach, brain, and prostate. The map of the United States during the mid-1970s depicted mortality patterns by county or state economic area (Mason, 1975). Several international occupational surveys were used to evaluate the overall cancer pattern among farmers. Occupational surveys from many developed countries were used to evaluate the overall cancer pattern among farmers. The data indicate that farmers have a more favorable experience than the general population for many cases of death, including all causes combined, heart disease, all cancers combined, as well as cancers of lung, bladder, liver, colon, esophagus, rectum, and kidney. US farmer cases of leukemia depicted on the map “showed a string if high-rate counties through the center of the United States, ranging from the Dakotas to Texas” (Manson). Since studies show that the workers who directly produce our clothing suffer from malignancies derived from toxic chemicals, consumers as well may possibly contract harmful

toxins through their skin, the largest human organ. The general public may absorb these toxic chemicals by inhaling or absorbing liquids continuously through skin from touching certain clothing, bedding, towels, etc. For example, formaldehyde gas is often released into the air via car tailpipe emissions and passersby may inhale some hazardous fumes. Industrial workers who produce with formaldehyde containing products are exposed to higher levels than the general public at greater frequency, since they spend many hours working with insufficient chemical protection.

Even though this demographic affected may seem minute compared to many other stakeholders involved, the mere excess for these cancers among this occupational group and a lower mortality trend for other fatal causes. Moreover, "several of the cancers that are excessive among farmers show rising rates among the general population of many developing countries... [and the] excessive cancers among farmers appear to be associated with genetic or therapeutically induced immunodeficiencies" (Manson). The experimental and epidemiologic evidence suggests that potentially carcinogenic pesticides are not likely to be limited to any particular chemical class (Blair). No one particular exposure assessment approach is likely to be universally successful in all situations. Long-term prospective studies should be considered in addition to case-control designs. Future efforts, however, must also be expanded to include evaluation of cancer risks among other groups in the agricultural setting, i.e., spouses, children, and laborers. Anyone who lives on the farm, even if they are not in direct contact with farm chemicals, harmful indirect exposure is possible.

SOLUTIONS

Modern culture has adopted a strategy of tragedy, where we're following the de facto plan where we did not intend on causing global warming. Humility badly needs to adapt a strategy of change, where the end goal is infinite and there is no end game. We are currently living in a time of rapid change, where soon solar energy may overpower coal and end of the age of oil. Healthy competition leads the road to new developments, where competition serves as a way of cooperating in a way to work together. For business concern, the focus is not whether there is or isn't growth in a particular market, it is up to the entrepreneur to design what they want to grow. Together with an endless availability of energy, an unlimited access to resources would make the unlimited production of material things feasible, however the world obviously has its limitations and restraints (Braungart, 2003). William McDonough and Braungart's "Cradle-to-Cradle" design system is based on the principle that there is no real end for any object we manufacture, since everything is technically able to be recycled for "reincarnated."

A deeper analysis of our current system is very much called for. We must implore a reformation of the current system, which leaves farmers exposed to pesticides, child workers handling toxic dyes, the overflowing of ill-managed landfills, and blatant abuse of "natural resources used in extraction, farming, harvesting, processing, manufacturing, and shipping" (Sweeny, 2017). Top and bottom ends of the fast fashion food chain must come together to show empathy and listen to each other, as communication and compromise seem to be the cure for most issues of the world today. Industry-wide collaboration among buyers and sellers alike are to be widely adopted and standardized. Designers can take part in biological and technological metabolisms in their products though closed material cycles and by calculating by parts per million (intellectual filtering) for ecological and human health. The International Financial Reporting Standards and International Accounting Standards put bench markers in place so

companies may look to self-assessment and sharing quantitative metrics in order to report accurate operations performance accountability and provide stakeholders with company transparency. In summary, more efficient business models save companies money.

An industry-wide carbon tax would be a crucial chain mechanism to incentivize businesses not to purchase more fossil fuels and rely on them as the default mode of manufacturing consumer goods. Rapidly rising sea levels, bizarre weather patterns, and increasing global temperatures all make climate change an undeniable fact. The first call to action is alternating lifestyle choices, in which good behavior can be incentivized through such a systematically designed policy. Carbon taxes based on carbon combustion emissions are feasible and they already exist in countries like British Columbia and Sweden. US State-level governments, of New York State in particular, are looking into modeling off similar bills to these countries with the goal of creating a neutral economic effect (no decline in economic growth). A carbon tax is currently at the forefront of policy change in New York that could possibly generate $7 billion for New York State in its very first year enacted. This proposal leads the way for local governments in claiming energy independence. The benefits of such a tax will encourage the use of alternative energies, since the price of fossil fuels will no longer be cost efficient, along with raising revenues to fund social initiatives (i.e. building sea walls, increasing mass transportation efficiency, offsetting its regressive nature to not affect the poor and middle incomes, etc.), and stimulating the economy by creating jobs to fill the new demand for sustainability specialists. The American Society of Actuaries, which assesses risk to see what's insurable has just started a climate change study to evaluate the monetized risk of businesses due to environmental issues. A carbon tax has no color, there even exists a carbon tax drafted by the

conservative party. This market-based force is designed to pay for consequences and in turn change behaviors.

Since actual change is brought about by analyzing quantitative data, it seems that accountants are going to save the day. In order to keep up with the rapidly changing market revolved around carbon regulation, business entities are investing in low-carbon dioxide (CO_2) emission technologies, as part of their carbon permit compliances, along with account for the increased cost put onto consumers. Quantifying all processes allows managers to make strategic business decisions where "strategic management accounting information would facilitate decisions on business policy, human resource management, marketing, supply chain management, and finance strategies and the resultant evaluation of performance" (Ratnatunga, 2009). Global warming has impacted the cost of managerial accounting of corporate operations, to find solutions for environmental distortion. This shift requires informed decision making, along with changing out unprogressive people in command, since traditional business organizations need the support of more active sustainable mechanisms.

The Kyoto Protocol was an international standard agreed on at the Applied Power and Economics Conference in Australia, which assigned "allowable" CO2 emission caps to each county, only to be surpassed if the country can simultaneously balance the offset with carbon sinks, "such as trees, plankton, soils, and water bodies" (Ratnatunga, 2009). This is among one of the various alternative social mechanisms for reducing carbon emissions is the International Emission Trading (IET) scheme, where countries essentially trade carbon credits (allowances) in this new economic market. Countries with surplus carbon credits would be able to sell them to countries, qualified under Kyoto, with Co2 emission-reduction targets and limitations.

Quantifying our pooled resources in this way assigns responsibility for each nation's actions, as it makes countries account the post costs in with their production costs. Although the US has already backed out of some Individual Nationally Determined Commitments (INDCs) to reduce carbon emissions timid goals Global Climate Accord. "Separate studies by the oil giant BP (formerly British Petroleum) and the German Institute for Physics and Atmosphere released earlier this year revealed that the world's shipping could have a more serious impact on global warming than air travel" (Ratnatunga, 2009). Such mechanisms will indeed demand organizational and individual lifestyle changes, and shifts in world trade. The distance a product has to travel to reach its place for consumer purchase is also taken into consideration.

CONCLUSION

If clothing is actually the skin we choose, we should be able to choose the impacts of our purchases. Fashion is a choice. As a form of self-expression, consumers should have the right to clothing that reflects our moral and ethical vision for a better world. Consumers can give business to and empower companies who share ethical values by alternating how each consumer's tendencies affect the bigger picture. If only we could vote for clean clothes at cash registers, however citizens can take active measures by checking clothing sourcing information sourcing on clothing tags, check the quality of items by their seams for instance. Customers should make sure they absolutely love their clothing items before committing to a purchase. The Love Your Clothes initiative from the charity Wrap gives information for consumers on each stage of the purchase process, from buying smarter, to caring for and repairing items, to upcycling or customization and finally responsible disposal. Ultimately, the best thing we can do is to keep our clothing in use for longer – and buy less new stuff.

Conscious consumers make sure to be highly selective when making purchases as a means of buying less stuff. On top of this, what we do purchase should be of high quality so that clothing can live longer, hopefully to have multiple useful lives after being discarded by its previous owner to one day become recycled vintage or useful scrap fabric to be materialized for a new purpose. By adopting the theory of quality over quantity, consumers can enjoy their purchases for longer. This will in turn cause brands to redesign product sourcing and delivery around the consumer's right to desire organic fibers and certified farms and factories, as all humans deserve the same intrinsic rights for living a clean fashionable lifestyle.

As a synonym for crisis, opportunity is engaged through entrepreneurism to form creative solutions for a new mode of industry operations. Futuristic fashion businesses are investing in new technology to improve recycling of anaerobic digestion and composting, along with enforcing alternative material streams, allowing for more effective use of resources, including utilizing a renewable inputs. Sustainability is a must, and it's here to stay. It's not just a trend. If fashion is indeed the skin you choose, we should choose a long-lasting future.

"The greatest threat to our planet is the belief that someone else will save it."

-Robert Swann

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