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PURSUING ENVIRONMENTAL SUSTAINABILITY IN THE FAST FASHION INDUSTRY

An exploratory qualitative research

Nguyen Ngoc Minh Chau

International Business
Bachelor's Thesis
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ABSTRACT OF
BACHELOR'S THESIS

Author: Nguyen Ngoc Minh Chau	
Title of thesis: Pursuing Environmental Sustainability in the Fast Fashion Industry: A Qualitative Exploratory Research	
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Supervisor: Maria Elo	

Objectives: The main objectives of this study were to explore processes associated with producing fast fashion apparels that negatively impact the environment, to explore the sustainability initiatives that big clothing manufacturers and retailers in the fast fashion industry have adopted, and to explore the reporting practice of fast fashion firms concerning their environmental performance.

Summary: For this study, a qualitative content analysis was conducted to analyze a sample of five corporate reports or sustainability reports of fast fashion companies for the fiscal year of 2016. The findings related to the environmental impact of fast fashion industry were addressed by the literature review, while findings on environmental initiatives and reporting practices on environmental performance of fast fashion companies were based on the content analysis of the reports.

Conclusions: The environmental impact of the fast fashion industry stems from transportation, cultivation of raw materials, processing of fibers, and textile waste. Environmental initiatives taken by fast fashion companies can be categorized into product design, process design, supply chain, and customer engagement and awareness. Reporting practices of fast fashion firms on their performance are found to be focused on certain indicators; putting the environmental indicators within the context of the sustainability measures taken, it can be concluded that the measures bring about positive environmental performance outcomes for companies.

Key words: fast fashion, environmental sustainability, environmental impact, sustainability initiatives, environmental practices, environmental performance, environmental indicators, corporate reports, content analysis

Language: English

Grade:

TABLE OF CONTENTS

1 INTRODUCTION

Sustainable development has become a responsibility rather than a mere trend after the 17 Sustainable Development Goals of the 2030 Agenda for Sustainable Development was introduced by United Nations at the start of 2016 (www.un.org). Among the 17 Goals, already five of them directly address the environment. Indeed, environmental sustainability has become a centerpiece for managers working across industries that have negative impact on the environment, and the fashion industry is not an exception. The increasing public awareness of environmental issues during the last decade has urged clothing retailers and manufacturers to adopt practices that cause less harm to the environment (Chen & Burns, 2006). Just last year, a film named "River Blue" was released, exploring how rivers and waterways have been heavily polluted by the textile industry and affected the lives of many people (River Blue, 2017). It is apparent that the issues concerning environmental sustainability in the fashion industry have received much attention among both the press and especially the academia. Therefore, this paper seeks to explore various environmental impacts of the fast fashion industry, the environmental sustainability initiatives taken by fast fashion firms, as well as their environmental performance reporting practices.

1.1 Research problem

Clothes are undoubtedly so indispensable in daily life that their presence has been taken for granted. However, it is not so widely known that the apparel industry is one of the largest industrial polluters, second only to oil (Sollano, 2017). The processing of materials and textiles as well as the manufacture and distribution of clothes have altogether put an extremely heavy strain on the environment. Specifically, the advent of fast fashion in the last couple of decades as a response to changes in the fashion industry has further exacerbated the issue with its low cost and flexibility in design, quality, delivery, and speed to market (Bhardwaj & Fairhurst, 2009). Many fast fashion firms have attempted to mitigate their environmental impact through numerous sustainability initiatives, which have brought favorable outcomes overall considering the environmental performance indicators that these companies report on.

1.2 Research questions

In view of the aforementioned research problem, this paper attempts to address the following research questions:

1. What are the environmental impacts of the fast fashion industry that make environmental sustainability a challenge for this sector?
2. Which practices have been adopted by fast fashion firms to tackle the challenge of environmental sustainability and to improve their environmental performance?
3. How do fast fashion companies assess their environmental performance?

1.3 Research objectives

Corresponding to the proposed research questions, four research objectives have been established.

1. To explore processes associated with producing fast fashion apparels that negatively impact the environment.
2. To explore the sustainability initiatives that big clothing manufacturers and retailers in the fast fashion industry have adopted.
3. To explore the reporting practice of fast fashion firms concerning their environmental performance.

This study is structured into five main sections: Introduction, Literature Review, Methodology, Findings & Discussion, and Conclusion. Following the literature review, there is a conceptual framework that serves as the foundation for the empirical analysis of this paper.

2 LITERATURE REVIEW

This literature review seeks to perform a structured review of available literature concerning the environmental sustainability issue particularly in fast fashion, a phenomenon that has emerged in response to changes in the fashion industry. This literature is structured in four main sections. First, the concepts of sustainability and the triple bottom line associated with it are explained. Second, the changes in the

fashion industry that lead to the advent of fast fashion are explored. Third, there is a review of literature with regards to the supply chain management of fast fashion. Fourth, various issues associated with environmental sustainability in the fashion industry are examined, including the globalization trend of clothing production, the unsustainable characteristics of the fashion industry, and the different sustainability initiatives that have been adopted. Finally, a conceptual framework that aims to visualize concepts and provide a basis for empirical analysis is illustrated.

2.1 The concept of Sustainability and the Triple Bottom Line in business

2.1.1 Definition of Sustainability

The concept of "sustainability", also known as "sustainable development", was originally defined by the United Nation's World Commission on Environment and Development (1987: 41) as the capability "[to meet] the needs of the present without compromising the ability of future generations to meet their own needs". More specifically at the organizational level, sustainability was given the definition of "meeting the needs of its stakeholders without compromising its ability to meet their needs in the future" (Hockerts, 1999: 32). However, the interpretation of sustainable development from a corporate perspective is sometimes rather different; managers mainly associate corporate sustainability with the economic performance, neglecting the other two, and focus on the maximization of shareholder value, market share, and innovation (Bansal, 2002). Sustainability can be perceived differently depending on each organization's strategy, whether as "a compliance issue, a cost to be minimized, or an opportunity for competitive advantage" (Hubbard, 2009: 181).

2.1.2 The concept of Triple Bottom Line

Sustainability is believed to be based on three interconnected pillars, namely economic prosperity, environmental quality, and social justice, which can also be recognized as the 3Ps – people, planet, and profit (Elkington, 1997; Bansal, 2002; Elkington, 2013). These three principles are widely acknowledged as the Triple Bottom Line (TBL), a term initially introduced by John Elkington in 1994 and later gaining currency after the publication of his book, "Cannibals with forks: The triple bottom line of 21st century business", in 1997 (Elkington, 2013). He strongly believed the TBL to be something

that individual businesses and gradually the entire economies would have to perform when the 21st century was approaching.
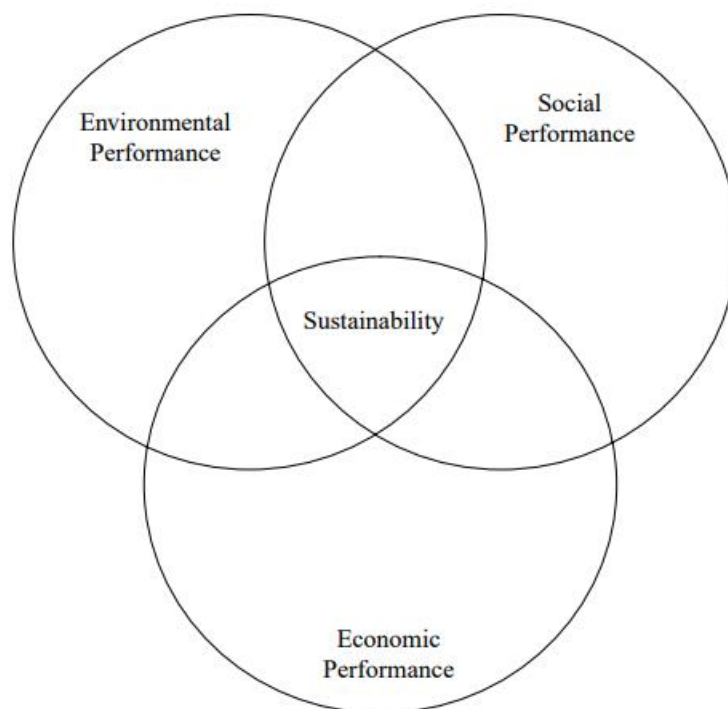
Figure 1: Sustainability – The Triple Bottom Line (Carter & Rogers, 2008: 365)

However, there was some controversy regarding the usefulness of the term; according to Norman and MacDonald (2004: 7), the TBL was redundant to contemporary discussions on corporate social responsibility, which constitutes a quite similar idea, generally defined as "a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" (Commission of the European Communities, 2001), and that "what is novel about 3BL is not sound". They asserted that the social bottom line made no sense because it is impossible to quantify an organization's social performance to produce a "bottom line" result such as the financial bottom line. Hubbard (2009) also held the same opinion when he claimed that measuring social and environmental performance was not a straightforward task as they were specific to each firm or industry and usually quite difficult to be quantified. Nevertheless, the TBL is still popular among many big businesses; exemplars include General Electric, Unilever, Proctor and Gamble, and 3M (Slaper and Hall, 2011). They do not adopt an index-based TBL, but they do measure their sustainability performance based on the

TBL concept. After all, the flexibility of the TBL allows companies to employ the concept according to their needs.

These concepts of sustainability and triple bottom line play a crucial role for clothing retailers and manufacturers, as they do not exist in a vacuum but rather in a circle with various stakeholders, and their decisions and corresponding actions inevitably have impacts on those stakeholders. In view of the increasing public concerns of social and environmental problems, industry practices are bound to undergo changes (Turker & Altuntas, 2014), especially when there has a shift in power in the fast fashion industry from retailers to consumers (Barnes & Lea-Greenwood, 2006). This idea will be discussed in more depth in the following sections.

2.2 The emergence of fast fashion

Until the mid-1980s, apparels were manufactured in a large-scale and low-cost manner and with low diversity in styles since the design capabilities of the factories was limited (Brooks, 1979). A work shirt factory would only produce work shirts; that factory would have been "literally tearing itself apart" if it had to manufacture another product (Bailey, 2001: 35). Items such as jeans, men's shirts, trousers, and underwear hardly had their designs changed for decades; however, there were still the exceptions of several women's clothing styles and rapidly changing haute couture, which denotes highly sophisticated and high-end apparels targeted at the market segment with high income and social status (Brooks, 1979; Mazza & Alvarez, 2000; Bailey, 2001).

It was evident that consumers before the 1990s attached less importance to style and fashion, and favored basic clothing (Bhardwaj & Fairhurst, 2010); however, they later became more fashion-conscious (Bailey, 2001). At the beginning of the 1990s, Bailey and Eicher (1992) took note of a sudden rise in the import of apparel for women that were rather stylish and fashionable compared to the standardized apparel in the 1980s. In turn, rather than focusing on cost reduction for manufacturing, clothing retailers started responding to the new fashion trends by the expansion of their product range with new and 'refreshing' products (Barnes and Lea-Greenwood, 2006). At the same time, there has been a constant change in consumer demands, and contemporary women are updating and refreshing their wardrobes more frequently than they used

to, even within a single fashion season (Mintel, 2003; Barnes and Lea-Greenwood, 2006). Furthermore, it became a growing trend for fashion businesses to increase the number of 'season', which means the frequency of changing the entire products within a store; in the case of the successful clothing retailer Zara, there might be as many as 20 micro-seasons per year (Christopher et al., 2004). Tyler et al. (2006) also noticed a similar trend of retailers launching more phases (3 – 5 phases) to the existing traditional seasons of Spring/Summer and Autumn/Winter. Crewe and Davenport (1991) cited in Tyler et al. (2006) indicated that garment suppliers were increasingly expected to introduce products in smaller batches within shorter lead times due to the extension of the number of micro-seasons.

Capturing the transitions in the fashion industry taking place around this period, the concept of "fast fashion", also known as "quick fashion" or "street fashion" in Europe (Guercini, 2001; Doeringer and Crean, 2006) began to emerge. It was believed to be originally developed in France to meet the demands of teenagers and young adult women for trendy and reasonably affordable clothing (Doeringer and Crean, 2006). Barnes and Lea-Greenwood (2006: 4) defined fast fashion as "a business strategy which aims to reduce the processes involved in the buying cycle and lead times for getting new fashion product into stores, in order to satisfy consumer demand at its peak". The authors (2006: 19) also found out that fast fashion is largely a consumer driven move – "reacting in season to maximize sales by responding to and satisfying consumer demand". Furthermore, it is apparent that the concept of fast fashion revolved around response to changing styles, trends, and demand; both Christopher et al. (2004) and Doeringer and Crean (2006) contended that the cornerstone of fast fashion was the capability to promptly spot fashion trends, discover potential new fads, and transform them into products ready on the shelf in the shortest time possible. This idea of identifying a pattern and predicting the next accordingly, also called "shared situation awareness", is believed to be the decisive element to the success of Zara, one of the pioneers in the fast fashion industry (Sull & Turconi, 2008).

2.3 Fast fashion supply chain management

The fast fashion industry has the same characteristics as the traditional fashion industry, including low predictability, high market demand volatility, high impulse

purchase, and short life-cycle (Bruce et al., 2004; Christopher et al., 2004; Bhardwaj & Fairhurst, 2010). In order for fast fashion supply chains to adequately respond to those features, such strategies as lean or agile supply chain and quick-response system (Christopher et al., 2004) were utilized.

On the one hand, Naylor et al. (1999: 108) defined lean supply chain management as "developing a value stream to eliminate all 'waste', including time, and to ensure a *level* schedule". Abernathy (2000) claimed that lean retailing requires quick product replenishment, and high rate of order fulfilment, punctuality, and accuracy. On the other hand, agile supply chain management means "using market knowledge and a virtual corporation to exploit profitable opportunities in a *volatile* market place" (Naylor et al., 1999: 108). There are several features of an agile supply chain, namely market sensitivity, in-time response to changes in demand, and use of information technology (Bruce et al., 2004). Christopher et al. (2004) presented a similar view, indicating that agile supply chains have shorter lead times, are demand-driven and information-based rather than forecast-driven and inventory-based like traditional supply chains. He also asserted that agility in clothing supply chains is indispensable due to the volatility and unpredictability of fashion markets. Nevertheless, Bruce et al. (2004) posited that textile and clothing supply chains are characterized by neither agility nor leanness solely, but by a mixture of the two – "leagile". This enables companies in textile and clothing to provide fast product replenishment and maintain flexibility to keep pace with the volatility of consumer demand.

Considered the ultimate agility, quick response strategy has achieved growing popularity in the fashion industry (Christopher et al., 2004). Lowson et al. (1999) cited in Christopher et al. (2004:14) gave a definition for quick response as follows:

> A state of responsiveness and flexibility in which an organisation seeks to provide a highly diverse range of products and services to a customer/consumer in the exact quantity, variety and quality, and at the right time, place and price as dictated by real-time customer/consumer demand.

What considerably differentiates quick response from traditional clothing supply chains is the tendency of collaboration and vertical integration to improve efficiency (Barnes & Lea-Greenwood, 2006). Sen (2008) considered these elements as prerequisites for quick response to be successfully implemented, arguing that information sharing

between manufacturers and retailers is mandatory. Christopher et al. (2004) elaborated this idea further by proposing that fundaments of quick response include such factors as market sensitivity – quick response to consumer trends, virtual integration – shared information across all suppliers, networked logistical systems – leverage of partners' capabilities, and process alignment – collaborative process and product planning and design. The importance of supplier engagement into the management of supply chain is once again reiterated in a research by Turker and Altuntas (2014), who conducted a content analysis of nine fast fashion firms' corporate reports to examine their sustainable supply chain management. The authors discovered that these companies placed heavy emphasis on integrating suppliers into their system to ensure that they also comply to the same sustainability requirements.

Overall, according to Cachon and Swinney (2011), there were at least two components of a fast fashion system: (1) quick response – short production and distribution lead times, allowing for synchronization of supply with changing demand, and (2) enhanced design – highly trendy product design. The authors concluded with their research by saying that the two practices are more likely to have a complementary effect on each other (i.e. implementing one practice increases the marginal worth of the other) rather than substituting (i.e. implementing one practice decreases the marginal worth of the other), and that the more strategic the customers, the greater the extent of complementarity. Caro and Martínez-de-Albéniz (2014) suggested a basically similar but rather more holistic characterization of fast fashion business models, positing three elements: (1) quick response, (2) frequent assortment changes, and (3) fashionable designs at affordable prices. Despite its breadth, this definition does exclude several fashion retailers often mistakenly considered fast fashion, such as Old Navy, the sub-brand of Gap Inc., which offers reasonably-priced clothing but does not employ the quick response system (Caro & Martínez-de-Albéniz, 2014). The quintessence of success in the fast fashion industry must be Zara, with its acclaimed business model of quick response (Barnes & Lea-Greenwood, 2006). Zara is well-known for its short lead times; new products are delivered to Zara stores twice a week, a delivery frequency that might only be "common in the grocery business, but in fashion retailing they are unheard of" (New Yorker, 2000: 74). Short lead times enable Zara to predict short-term trends and sale more accurately, minimize inventory obsolescence, and postpone fabric dying, which help yielding higher profit margins (Tokatli, 2008).

2.4 Environmental sustainability in fast fashion industry

The emergence of fast fashion along with its distinctive characteristics from the traditional fashion industry have brought about negative impacts on the environment, the society, as well as the local economy of some countries such as those in Europe (DeBrito et al., 2008; Turker & Altuntas, 2014). Since this literature review aims to examine current literature about environmental sustainability in the fast fashion industry, this section focuses only on the environmental aspect of sustainability, excluding the social and economic aspect.

In response to the negative issues involved with the fashion industry, fast fashion retailers are increasingly adopting the sustainability mindset and undertaking sustainability initiatives (Caniato et al., 2012). Indeed, it is necessary for companies operating in sensitive business areas that, for example, exploit natural resources intensively or offer poor labor conditions, to put heavy emphasis on their sustainability strategies, which is the case of the fashion industry due to its intrinsic characteristics of excessive use of resource and the trend of outsourcing manufacture to low labor cost countries (Smith, 2003; De Brito et al. 2008).

2.4.1 The trend of global sourcing of clothing

MacCarthy and Jayarathne (2010) indicated that there has been a significant shift of clothing production from well-developed to less developed countries. According to the World Trade Organization (2015), among the top 10 clothing exporters in 2015 were China, Bangladesh, Vietnam, India, Turkey, Indonesia, and Cambodia. This global sourcing trend of the clothing industry is attributed to one of the two types of fast fashion retailers. Tokatli (2008) revealed two categories of retailers operating in the fast fashion industry: those with their own factories, such as Benetton and Zara, and those with no manufacturing facilities of their own, such as H&M and Mango. For example, according to the supplier list published on H&M official website, the fashion chain allocates their production at only 12 factories in its home country Sweden, while it outsources the heavy majority of its manufacture to countries such as China with 627 factories, Bangladesh with 305 factories, and Turkey with 283 factories (H&M, n.d.). Even Zara, the Spanish apparel retailer which gained "the reputation of being one of the exceptions to globalization" has started to source their production offshore to Morocco, Bulgaria,

Turkey, Vietnam, and so on (Tokatli, 2008: 21). This practice of offshoring production has led to adverse consequences on the environment due to transport-related energy consumption and harmful emissions (Caniato et al., 2012; Turker & Altuntas; 2014). Furthermore, the issue is aggravated even further by the quick turnaround time pressured by fast fashion industry, which results in higher carbon footprint because of the use of airfreight (Saicheua et al., 2012). In addition, when shipped by sea or by land, clothes are often packaged as 'retail-ready' in the containers, hanging on bars or strings; in this way, only 30% of container capacity is utilized compared to full capacity with clothes packaged in flat-packs (Saicheua et al., 2012).

2.4.2 The "unsustainable" characteristics of the fashion industry

2.4.2.1 Impacts of cultivating raw materials

Apart from the impact of global sourcing, the fashion industry imposes further burdens on the environment due to its nature. The production processes of clothing extensively exploit natural resources and heavily use chemical products (De Brito et al., 2008). This can be seen, for instance, through the growth of cotton and the creation of polyester; these two fibers together dominate more than 80% of the global textile market (Simpson, 2006). Cotton, the most important natural apparel fiber in the world, has been under the examination of various literature (Clay, 2004; Chen & Burns, 2006; Fletcher, 2008; Lakhal, 2008; Grose, 2009; Saicheua et al., 2012). Cotton is a natural cellulosic fiber, a renewable and biodegradable resource; therefore, it is believed by many to be an environmentally-friendly product (Chen & Burns, 2006). On the contrary, cotton grown conventionally is actually one of the major enemies to the environment due to its need for high levels of chemicals to account for its susceptibility to insects and fungi (Lakhal, 2008; Chen & Burns, 2006). It takes intensive use of pesticides and insecticides to grow conventional cotton; this fiber takes up roughly 25% of global insecticide consumption and 11% of global pesticide consumption according to Clay (2004). Environmental issues such as severe human health problems, water and air pollution, insect and weed resistance, depleted soils, and loss of diversity are several issues that are caused by these chemicals (Grose, 2009). However, substantial use of chemicals is not the only downside of conventional cotton; growing this textile fiber also requires a considerable amount of water. It takes 7000 – 29000 liters of water to produce 1 kilogram of cotton fiber, which can merely be processed to make one pair

of jeans (Clay, 2004). Fortunately, many of these issues caused by cotton cultivation can be addressed by cultivating cotton organically, which is a process that requires much less pesticides, fertilizers, and other toxic chemicals (Fletcher, 2008). The overall product toxicity of organic cotton is dramatically reduced by 93% compared to conventional cotton (Allwood et al., 2006).

In contrast to cotton, polyester is a synthetic fiber, yet it is also widely popular with the reputation of being the "workhorse fiber of the industry" (Chen & Burns, 2006). While polyester consumes less water and land, it uses non-renewable resources and its emissions into air and water if not treated can cause medium to high damage to the environment (Fletcher, 2008; Shen & Patel, 2010). Compared to cotton, polyester only needs approximately 0.1% of the amount of water that cotton requires; however, manufacturing 1 kilogram of polyester consumes on an average 63% higher energy than producing the same amount of cotton (Kalliala & Nousiainen, 1999; Fletcher, 2008). The reason for such intensive energy consumption is that petrochemicals are the key ingredients in polyester manufacture; the petroleum is not only utilized as a raw material but also a source of energy for the conversion process of the fiber (Fletcher, 2008). During its production, polyester not only releases into the air toxic emissions that can lead to or worsen respiratory diseases but also discharges harmful substances into the wastewater (Claudio, 2007; Saicheua et al., 2012). Fortunately, recycled polyester, an alternative to virgin polyester, is much more environmentally-friendly as it uses PET – polyethylene terephthalate, the same material that is found in clear plastic bottles, as its raw material (Chen & Burns, 2006; Fletcher, 2008). This makes good use of the thrown-away plastic that otherwise would end up in landfills. Furthermore, the environmental impact of recycled polyester is discovered to be more positive than its virgin counterpart due to its roughly 85% lower air pollution (Chen & Burns, 2006).

2.4.2.2 Impacts of processing fibers

Apart from obtaining fibers, there are also environmental concerns associated with processing fibers to fabric and garment. The dyeing process is highly resource intensive (Fletcher, 2008; Saicheua et al., 2012); a kilogram of fiber consumes nearly 80 to 100 liters of water to dye (Anyangwe, 2010). Additionally, the dyeing process

discharges effluent that still contains color from the dye, which is the source of metal pollutants such as zinc, copper, and chromium (Fletcher, 2008). If this discharge is untreated, it can have detrimental effect on waterborne biodiversity and enter the human food chain (Greenpeace International, 2011). Generally, darker shade will result in a greater amount of dye going into effluent, so the problem can be alleviated by avoidance of dark shade (Fletcher, 2008). Another issue related to the processing of fibers is non-renewable energy consumption such as fossil fuel and nuclear power from use of machinery during the knitting, weaving, and manufacturing process (Saicheua et al., 2012).

2.4.2.3 Impacts of textile waste

It is estimated that nearly 75% of the 2.35 million tonnes of clothing and textile discarded by consumers in the UK ends up in landfills (Allwood et al., 2006). A proportion of that waste is made from non-biodegradable synthetic fiber (Saicheua et al., 2012); other natural fibers do decompose yet producing emissions of toxic gases such as methane or ammonia during the process, which are pollutants to both air and water (Fletcher, 2008). In terms of the other 25% of textile waste that is recovered, they are either reused, repaired and reconditioned, or recycled (Fletcher, 2008). Reuse, which involves collecting, sorting, and reselling as second-hand clothes, "brings significant environmental savings" (Fletcher, 2008: 100). Repair and reconditioning requires more resources as retrieving, fixing, and upgrading the products need labor and additional materials (Fletcher, 2008). Recycling uses resources the most, yet still less than producing new items even with the most complex processes (Fletcher, 2008). However, Aakko & Koskennurmi-Sivonen (2013: 16) maintain that recycling materials consumes energy for the mechanical or chemical processing of fibers and respinning them into new yarns, which means it is "a way of managing waste, but not a way of reducing it".

Another issue associated with textile waste is the release of microplastic fibers, or microfibers, during domestic laundry of synthetic fibers, particularly polyester (Bruce et al., 2016; Hartline et al., 2016; Pirc et al., 2016). Microplastics, plastic particles smaller than 5 mm, are a new pollutant found in freshwater and marine environments (Andrady, 2011; Hartline et al., 2016). They can easily enter airborne organisms such as plankton

(Wright et al., 2013) and get entangled in their stomach, consequently reducing feeding activity (Bruce et al., 2016). Furthermore, the ingestion of microplastics can lead to the absorbed chemicals being leached, which in turn become a source of toxic substances impacting the organisms and entering the food chain upward to humans (Koelmans et al., 2013). Dangerous as they are, microplastic fibers are released into the environment in every domestic wash (Hartline et al., 2016; Bruce et al., 2016; Pirc et al., 2016). Washing experiments were conducted by a number of researchers in both front and top-load household washing machines for polyester fleece jackets and sweaters, and it was discovered that there are approximately 0.16 to 2.7g microfiber mass shedded per garment per wash, with increased shedding as garments age (Hartline et al., 2016; Bruce et al., 2016). Additionally, the amount of microfiber mass recovered from top-load machines is much more considerable than that from front-load machines, which was found to be seven times larger by Hartline et al. (2016) in comparison with 2.7 times by Bruce et al. (2016). Although this issue of microfiber pollution occurs during the consumption phase of consumers, it is of significant implication for fashion managers and manufacturers in terms of their use of materials and their strategy to mitigate the impact of this type of pollution.

2.4.3 Different approaches to improve environmental performance

A number of sustainability measures have been adopted to improve environmental performance in the fashion industry. At the industry level, various environmental standards and programs have been introduced by industry associations and alliances or not-for-profit organizations, including Global Organic Textile Standard[1], Better Cotton Initiative[2], Zero Discharge of Hazardous Chemicals[3], and Sustainable Apparel Coalition[4]. Furthermore, alternative sustainable fibers have also been developed, such as man-made cellulosic fibers which originate from sustainably forested wood pulp as

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[1] Global Organic Textile Standard: acknowledged as the world's leading processing standard for textiles made from organic fibers, involving strict environmental and social criteria in the entire organic textile supply chain (http://www.global-standard.org).
[2] Better Cotton Initiative: a program that aims "to make global cotton production better for the people who produce it, better for the environment it grows in and better for the sector's future." (BCI, n.d.)
[3] Zero Discharge of Hazardous Chemicals Programme: a program that encourages manufacturers in the textile, leather, and footwear value chain to improve the environment and people's well-being. (www.roadmaptozero.com)
[4] Sustainable Apparel Coalition: the apparel, footwear, and textile industry's leading alliance for sustainable production (www.apparelcoalition.org)

a substitute for cotton, and recycled polyester for conventional virgin polyester (Saicheua et al., 2012).

At the corporate level, fashion chain managers have taken active steps towards pursuing a green strategy. Caniato et al. (2012) examined environmental sustainability in fashion supply chains through their exploratory case-based research and revealed that product design practices are considered the core element of an environmentally sustainable strategy. In doing so, fashion company decision-makers keep a green mindset from the beginning of the design process and choose to use organic or recycled materials, manufacture a recyclable product, and use recyclable and reusable packaging. Production processes are also considered important; companies that have their own manufacturing facilities try to incorporate clean technologies and natural production processes such as natural leather drying (Caniato et al., 2012). In addition, mitigation of environmental impact through supply chain design plays a significant role; for retailers that outsource their production, strict compliance system, frequent monitoring and auditing of their supply partners are put in place (Turker & Altuntas, 2014). Many firms also focus on logistics and distribution optimization, attempting greener transports via, for example, vehicle routing, which is planning the transport route for minimal carbon emissions (Caniato et al., 2012).

This literature review has made an attempt to synthesize and review relevant constructs and researches in the fields of environmental sustainability and fast fashion. While prevailing researches produce persuasive findings and profound insights, certain gaps and shortcomings still exist. Firstly, a research that investigates the environmental impact especially of the fast fashion industry is still missing. Secondly, there has not been any literature that examines the different practices that can be adopted to achieve better environmental sustainability performance in a detailed, structured, and holistic manner. Besides these gaps, however, this literature review sets a strong theoretical foundation for further progress of the thesis. Furthermore, the review of literature on the "unsustainable" characteristics of the fashion industry has provided answers for the first research question of this study, which is "What are the environmental impacts of the fast fashion industry that make environmental sustainability a challenge for this sector?". This provides insights that certainly helps to clarify and broaden the understanding of the topic.

2.5 Conceptual framework
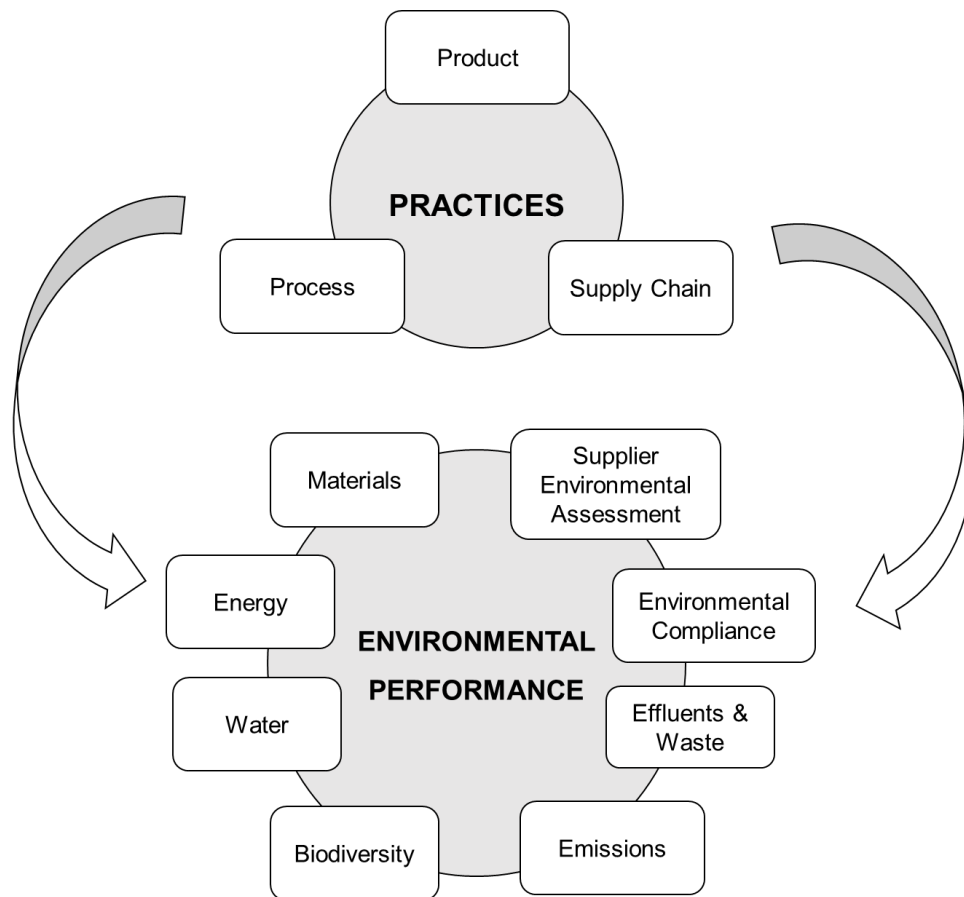
Figure 2: Conceptual Framework

The above-illustrated conceptual framework serves as a basis for the next analysis stage of this thesis. It is largely based on the research framework presented in a research conducted by Caniato et al. (2012). In the framework, sustainability practices are categorized according to the Three-Dimensional Concurrent Engineering framework by Fine (1998), which has been further applied to environmentally responsible manufacturing practices by Ellram et al. (2007). There are particularly three categories (Ellram et al., 2007; Caniato et al., 2012):

- Product Design: involves issues such as design specifications, quality, materials, and packaging.

- Process Design: concerns production processes from raw materials to the finished products, including manufacturing methods, technology, equipment, and such like.

- Supply Chain: encompasses insourcing and outsourcing, logistics system, relationships with stakeholders in the supply chain, especially suppliers and customers.

On the other hand, the categorization of environmental performance is based on the latest Global Reporting Initiative (GRI) Sustainability Reporting Standards, the first global standards for sustainability reporting on a range of economic, environmental, and social impacts (www.globalreporting.org) as well as the most popular framework according to KPMG (2017). Considering the scope of this thesis, only the environmental standards by the set of GRI are utilized. Eight aspects belong to the general standardized environmental standards, while one aspect, "business integration", is industry-specific for the Apparel and Footwear Sector. Below is an overall view of the indicators encompassed in each aspect (GRI, 2016):

- Materials: use of non-renewable or renewable materials; use of recycled input materials; percentage of reclaimed products and their packaging materials.

- Energy: energy consumption within and outside the organization; energy intensity; reduction of energy consumption; reduction in energy requirements of products and services.

- Water: amount of water withdrawn; number of water sources affected by withdrawal of water; amount of water recycled and reused.

- Biodiversity: details of operational sites related to areas of high biodiversity value; impact of activities, products, and services on biodiversity; and protection or restoration of habitats.

- Emissions: direct and indirect emissions of greenhouse gas (GHG), ozone-depleting substances (ODS), and other significant air emissions; reduction of GHG emissions.

- Effluents and Waste: water discharge by quality and destination; weight of hazardous and non-hazardous waste by disposal methods; water bodies affected by water discharges.

- Environmental Compliance: fines and non-monetary sanctions for non-compliance with environmental laws and regulations.

- Supplier Environmental Assessment: new suppliers that were screened using environmental criteria; negative environmental impacts in the supply chain and actions taken.

This structured and holistic framework is a useful fundament for the corporate reports' content analysis process, the methodology of which will be discussed in more depth in the following section.

3 METHODOLOGY

As the literature review has provided answers to the first research question, the rest of this paper aims to seek answers to the other research questions, which are:

RQ 2: Which practices have been adopted by fast fashion firms to tackle the challenge of environmental sustainability and to improve their environmental performance?

RQ 3: How do fast fashion companies assess their environmental performance? As these questions are exploratory by nature, this paper is correspondingly an exploratory study. In order to answer the aforementioned questions, actual practices and measures of performance of fast fashion firms must be explored and then compared to find commonalities. One research method that would effectively serve this purpose is case study, which involves careful and complete observation and analysis of processes and their interrelationship (Kothari, 2004). Case study in this particular research would allow for direct interaction with fast fashion companies and their managers, hence in-depth exploration of environmental sustainability practices and their measures. However, another more accessible secondary source of information that provides sufficiently comprehensive details about these aspects is corporate annual report or particularly sustainability report. With these qualitative data, the method of content analysis can be adopted. According to Milne and Adler (1999), content analysis is the most common research technique to assess organizations' social and environmental disclosures. Taking this point as well as this study's scale and allotted time frame into account, the content analysis method has been chosen over case study.

3.1 Data collection and sample selection

The sample for this study consists of five fast fashion brands that are selected from a list compiled by Caro and Martínez-de-Albéniz (2014), namely H&M, Zara, Gap, Uniqlo, and Mango. Since no known clothing brand describes itself as offering fast fashion clothing, reference to an external source is necessary in order to identify companies operating in this sector. In their study, Caro and Martínez-de-Albéniz (2014) assembled the list of fast fashion firms by performing a frequency count of brand names associated with the exact phrase "fast fashion" in all media publications from 2012 to 2013 using the Factiva database. This was followed by a validation check,

which involves performing a similar frequency count in all PDF documents available through the Google search engine that contained the phrase "fast fashion". The result of those measures performed by the authors are illustrated in Figure 2.

Table 1: Frequency count of apparel companies' in media publications that refer to "fast fashion" (Caro & Martínez-de-Albéniz, 2014: 3)

Specialty apparel retailer	number of appearances in Factiva search		number of appearances in PDF online search	
	rank	% appearances	% appearances	rank
H&M	1	31.7%	41.0%	2
Zara/Inditex	2	29.2%	45.9%	1
Gap	3	11.9%	18.2%	3
Uniqlo/Fast Retailing	4	9.9%	9.4%	8
Topshop	5	9.3%	13.7%	4
Forever 21	6	7.5%	11.2%	6
Mango	7	4.3%	12.4%	5
Wet Seal	8	3.2%	0.6%	16
Benetton	9	3.1%	10.1%	7
New Look	10	2.8%	6.2%	9
Esprit	11	2.8%	4.7%	10
C&A	12	1.9%	4.7%	11
American Apparel	13	1.2%	2.6%	13
Urban Outfitters	14	0.9%	2.8%	12
Peacocks	15	0.5%	1.1%	15
Charlotte Russe	16	0.5%	0.2%	17
Armani Exchange	17	0.3%	1.5%	14

With the aim of having a comparable data set, five of the top-ranking brands that (a) publicize their corporate annual or sustainability reports, and (b) prepare their reports in accordance with the GRI standards are chosen, which results in a final sample including H&M, Zara, Gap, Uniqlo, and Mango. Although the reports of Uniqlo and Mango follow an older version of the GRI standards, such version is still largely similar to the latest one, which means relevant information can still be found. The annual reports of the selected brands, which cover the fiscal year of 2016, are retrieved from their official website. As for Zara, Uniqlo, and Gap, the reports obtained entail the overall performance of all the brands associated with their parent company, which are Inditex (Zara), Fast Retailing (Uniqlo), and Gap Inc. (Gap). In the case of Gap, their GRI disclosures are retrieved mostly from the company's Global Sustainability website.

Table 2 provides overall basic information about the sample five firms that were collected from their corporate reports or official websites. As can be seen from the table, all five companies operate on an international scale, having strong and widespread presence all over the world.

Table 2: Overall Information on Sample Companies

Company	Headquarter	Revenues (in millions of euros)	No. of Employees	No. of Stores	No. of Suppliers
Inditex (Zara)	A Coruña, Spain	23,311	162,450	7,292 stores in 93 countries	1,805 suppliers
H&M	Stockholm, Sweden	21,870	161,000	4,351 stores in 64 countries	1,826 suppliers
Fast Retailing (Uniqlo)	Yamaguchi, Japan	13,590	100,130	3,160 stores in 18 countries	184 suppliers (for Uniqlo only)
Gap (Gap Inc.)	California, USA	12,510	135,000	3,659 stores in 40 countries	900 suppliers
Mango	Barcelona, Spain	2,260	15,730	2,217 stores in 110 countries	611 suppliers

Notes: Revenues in local currencies are converted to Euro according to the currency conversion rate as of March 6, 2018.

3.2 Data analysis method

Content analysis is a research method used for "making replicable and valid inferences from data to their context" (Krippendorff, 1989: 403), and Weber (1988) cited in Milne and Adler (1999: 1) posited that it involves codifying the content of a piece of writing into categories based on a set of criteria. In this study, the reports are analyzed and interpreted with the aim of exploring the environmental sustainability initiatives taken by large fast fashion firms based on the conceptual framework (Figure 2) presented in the previous section. Accordingly, relevant texts in the reports will be connected and categorized to delineate certain concepts through the use of specific words or themes. Specifically, this process is based on concepts related to practices and performance, which are the two general codes, presented in this paper's conceptual framework

(Figure 2). Each code has their corresponding sub-codes, as specified in section 2.5. – Conceptual Framework. The reports are scrutinized to see whether there are texts related to each code and sub-code, after which texts are recorded accordingly. The codes and sub-codes are as follows:

- Practices: (1) product design, (2) process design, and (3) supply chain.
- Performance: (1) materials, (2) energy, (3) water, (4) biodiversity, (5) emissions, (6) effluents and wastes, (7) environmental compliance, and (8) supplier environmental assessment.

4 FINDINGS AND DISCUSSION

Overall, the five companies attach considerable importance to sustainability in general and environmental sustainability in particular. Nearly all companies have a separate sustainability report apart from Inditex, which incorporates sustainability reporting into their corporate report as an integral part. Table 3 and Table 4 present the content analysis of those reports based on the conceptual framework, with the former about environmental practices and the latter about environmental performance reporting of the five fast fashion firms. Correspondingly, the results presented in Table 3 and 4 are aimed at answering the second and third research question respectively, namely (2) "Which practices have been adopted by fast fashion firms to tackle the challenge of environmental sustainability and to improve their environmental performance?", and (3) "How do fast fashion companies assess their environmental performance?"

4.1 Environmental Practices

Information in the reports related to environmental practices as categorized is reported in Table 3 below.

Table 3: Environmental Practices of the Five Fast Fashion Companies

Categories / Companies		Inditex	H&M	Fast Retailing	Gap	Mango
Product Design	**Overall design process**	• Creating garments following Right to Wear philosophy. • Environmentally-friendly products labelled Join Life, or Wear the Change.	• Incorporating circularity into design process. • Environmentally-friendly products labelled Conscious. • Using Life Cycle Assessment.	N/I	• Building awareness and education around sustainability for designers. • Using Life Cycle Assessment.	N/I
	Materials	• Sustainably sourced materials, e.g. organic cotton and cotton from BCI, or TENCEL®Lyocell. • Recycled materials, e.g. polyester, wool, cotton. • Focusing on upcycling, the creation of new fibers of the same quality, Refibra™Lyocell.	• Sustainably sourced materials, e.g. organic cotton, linen, hemp, jute, & silk, TENCEL®Lyocell & third-party certified down, rubber, wood, cotton from BCI & wool. • Recycled materials, e.g. recycled cotton, polyester, wool, cashmere, and plastic.	N/I	• Sustainably-sourced materials, e.g. wood-derived fabrics, sustainable cotton (organic, American-grown, and cotton from BCI). • Sustainable synthetic materials, incl. polyester, spandex, nylon.	Sustainable fibers, e.g. organic cottons, recycled cotton, recycled polyester, TENCEL®, among others.
	Packaging	• Reducing consumption of raw materials in packaging. • Using more sustainable materials in packaging.	N/I	N/I	• Reducing packaging weight or changing packaging materials to decrease overall waste volume or allow for greater recycling. • Reusing or recycling packaging.	• Packaging Waste Prevention Business Plan → for reduction and optimal use of product packaging. • Using 100% recycled materials in boxes, with paper sealing tape.

Table 3 *(continued)*

Categories	Companies	Inditex	H&M	Fast Retailing	Gap	Mango
Process Design	**Chemical management**	• Commitment to ZDHC Programme. • The List programme: aiming to improve quality of chemical products used in manufacturing of textile and leather products. • Ready to Manufacture: a code of good manufacturing practices for wet process facilities. • Green to Wear: a standard that guarantees our wet production processes are environmentally responsible. • Performance of RCA when an item does not comply with Health and Safety requirements, then a Corrective Action Plan provided for facilities to avoid repetition.	• Commitment to ZDHC Programme. • Having their own Restricted Substances List. • Training for H&M Group chemists in Green Screen hazard assessment. • Hazardous Substances Control training pilot for suppliers. • Environmental emission evaluator to help supplier assess performance and proactively improve chemical usage and discharge.	• Having their own Restricted Substances List. • Regular review and compliance with latest scientific guidelines to ensure safe use of chemicals. • Stringent quality standards against current best practices guidelines for partner factories.	• Commitment to ZDHC Programme. • Having their own Restricted Substances List. • Having independent 3rd-party laboratory to test for restricted chemicals in finished product.	• Creating a hazardous substances standard, of mandatory compliance for suppliers. • Exhaustive analysis of sample of finished garment by a laboratory.
Process Design	**Water stewardship**	Master Plan for Water Management in the Production Chain: part of Global Water Management Strategy, aiming at sustainable use	• Collaborating w/ WWF • Building water-efficient equipment across own operations, harvesting rainwater, raising awareness among employees.	N/I	Women + Water strategy: partnering with fabric mills and laundries to reduce manufacturing impacts; adopting more water-efficient product design and sourcing practices.	N/I

(Continued on next page)

		of water by Inditex and suppliers.	• Collaborating with STWI to implement sustainability guidelines that improve water practices in factories.		
Process Design	**Energy efficiency**	• LEED certified headquarters and centers; using electricity from renewable sources. • Eco-efficient stores: reduced electricity consumption (HVAC systems) & water usage; purchasing electricity from certified renewable sources.	• Within H&M Group: new technologies for lighting, heating, ventilation, and air-conditioning (HVAC) systems, purchasing/ self-generating renewable energy, installing solar panels on some buildings. • Across value chain: supplier energy efficiency programs; encouraging business partners to use renewable energy.	Investing in renewable energy, e.g. wind, micro-hydroelectric.	Energy-management solutions for retail operations, updating HVAC systems and exploring renewable energy options, installing LED lighting at stores.	N/I
Supply Chain	**Suppliers**	• All suppliers subject to policies and standards and required to register the factories involved in production. • Pre-assessment audit system - evaluation of potential suppliers. • Continuous development of supplier training to improve factories. • Effective auditing to ensure all suppliers and manufacturers comply with Code of Conduct	• All suppliers signing Code of Ethics and Sustainability Commitment and receiving dedicated training. • Supplier Impact Partnership Program: used as a pre-assessment for potential suppliers, to support suppliers in improving sustainability performance, & to help monitor and measure	• Pre-contract monitoring. • Conducting environmental audits at partner factories and in-depth environmental assessments using SAC's Higg Index tool. • Introducing Code of Conduct for second-tier fabric manufacturers. • Responsible Mill Program: rolling out the Higg Index with fabric manufacturers, or mills, collaborate with strategic	• All manufacturers signing Vendor Compliance Agreement. • Tier 1 suppliers trained on Code of Vendor Conduct (part of VCA) on an ongoing basis. • Supplier Sustainability Assessment Manual: used to assess and remediate issues. • Encouraging first and second-tier suppliers in conducting environmental footprint	• Allowing manufacturers to only subcontract production to companies authorized by Mango. • Manufacturers required to sign social, employment, and environmental Code of Conduct for manufacturers. • Conducting preliminary analysis & audit of factories before 1st orders.

		and establish Corrective Action Plans where possible defaults are detected.	suppliers' compliance & assess implementation of Sustainability Commitment. (SIPP based on Higg Index facility module and own KPIs) • Rewarding partners who maintain a good sustainability performance.	suppliers to improve environmental performance, using the Higg Index.	assessments, SAC's Higg Index. • Mill Sustainability Program: expanding sustainability programme beyond direct suppliers to strategic mills.	• Training from all departments involved in manufacturing process and CSR for new suppliers. • Quality control team periodically visiting different factories and checking if any aspect of Code of Conduct is breached.
Supply Chain	**Logistics**	• Green to Pack programme: improving shipment density, filling distribution trucks as efficiently as possible, and using these trucks as a reverse logistics channel to transport items returned to our stores. • Using thinner plastic bags to transport clothing. • All logistics centers having an ISO 14001 certified environmental management system. • Having indicators to measure efficiency of shipments.	• Working to reduce energy used in logistics, transport, and warehouses. • Transport service providers controlled by environmental programs and required to be part of Clean Shipping Project.	N/I	• Taking part in SmartWay Shipper Program. • Commitment to using cleaner modes of transportation and encouraging use of fuel-saving strategies and technologies.	• Cross-docking system used for initial deliveries to stores, which consists of pre-established assortments prepared by supplier. • Optimization of load times and volumes of deliveries. • Mainly using sea transport. • Distributing hung garments on coat hangers from supplier to distribution center and from there to nearest stores --> optimized use of packaging and of space.

Table 3 *(continued)*

Categories \ Companies	Inditex	H&M	Fast Retailing	Gap	Mango
Customer Engagement and Awareness	Closing the Loop program: reuse and recycling of textile products - placing specific containers to facilitate donation by customers; also initiating free home collection service for clothing donations.	• Providing customers with climate-friendly ways of caring for clothes, and encouraging them to use products longer, reuse, and recycle. • Clever Care label on garments in washing instructions. • Garment collecting initiative, then reusing or recycling (making products using post-consumer textile wastes).	Collecting garments and redistributing to others in need; recycling those that are not wearable.	N/I	• Project to collect clothing in stores for textile recycling; items collected from stores processed at KOOPERA recovery and recycling sites, where they are classified & given a second life. • Stores providing customers with bags made of recycled paper or certified paper.

Abbreviations: BCI: Better Cotton Initiative, CSR: Corporate Social Responsibility, KPI: Key performance indicator, RCA: Root Cause Analysis, SAC: Sustainable Apparel Coalition, STWI: Sweden Textile Water Initiative, WWF: World Wide Fund for Nature, ZDHC: Zero Discharge of Hazardous Chemicals.

4.1.1 Product Design

Product design is a crucial factor of the sustainability strategy of every company. Indeed, Gap Inc. (2017) revealed in their report that approximately 80% of products' environmental impact is attributed to decisions made in design and development. However, as for Fast Retailing, no information on their product design practices was found. An overall view of product design practices of the other four companies are presented as follows:

1. *Overall design process*: As the two largest companies in the sample according to their revenue and size, both H&M and Inditex have separate labels that signify more environmentally-friendly products, Conscious and Join Life/Wear the Change respectively. Products with these labels are either made up of more sustainable materials or produced with processes that have less environmental impact. Furthermore, Life Cycle Assessment[5] (LCA) comes across as a common practice by H&M and Gap. H&M conducts LCA to compare the overall environmental impact of recycled cotton and conventionally sourced cotton, while Gap performs LCAs to understand environmental impacts of the entire process – from design to manufacturing.

2. *Materials*: It is common practice among the four companies to have material choice as an indispensable part of their environmental sustainability initiatives. All companies choose to use sustainably sourced and recycled materials, the most common of which are organic cotton or Better Cotton from Better Cotton Initiative, TENCEL®Lyocell, recycled cotton, and recycled polyester. In this Material aspect, Inditex seems to be a pioneer when the company in collaboration with another company has developed a new high quality and sustainable material, Refibra™Lyocell, made from cotton waste and wood from sustainably managed forests.

3. *Packaging:* The main trend in terms of packaging practices is using more sustainable packaging materials and reusing/recycling packaging. Mango even has

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[5] Life Cycle Assessment: "tool to assess the environmental impacts and resources used throughout a product's life cycle, i.e.: from raw material acquisition, via production and use phases, to waste management." (Finnveden et al., 2008: 1)

its own Packaging Waste Prevention Business Plan, which aims to reduce and optimize use of product packaging and uses 100% recycled materials in boxes.

Overall these product design initiatives are bound to mitigate the environmental impacts of materials delineated in the literature review section to some extent. However, it is worth mentioning that the amount of sustainably sourced or recycled materials used by the sample companies only constitutes a fraction of the total materials. Thus, the environmental burden imposed by raw materials is likely to remain as long as production volume stays unchanged or continues to increase and those resource-intensive conventional materials are still mainly used.

4.1.2 Process Design

Companies have many similar and different initiatives in order to reduce the environmental impact of their own or their suppliers' production processes.

1. *Chemical management:* The majority of companies choose to partake in the Zero Discharge of Hazardous Chemicals and have their own restricted substances list or hazardous substances standard. H&M even takes an active step by sending their chemists for training in Green Screen hazard[6] assessment and provides Hazardous Substances Control training for its suppliers. Furthermore, several firms have a laboratory test for restricted chemicals in the finished products. As for Inditex, a root cause analysis is performed when an item does not comply with Health and Safety requirements.

2. *Water stewardship:* As for the companies that address water stewardship in their strategy, each of them has their own program and approach, but what they have in common is engagement and partnership with suppliers in the collective effort to use water sustainably.

3. *Energy efficiency:* A common practice for companies to improve their energy efficiency is installing a heating, ventilation, and air-conditioning (HVAC) system in their operational buildings and stores as well as using renewable energy. H&M even

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[6] GreenScreen® for Safer Chemicals: a method of comparative Chemical Hazard Assessment used to identify chemicals of high concern and safer alternatives (www.greenscreenchemicals.org)

takes a step further by self-generating renewable energy, installing solar panels on some of their own buildings, and by engaging their suppliers, implementing supplier energy efficiency program.

It is undeniable that the process design practices that companies adopt will diminish the impact of processing fibers and producing garments in terms of chemical and water use. However, the initiatives to improve energy efficiency are mainly just on an internal scale of the sample companies' own stores and buildings, while energy consumption by supplier factories certainly accounts for a considerable proportion due to the non-renewable energy used by machinery during the manufacturing process as discussed in the literature review.

4.1.3 Supply Chain

Since all five primarily contracts external factories to produce fabrics and garments, it is essential that they establish a close-knit working relationship with and maintaining direct control over their suppliers in terms of environmental performance. Logistics plays a major role as well, since transportation is one of the sources that releases the highest amount of carbon emissions according to data reported by the companies.

1. *Suppliers*: An approach that is taken by all companies in the sample to control their first-tier suppliers is conducting a preliminary audit of the factories and then requiring them to sign the company's code of conduct. Mango is even stricter in that they allow manufacturers to only subcontract production to factories known and authorized by Mango. Another necessary practice carried out by most of the companies is training their suppliers according to the company's standards and conducting frequent audits. What also stands out as common practice is the incorporation of the Sustainable Apparel Coalition's Higg Index, a tool for textile retailers and manufacturers to measure and score a company or product's sustainability performance (www.apparelcoalition.org). In addition, H&M even develops the Supplier Impact Partnership Program based on the Higg Index as a tool to monitor suppliers' compliance and support them in improving sustainability performance.

2. *Logistics:* Each firm has a different set of practices to reduce the environmental impact of transportation. H&M only opts for transport service providers controlled by environmental programs, while Gap takes part in SmartWay Program [7] themselves. Both Inditex and Mango attempt to optimize load volume by filling distribution trucks as efficiently as possible. One intriguing practice that was found is Mango's distribution of hung garments on coat hangers from suppliers to distribution centers and there to the nearest stores, which aims at optimized use of packaging and of space. In contrast, as previously discussed in the literature review, only 30% of container capacity is utilized when clothes are often packaged as 'retail-ready' (Saicheua et al., 2012). This is a small but interesting contradiction between reality and academic research.

Overall, the sustainability initiatives that involve suppliers are likely to minimize the overall environmental impact of the companies as suppliers directly produce what companies put on their shelf, playing a major role in the entire value chain. The same also applies to environmental strategies concerning logistics; however, in view of the increase in emission of scope 3 GHG, such strategies appear to be insufficient compared to the level of transportation and distribution that needs to be carried out. This will be discussed in further detail below in sub-section 4.2.1.

4.1.4 Customer Engagement and Awareness

Customer engagement and awareness was not part of the established conceptual framework; nevertheless, after the reports were analyzed, the category was added because it was constantly mentioned across the documents as integral environmental sustainability practices. As seen from Table 4, nearly all sample firms put strong emphasis on environmental initiatives that involve customers, which in the case of these firms is collection of old garments for the purpose of recycling, reusing, or making new products. This practice is bound to decrease the volume of textile waste released into the environment, thereby alleviating the pollution caused by such waste as discussed in the literature review. The majority of the collected garments are reused and made into new products, while the technologies for recycling blended textiles into

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[7] SmartWay Program: a program of the US Environmental Protection Agency that helps companies to improve supply chain sustainability by measuring and improving freight transportation efficiency (www.epa.gov).

new fabrics are still limited and still being developed through collaboration with business organizations and research institutes.

Notably, H&M even provide customers with instructions on caring for clothes and encourages them to use products longer. This practice seems to contradict the common notion of a "throwaway culture" purportedly promoted by fast fashion, in which customers are encouraged to replace and dispose of products before their actual life cycle had ended (Birtwistle & Moore, 2007). Remy et al. (2016) in a McKinsey & Company article acknowledged the same trend, pointing out that consumers now keep their garments for nearly half as long as they did 15 years ago. Therefore, H&M's initiative of instructing and encouraging customers to use apparels longer is likely to bring about changes in customers' consumption patterns. However, it is worth mentioning that fast fashion companies and their manufacturers first have to produce garments that are durable enough for customers to keep using the clothing items for a reasonable time.

Furthermore, it is noteworthy that the customer engagement and awareness initiatives of the sample companies still do not address the problem of microplastic wastes associated with consumers' domestic laundry mentioned in the literature review. Otherwise, overall, firms' environmental initiatives that engage customers will undoubtedly raise their awareness of minimizing their carbon footprint, hence mitigating the environmental impact of fast fashion clothing to a great extent.

4.1.5 Actors Involved

Each of the five sample companies in one way or another has one or several corporate bodies that directly manage and oversee all issues related to corporate sustainability. Most companies have a sustainability committee along with a sustainability team or department. Inditex even has a Social Advisory Board made up of individuals or institutions outside the company to advise them in the area of environmental sustainability; similarly, Gap Inc. has an Environmental Council that undertakes the same advisory role. As for H&M, there is a dedicated person for each standard or policy that is responsible for the implementation and update of that standard or policy. Although each firm has a different sustainability governance structure, one

characteristic that all five companies certainly have in common is the close coordination and cooperation with relevant departments or teams within the company to turn plans and goals into actions and achievements.

Another common pattern of the five companies' environmental sustainability strategy is the collaboration and engagement with stakeholders such as non-governmental organizations (NGO) and intergovernmental organizations (IGO), industry associations, and academic institutions. Most companies assert that many challenges are so systemic and complex that they cannot be solved by one actor alone and demand collective efforts, especially environmental issues such as climate change. Thus, as seen from the environmental practices of the sample firms, none of their sustainability teams implement strategy without the engagement of environmental organizations, most common of which are Zero Discharge of Hazardous Chemicals, Sustainable Apparel Coalition, and Better Cotton Initiative. H&M and Inditex even collaborate with academic institutions and universities in joint research projects, promoting a science-based approach and innovation to sustainability. Furthermore, Gap works with diverse groups of experts and organizations to foster better understanding of local conditions in countries where they do business. H&M has a similar practice of maintaining dialogue with policy-makers to shape their legal and regulatory context and stay informed about local standards and issues in various markets.

4.2 Environmental Performance

Table 4 presents indicators related to specific performance category that each company reports on.

Table 4: Measured environmental performance according to GRI Standards

Performance Category	Performance	Company				
		Inditex	**H&M**	**Fast Retailing**	**Gap**	**Mango**
Materials	**Recycled/Sustainably-sourced materials**	No. of garments made from sustainable/ recycled materials	• Share of recycled or other sustainably sourced materials • Sustainable Cotton in % of total cotton use	No Information (N/I)	Volume of BCI cotton sourced	Volume of fibres used (% of synthetic chemical fibres/fibres of natural origin)
	Reclaimed/Recycled garments	Tonnes of reclaimed garments/Products recovered to be sent for recycling (kg)	Tonnes of garments reclaimed in H&M Group stores	No. of non-wearable garments recycled	N/I	Destination of collected garments
	Packaging	% of recycled cardboard boxes; no. of hangers reused and security tags recycled.	N/I	N/I	N/I	N/I
Energy	**Energy consumption within & outside of organization**	• Global energy consumption (gJ) • Electricity consumption in own logistic centers, head offices & factories	Energy use (gJ) by source	Energy use of stores and headquarters (Japan), of logistics (Japan), of strategic production partners	Energy consumption from operations (by building type, regions, source)	Consumption of electricity (GWh) at company stores and franchises abroad and in Spain
	Energy intensity	Relative electricity consumption (Wh/€ & Wh/garment)	Electricity use reduction per H&M store sqm (2007 baseline) over 5 years	N/I	• Energy consumption intensity • Energy consumption per $ revenue	N/I
	Reduction of energy consumption	Comparing data over 4 years	• Electricity use reduction per H&M store sqm (2007 baseline)	N/I	Annual reduction rate in operational energy consumption (%)	% energy consumption saving per sqm in Spanish stores

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			• Energy savings by suppliers			
	Energy from renewable source	Consumption of energy from renewable sources, trigeneration & cogeneration (MWh)	% renewables in our total electricity use within H&M group	N/I	N/I	N/I
Water	**Water withdrawal (by source)**	Water consumption (m^3) of suppliers of HQ, Inditex's factories, logistics centers, own stores	• Water withdrawal by source in supplier factories in Bangladesh and China • Total water (million m^3) withdrawal for own operations • Average yearly water withdrawal/ factory in water stressed areas • Liters (million) of rainwater harvested in own operations.	Water consumption (m^3) of strategic production partners	• Water consumption from Tier 1 suppliers (million m^3) • Water consumption from own operations (million m^3)	Water consumption at headquarters and warehouses in Spain
	Water recycled and reused	N/I	% of used water that is recycled in 2 regions in Bangladesh and China	N/I	N/I	N/I
	Own indicators	N/I	• % of stores, offices, and warehouses with water-efficient equipment • No. of supplier factories in full compliance with waste water quality requirements	N/I	N/I	N/I

(Continued on next page)

Table 4 *(continued)*

Performance Category	Performance	Company				
		Inditex	H&M	Fast Retailing	Gap	Mango
Biodiversity	**Significant impacts of activities, products, and services on biodiversity**	"All of our products from forests are managed responsibly (Forest Product Policy). All products of animal origin used in the items commercialised by our brands originate from animals that are treated in an ethical and responsible manner."	N/I	N/I	N/I	N/I
Emissions	**Direct and indirect (Scope 1 + 2 + 3) greenhouse gas (GHG) emissions**	GHG emissions from scope 1 +2 +3 (tCO$_2$e)	• Total CO$_2$e emissions in tonnes (Scope 1+2) - incl renewables • Total Scope 3 emissions (% by sources) • CO$_2$e emissions in kilo tonnes, incl. energy use, transport, distribution and business travel	• Total carbon emissions (tCO$_2$e) scope 1, 2 of stores and HQ • Total carbon emissions (tCO$_2$e) of strategic production partners • Total carbon emissions (tCO$_2$e) of logistics (Japan)	• Total GHG emissions (scope 1, 2, 3) • Scope 1 GHG emissions (by building type, region, source) • Scope 2 GHG emissions (by building type, region, source) • Scope 3 GHG emissions (by source) • GHG emissions from Tier 1 suppliers	Tonnes of CO$_2$e; % of scope 1, 2, 3 GHG emissions; by source
	GHG emissions intensity	gCO$_2$e per garment released on the market	• Total CO$_2$e emissions to previous year in % (Scope 1+2) vs. growth in sales (in local currencies)	N/I	GHG emissions per US$ revenue	N/I

			• Carbon emissions per million SEK sales turnover incl. VAT			
	Reduction of GHG emissions	Comparing data over 4 years	Emission reduction % compared to 2015	N/I	Reduction rate (%) from 2008 goal	Offset emissions compared to 2015
Effluents and Wastes	**Waste by type and disposal method**	Proportion of waste generated by weight (%)	N/I	Tonnes of waste by stores and HQ in Japan	N/I	• Total weight of waste managed by type • Tonnes of each type by treatment methods
	Water effluents/discharge	N/I	Share of total water discharge by destination (m^3, %)	Water effluents (m^3)	N/I	N/I
	Hazardous waste	Hazardous waste (kg) by type and treatment methods	N/I	N/I	N/I	N/I
	Own indicators	N/I	• % of supplier factories in full compliance with wastewater quality requirements (BSR) • Recycling systems in stores	N/I	N/I	N/I
Environmental Compliance		"During 2016, Inditex has not been notified through the available channels of any significant sanction for non-compliance with environmental laws and regulation."	"We have not identified any non-compliance with environmental laws and/or regulations."	N/I	N/I	"At the date of this report, MANGO has not been fined or penalised for breach of the environmental legislation and regulations."

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Table 4 *(continued)*

Performance Category	Performance	Company				
		Inditex	**H&M**	**Fast Retailing**	**Gap**	**Mango**
Supplier Environmental Assessment	**New suppliers screening**	No. of pre-assessment audits	% of factories assessed before 1st order placement	N/I	N/I	N/I
	Environmental impact assessments in the supply chain and negative impact detected	• No. of environmental evaluations in wet process plants in 3 years • % of compliance with Code of conduct in active factories (environmental commitment)	N/I	No. of workplace inspections	% of factories who doesn't have an EMS/procedure to contact appropriate authorities in case of accidents	% of environmental breaches according to points of Code of Conduct detected in audits conducted
	Own indicators	N/I	N/I	N/I	No./% of Tier 1/2 suppliers responding to SAC Higg Index survey (2015)	N/I

After a glimpse at Table 4, it is evident that none of the companies cover all of the indicators suggested by the GRI Standards. However, Inditex and H&M, the two biggest companies, do have more comprehensive environmental sustainability reporting, covering virtually all major disclosures.

The performance indicators that are reported by most of the sample companies include recycled/sustainably-sourced materials, reclaimed/recycled garments, energy consumption within and outside the organization, water withdrawal, direct and indirect GHG emissions, and environmental impact assessments in the supply chain and negative impact detected. In contrast, water recycled and reused, biodiversity, and hazardous waste are the aspects that are reported the least.

4.2.1 Evaluation of environmental performance indicators based on environmental practices

This section aims to provide an overall evaluation of the environmental disclosures synthesized in section 4.2, particularly disclosures that measure use of resources or impact on the environment, namely materials, energy, water, emissions, and waste, with reference to their corresponding environmental practices by the five companies compiled in section 4.1. Only the indicators that have their figures of 2016 compared to those of previous years in the company reports can be used for this purpose; thus, only a portion of the indicators listed along with their companies were reviewed. Since Uniqlo does not compare data over the years in any of their indicators, none of their performance indicators will be analyzed.

1. *Materials*: H&M's disclosures indicate fairly considerable increases in the share of recycled or sustainably-sourced materials as well as of sustainable cotton. This clearly reflects a positive result of the attempt to use sustainable materials of this company.

2. *Energy*: All three companies that compare their energy use of 2016 to previous years, Inditex, H&M, and Gap, have quite favorable overall results. Inditex and Gap experience a drop in their global energy consumption as well as energy intensity, with Inditex consuming an increased amount of renewable energy. H&M also

shares a largely similar result, although H&M's total energy consumption in 2016 is higher than the previous year. This rise might be attributed to the fact that H&M opened 427 new stores net in 2016, considering the reduction in their electricity use per brand stores. It is notable that Inditex, H&M, and Gap all have new technologies for their HVAC system and use electricity from renewable sources in their operations as their initiatives to increase energy efficiency.

3. *Water*: It is observed that water consumption or withdrawal for Inditex, H&M, and Gap altogether saw a drop in 2016. Coincidentally, those three companies are the only ones that employ strategy on water stewardship among five companies.

4. *Emissions*: It is a common trend for Inditex, H&M, and Gap that their scope 1 and 2 GHG emissions show decreases in contrast to increases in scope 3 emissions, which are emissions that originate from sources not owned by the organization such as transport, distribution, and business travel. According to H&M, increase in this category is mainly due to more accurate data collection and validation from transport providers as well as a slight increase in air transportation. As for Inditex, they associate the higher scope 3 emissions with the increase in transport of products and the growth of franchised commercial surface area. However, GHG emissions in all three scopes are higher than previous years in the case of Mango.

5. *Waste:* While Inditex experiences an increase in total waste generated, there was a significant reduction in the amount of textile waste. This undoubtedly indicates the success of Inditex's garment collecting initiative. On the other hand, Mango reduces the amount of waste overall; however, both Mango and Inditex produce larger volumes of paper and cardboard wastes. One possible reason for this is the two companies' use of more sustainable materials in packaging.

Overall, when putting the environmental disclosures presented above within the context of the sustainability measures taken, it can be concluded that such measures bring about quite positive environmental performance results for companies.

4.2.2 Reporting practices of the five sample firms

Overall, it can easily be seen that the environmental reporting practices of the five companies are of high autonomy and flexibility and under minimal control. Firstly, these firms disclose non-financial information on their environmental performance by choice rather than under obligation, not to mention following the GRI reporting standards. As for Inditex, H&M, and Mango, which have their headquarter located in a certain European Union (EU) country, the EU law does not require mandatory non-financial reporting for such companies until 2018 (European Commission, n.d.). In the case of Fast Retailing and Gap, whose headquarter is situated in Japan and the US respectively, the US Environmental Protection Agency requires large emitters of greenhouse gases to only report data with respect to their greenhouse gas emissions, while corporate social responsibility reporting in Japan is rather on a voluntary 'comply-or-explain' basis (Initiative for Responsible Investment, 2015).

Secondly, the sample companies adopt the GRI sustainability reporting framework but do not cover all the involved disclosure aspects, and H&M even incorporates their own indicators. There can be several underlying reasons for this. According to a 2013 survey conducted by Boston College Center for Corporate Citizenship and Ernst & Young, managers from organizations who prepare a sustainability report identified data-related issues such as availability and accuracy or completeness of data as among the biggest challenges in the reporting process. In addition, certain data are particularly difficult to obtain. As Ernst & Young (2016) stated in their report on reliable non-financial reporting, external non-financial information disclosures are highly complex, and reporting on Scope 3 greenhouse gas emissions was taken as an example due to its requirement to obtain data from a variety of sources. Furthermore, since the supply chain of all five companies is highly complex due to its multilayered structure, involving not only first-tier suppliers but also second and even third-tier suppliers, it is even more challenging for managers to fully measure business impacts throughout the supply chain. In a different light, it is possible that managers choose not to report all of the data that they manage to compile because there may probably be information that they would rather not publicize. These undocumented or undisclosed practices, processes, and controls are deemed one of the common pitfalls that can influence reliable nonfinancial reporting by Ernst & Young (2016), which can possibly be the case for any of the five sample firms.

Thirdly, the fact that the five sample companies are unrestricted in their sustainability reporting practice is also reflected by their engagement of external auditors. On the one hand, sustainability reports issued by Gap and Fast Retailing were not even verified by external auditors; as a result, the reliability of their reports is dubious to some extent. On the other hand, reports by Inditex, H&M, and Mango all receive external verification; nonetheless, as for Inditex and H&M, auditors only analyze and review the range of indicators that have been selected by management of these two companies. Among the GRI environmental disclosure categories in Table 3 above, about one-third of those indicators by Inditex and H&M have external assurance, including scope 1, 2, and 3 GHG emissions and energy consumption within the organization. Of the other indicators, some even have no information in the report even though it is signified with page numbers in the GRI Content Index provided along with the report.

4.3 Limitations of research

This research is subject to several limitations. Firstly, even though the selected five companies are the most frequently mentioned, hence in some way well-known and well-established, in media publications among those in the fast fashion industry, their environmental sustainability practices are far from being representative of the whole industry, not to mention the small sample size of five. Smaller companies may have more innovative approaches or be able to implement them on a more deep-rooted scale due to their size.

Secondly, since this study only relies on company reports as its data source, it can have the limitation that words may speak louder than actions. Reporting about eco-friendly actions is one thing, but actually taking action is another thing. In other words, the corporate reports or sustainability reports can just be a means of greenwashing, in which companies claim to be 'green' just to attract customers and increase sales without actually 'walking the talk'.

Finally, during the content analysis process, there might have been some unwanted subconscious biases and subjectivity of the author involved. Moreover, since the analysis was conducted by only one person, some information could have been

missed. These factors may have affected the analysis procedure and consequently the findings to a certain extent.

5 CONCLUSION

This research has explored the environmental impact of the fast fashion industry through a review of extant literature as well as the environmental sustainability practices and performance of five fast fashion firms through a content analysis of their sustainability or corporate reports.

5.1 Main findings

The main findings are presented as answers to the corresponding research question as follows:

5.1.1 Environmental impacts of the fast fashion industry

RQ1: What are the environmental impacts of the fast fashion industry that make environmental sustainability a challenge for this sector?

1. Impact of transportation as a result of global sourcing of clothing: consumption of transport-related energy and release of harmful greenhouse gas emissions into the environment.

2. Impact of cultivating raw materials: heavy use of chemicals including pesticides and insecticides resulting in health problems, water and air pollution, depleted soils, and loss of diversity; intensive use of natural resources such as water and non-renewable resources; release of toxic emissions into the air and water.

3. Impact of processing fibers: intensive use of resources; discharge of toxic effluents having adverse effect on waterborne biodiversity and entering human food chain; non-renewable energy consumption such as fossil fuel and nuclear power.

4. Impact of textile waste: non-biodegradable synthetic fiber; decomposing process of natural fibers emitting toxic substances into the air and water; use of resources such as energy involved in recycling textile waste; release of microplastic fibers

during domestic laundry of synthetic fibers, entering airborne organisms, consequently leading to leached chemicals and eventually reaching human food chain.

5.1.2 Environmental initiatives taken by fast fashion companies

RQ2: Which practices have been adopted by fast fashion firms to tackle the challenge of environmental sustainability and to improve their environmental performance?

1. Product design:
   - Conducting Life Cycle Assessment
   - Using sustainably-sourced and recycled materials, e.g.: organic cotton, TENCEL®Lyocell, and recycled polyester
   - Reducing overall materials, using recycled or more sustainable materials for packaging, and reusing or recycling packaging.

2. Process design:
   - Chemical management: commitment to Zero Discharge of Hazardous Chemicals program; having own restricted substances list or standard; organizing hazardous substance control training pilot for suppliers; having a code or standard for suppliers to assess and improve chemical usage; performing laboratory test for restricted chemicals in finished products
   - Water stewardship: formulating guidelines for sustainable use of water in factories; adopting water-efficient equipment or product design and sourcing practices; collaborating with NGOs
   - Energy efficiency: updating new technologies for heating, ventilation, and air-conditioning systems; using or self-generating renewable energy; building eco-efficient stores; developing energy efficiency programs for suppliers.

3. Supply chain:
   - Suppliers: conducting preliminary audit of factories and requiring them to sign company's code of conduct before beginning partnership; providing training for suppliers according to company's standards and conducting frequent audits; incorporating the Higg Index to monitor sustainability performance

- Logistics: choosing transport service providers controlled by environmental programs; taking part in sustainable shipping program; optimizing shipment density; using cleaner modes of transportation, e.g.: sea transport, and fuel-saving strategies; employing ISO 14001 certified environmental management system for logistics centers; having indicators to measure efficiency of shipments.

4. Customer engagement and awareness: collecting used garments from customers for reusing and recycling; providing customers with climate-friendly ways to care for clothes and use clothes longer

5.1.3 Reporting practices on environmental performance

RQ3: How do fast fashion companies assess their environmental performance?

- The performance indicators that are reported by most of the sample companies are as follows: recycled/sustainably-sourced materials, reclaimed/recycled garments, energy consumption within and outside the organization, water withdrawal, direct and indirect GHG emissions, and environmental impact assessments in the supply chain and negative impact detected. In contrast, water recycled and reused, biodiversity, and hazardous waste are the aspects that are reported the least.

- Overall, when putting the environmental disclosures that involve use of resources and impact on the environment within the context of the sustainability practices taken, it can be concluded that such practices bring about quite positive environmental performance results for companies.

- The environmental reporting practices of the five companies are of high autonomy and flexibility and under minimal control. Firstly, these firms disclose non-financial information on their environmental performance by choice rather than under obligation, not to mention the adoption of GRI reporting standards. Secondly, the sample companies adopt the GRI sustainability reporting framework but do not cover all the involved disclosure aspects. Thirdly, reports of some companies do not even receive verification from external auditors, while for those that do receive

external assurance, auditors only analyze and review the range of indicators that have been selected by management of the companies.

5.2 Implications for international business

This study carries practical implications for both company managers and policy-makers in the fast fashion industry and theoretical implications for the academia. Firstly, from the perspective of managers of fast fashion companies that are making an attempt to improve their environmental performance, this paper proves useful to them in that it provides an overall view of exemplary practices of well-established firms in the industry. This may help managers from those striving companies to identify suitable practices and implement accordingly, depending on their resources and characteristics. Nowadays, due to the increasing number of people in the middle class spending more on clothes as well as of eco-minded consumers, sustainability in general and environmental sustainability in particular seems to no longer be a competitive advantage, but rather a prerequisite for companies' resilience, profitability, or 'ability to sustain' in the fashion industry.

Secondly, as some aspects of environmental impacts presented in the paper have still not been addressed by companies' current environmental practices, there is still room for further improvement. For example, in terms of the microfiber pollution caused by domestic washing of polyester garments, managers need to conduct research and development for alternative materials or for improving fabric construction to minimize fiber shedding. What they can also do is to formulate initiatives that educate and raise awareness of customers about the problem and provide them with instructions on how to care for their clothes that can minimize the release of microfibers. In addition, fast fashion companies should also invest further into developing the currently limited technologies for recycling textile waste. Through a coordinated and collective effort, the importance of which has already been emphasized, among industry peers, industry associations, NGOs, academic institutions, and such like, innovation will likely ensue, environmental challenges will be tackled, and overall sustainability performance of the industry will improve.

Thirdly, in view of current reporting practices of fashion companies, managers should strive to provide a more complete sustainability report that cover all the disclosures suggested by the reporting framework of their choice. They should also increase the reliability of their reports by having all rather than just a fraction of indicators externally verified. On the other hand, from the perspective of policy-makers, it is necessary to not only standardize but also compel non-financial reporting on an international scale. Only the European Union thus far obliges companies to include non-financial statements in their annual reports from 2018 onwards. Besides, a common reporting standard or framework should also be determined for the purpose of fair and transparent data comparison. As a suggestion, the sustainability reporting framework that should be used is none other than the Global Reporting Initiative Standards, used by the sample companies in this study. In addition, the engagement of external verification of the reports by auditors should also be mandatory to ensure reliability of disclosures.

Finally, the theoretical implication of this study is the addition of 'Customer engagement and awareness' category to the environmental version of Three-Dimensional Concurrent Engineering framework by Ellram et al. (2007). The reason for this addition is the considerable relevance and significance of the environmental practices that involve engaging customers and raising customers' awareness to the environmental strategy of fast fashion firms.

5.3 Suggestions for future research

There are several suggestions for ways in which future research can expand on the outcome of this study. Firstly, a larger sample size can be incorporated to provide a more comprehensive and reliable view of the fast fashion industry. Secondly, with or without a larger sample, future researchers can adopt a case study research method in which they obtain information directly from firms' managers and observe the companies' operations first-hand, so that they can have deeper insights into the environmental practices of the companies as well as carry out a more informed and critical evaluation of their performance. Furthermore, the relationship between environmental practices and environmental performance can be analyzed in further depth, with in-depth investigation of the outcomes that a particular initiative produces. As a result, managers can see which practices are effective and which practices are

not, so that they are able to make more informed decisions and invest effort and resources more economically. In addition, it would be interesting and enlightening to explore the environmental sustainability initiatives of fashion companies that only produce environmentally-friendly products or aim for sustainability since their foundation.

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