



CONDITIONS FOR UP-SCALING SUSTAINABLE MATERIAL USE IN THE FASHION INDUSTRY

Exploring success factors in implementing sustainable materials in the context of the wider transition toward a sustainable material mix in fashion

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Summary

The fashion industry is one of the world's most polluting industries. Its negative environmental impact is strongly related to its large consumption of unsustainable resources. These unsustainable or conventional resources are either nonrenewable or farmed using harmful agricultural practices. Many studies have quantified the environmental impact of these materials and demonstrated the need for a change in material consumption by large fashion brands and retailers.

In the past ten years, the fashion industry has started to transition toward using sustainable materials, for example, recycled material or material farmed using organic farming practices. Currently, many fashion brands indicate that at least half of their material comes from sustainable sources.

To help the fashion industry speed up the implementation of sustainable materials, it is important to understand why certain sustainable materials have been implemented successfully and other have been rejected or marginally used. Currently, scientific research has only focused on the larger transition toward a sustainable fashion industry and has not analyzed the implementation of specific materials. Therefore, the multi-level perspective (MLP) theory, which conceptualizes social-technical transition in regime changes, was used to analyze the transition toward a sustainable materials mix by looking into specific examples.

Because this study cannot analyze the entire regime, it focuses on the sub-regime of Tommy Hilfiger, a large fashion brand, that started using sustainable materials in 2010, and in 2018 reported that 47% of its material use was sustainable. By analyzing how this transition has evolved for Tommy Hilfiger, factors of successful implementation of sustainable materials can be uncovered. Understanding these factors can help speed up and guide the transition. Therefore, the following research question was formulated:

What success factors are responsible for the implementation of sustainable material niches at the Tommy Hilfiger sub-regime?

To answer this question, the implementation process of four sustainable material niches at Tommy Hilfiger was analyzed using the dynamics between the dimensions of the policy arrangement approach (PAA). The transition was analyzed by examining the state of Tommy Hilfiger before, during and after implementation of these materials through in the dynamics between actors, resources, rules, and discourses.

Four materials were selected. Better Cotton and Tencel Lyocell were implemented during the first phase of the transition. This phase was characterized by little consumer or political awareness and support for the implementation of sustainable materials. Even though both materials have been implemented around the same time, Better Cotton has been implemented at a much larger scale and thus has been more successful. This is because strict rules were set for Better Cotton in the form of targets, which were strongly enforced by resources dedicated by the corporate responsibility department. For Tencel Lyocell, in contrast, no specific targets were created and few resources were dedicated by the company to support the implementation of the material.

Re:Down and Apple Skins were implemented during the second phase of the transition. Both materials have been implemented based on the consumer demand for sustainable animal-based materials, which increased around that time. Even though both materials have been implemented successfully, the use of Re:Down has increased faster throughout the company. This is mainly a result of a more competitive price and higher quality.

The analysis of the implementation of the four materials revealed four success factors:

1. Competitive Price and Quality
2. Sustainable Material Strategy
3. Connection to Consumer Awareness
4. Dedication of Actor(s) or Actor Groups

At Tommy Hilfiger, understanding these factors can support the creation of favorable conditions for implementing sustainable material niches. To use the factors of success to create favorable conditions, the framework of Klettner, Clarke and Boersma (2014) can be used. This framework proposes a cyclical process of commitment, leadership, implementation, and communication for sustainability initiatives. To deepen the understanding of success factors and speed up the transition on an industry level, future research could include a wider scope.

Preface

I want to thank everyone who has helped me to finalize my master thesis. In this process, I applied my knowledge of the fashion industry and analytical skills and insights obtained through the master program. Executing this research has taught me many things about theory and practice that I will be able to use throughout the rest of my career.

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1 Introduction

This chapter states the objective of this research and its relevance. In Section 1.1, the problem statement is given, which guides this research. In Section 1.2, the research questions and aim of this research are discussed. In Section 1.3, the contribution and relevance of this research to scientific literature and practice is explained.

1.1 Problem Statement

Fashion is a fragmented and complex global industry that has a significant negative social and environmental impact. One distinctive aspect of the fashion industry, causing a large negative environmental impact, is its resource input-intensive nature (Saxena, Raja, Arputharaj, 2017). Life cycle assessment data shows that the largest environmental impact is generated by the cultivation of the raw material (Lehmann et al., 2018). Textile production requires large amounts of water, energy, and chemicals. For example, growing cotton typically requires large quantities of pesticides and water (Safaya, Zhang, Mathews, 2016). Due to cotton often being grown in water-scarce regions, this water consumption has a significant impact on the availability of freshwater resources and can disrupt ecosystems (Caniato, Caridi, Danese, Vinelli, 2011), while pesticides contribute to global warming through the release of GHG emissions (Nalley, Danforth, Niederman, Teague, 2013). To drastically lower the negative impact, the fashion industry must shift to using materials that have a lower environmental impact than conventionally cultivated materials.

To address the challenges of fashion's material use, deep structural changes are required. System changes or socio-technical transitions involve technology, science, culture, markets, policy, and consumer practices (Geels, 2018). The transitions toward sustainability have specific characteristics that differentiate them from many emergent historical transitions (Geels, 2011). First, sustainable solutions, like organic materials, are often expensive and, therefore, these solutions are unlikely to be implemented without support from regulatory frameworks. Second, domains where change is needed, such as the fashion industry, are characterized by large corporations that possess important assets, such as distribution channels. Large established companies therefore hold a strong power position, while at the same time, are less likely to implement sustainable solutions than pioneers.

Who is responsible for addressing the required changes for the shift toward sustainable material use by the fashion industry is a complex question. Nevertheless, initiatives to improve the system come from consumers, governments, and companies. Even though the main goal of a company is to make a profit according to a classical economic viewpoint (Scherer, Palazzo, 2011), many companies take responsibility beyond legal obligations. A company's active approach toward social and environmental issues is called as corporate social responsibility (CSR). CSR is "*a concept whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholder on a voluntary basis*" (European Commission, 2011, p. 23). Fashion companies have implemented CSR strategies for the use of sustainable materials, even though, implementing sustainable materials requires short term investment, which does not directly result in increased profitability.

Even though fashion brands are the ones implementing these sustainable materials, other stakeholders play a significant but indirect role in this transition. For example, media attention highlighting the negative environmental impact caused by the fashion industry is increasing awareness and changing consumer behavior (Cobbing, Vicaire, 2017). This change in consumer behavior is creating an environment where fashion brands are forced to adopt strategies to lower the negative impact of the industry.

As a result, in the last decade, fashion brands have focused their efforts on using sustainable materials. This shift is not only caused by scientific evidence on potential impact reductions but also because changes in material selection can be accomplished without interfering directly in supply chain operations. In 2018, 47% of fashion companies stated that more than half of their material use comes from sustainable resources (Lehmann et al., 2018). 80% of fashion companies have focused their efforts on improving their impact on material use, and 98% indicated that they will focus on this area in the coming two years (ibid). By focusing on preferred rather than conventional fibers, Reformation, a US-based sustainability champion, reduced its CO₂ emissions by 20%, its water consumption by 30% and its waste creation by 20% (Global Fashion Agenda and the Boston Consulting Group, 2017). Since most fashion brands are about halfway into the transitions toward replacing all conventional materials with sustainable materials, important lessons can be drawn from analyzing current efforts to support the increase of sustainable fiber use in the future.

1.2 Research Objective

This study aims to provide insight into factors influencing the fashion industry to scale up its sustainable material use. Understanding the conditions under which sustainable materials are successfully implemented can guide the creation of favorable conditions and developing, scouting and implementing sustainable materials. Once efforts toward upscaling sustainable material use are prioritized, this will contribute to speeding up the transition toward a sustainable material mix in the fashion industry. The use of sustainable materials on a large scale will result in a sustainable fashion industry overall and significantly lower its environmental impact.

This led to the following research question:

What success factors are responsible for the implementation of certain sustainable materials in the fashion industry?

Success factors are factors that influence a successful implementation of a sustainable material in the fashion industry. To identify a success factor, it is necessary to compare success factors in the implementation of different materials. If a success factor appears more than once in a successful implementation process, its importance as a success factor is stressed, especially when this factor is absent in a failed implementation process. As a result, the sub-questions focus on discovering success factors for specific sustainable materials:

1. What was the state of the fashion industry before implementing sustainable materials?
2. To what extent has the fashion industry changed when a sustainable material is implemented?
3. What success factors, if any, are responsible for these changes?
4. What is the state of the fashion industry after the implementation of sustainable materials?

1.3 Scientific Relevance

The scientific literature on sustainability and fashion is underrepresented. Fashion is mostly approached from a social science perspective and literature on fashion addresses subjects around gender, race, and identity (Entwistle, 2014). Entwistle (2014) explains that the under-representing of literature on sustainability and fashion is caused by the classical divide between social and natural sciences. Sustainability has largely been approached from a natural science perspective and, therefore, the relationship between fashion and sustainability has only been recently taken up by the academic world. An approach that combines natural and cultural aspects of sustainability and fashion is necessary to uncover the relationships between both topics.

Currently, research on environmental sustainability in fashion has largely focused on analyzing impact by applying the life cycle assessment (LCA) methodology (Smits, 2017; Van Der Velden, 2016; Nalley, Danforth, Niederman, Teague, 2013; Roos, Sandin, Zamani, Peters, 2015; Payne, 2011). Important LCA results are combined in *Sustainable Fashion and Textiles Design Journeys* by Kate Fletcher (2008). This book also focuses on the practical implications and sustainable strategies with the designer as the main actor in the transition toward sustainable textiles.

Other literature focuses on the transition toward sustainable fashion in general. In the report "The Transition Toward Good Fashion," a collaboration between research institute Drift and the nonprofit Fashion for Good, transition theory is applied to map the macro-dynamics in the transition toward sustainable fashion (Buchel, Roorda, Schipper, Loorbach, 2018). This report provides valuable insights, but does not focus on the dynamics influencing the transition toward sustainable materials.

Another element not addressed in the research by Drift, or by transition theory in general, is the agency of individual companies. The literature on the role of individual companies in sustainable transitions focuses on the drivers for CSR (Laudal, 2011; Russo-Spena, Tregua, De Chiara, 2018). How a company can manage or govern its efforts in the larger transition toward sustainability is addressed in the general context of CSR but not with a focus on fashion (Klettner, Clarke, Boersma, 2014; Kleine, Von Hauff, 2009; Yuan, Bao, Verbeke, 2011). Książak (2016) has analyzed CSR drivers and initiatives in the fashion industry. However, this study does not analyze how successful these initiatives have been and how they have been implemented internally.

CSR research on fashion also does not focus on the initiatives around materials. The current literature focusing on the upscaling of sustainable material use in fashion is the *Pulse of the Fashion Industry* report (2018) and the *A New Textile Economy* by the Ellen MacArthur Foundation (n.d.).

These reports provide valuable statistics on the use of sustainable materials as well as analysis of the barriers and opportunities related to sustainable materials. For example the Ellen MacArthur foundation states “More than USD 500 billion of value is lost every year due to clothing underutilization and the lack of recycling” (Ellen MacArthur Foundation, n.d.). However, these studies are performed by consultancies and nonprofit organizations and are not based on scientific evidence. Scientific research should, therefore, provide additional analyses on the quality of the outcomes of these reports. Detailed analysis of a case will provide specific insights into the practices of upscaling sustainable materials.

1.4 Practical Relevance

The high environmental impact of the fashion industry is an important societal topic that needs to be addressed in the greater debate around sustainability. Due to the size and impact of industry, general efforts to address challenges around climate change and resource depletion must include the fashion industry. To tackle the negative impact of the fashion industry, research should provide practical insights into how the use of sustainable materials can be scaled up. Since the largest part of the impact is generated in the raw material stage, focusing on this area will generate significant environmental and social improvements that support the larger ongoing efforts of combating climate change and water scarcity.

When fashion brands better understand under which conditions sustainable materials are successfully adopted and implemented they can focus their efforts to create these conditions in their organization. To speed up the transitions towards sustainable material use, fashion brands should use the knowledge on the conditions of their own organization as well as those of the sustainable material to strategically implement measures that enhance and match favorable conditions between the brand and the material. Stakeholders bringing the sustainable material to the brand could also use the insights to adopt their approach to meet the conditions of the fashion brand to increase the chance of successful adoption.

2 Theoretical Framework

To analyze the success factors influencing the implementation of sustainable materials by the fashion industry, theoretical concepts were applied to specify the scope of this research. In Section 2.1, the concept of the sustainable material mix is introduced. Since this research focuses on the upscaling of the sustainable material mix, two complementary theories are discussed that explain how and under what conditions the upscaling of a sustainable material mix occurs. In Section 2.2 the multiple level perspective theory is introduced, followed by the multi-level perspective theory in Section 2.3. In Section 2.4, the conceptual model is presented.

2.1 Sustainable Material Mix

The efforts of the fashion industry to become sustainable largely focus on replacing conventional high impact materials with lower impact or sustainable materials. All sustainable materials together are seen as a sustainable material mix (Lehmann et al., 2018). The concept of the sustainable material mix was first used in the Pulse of the Fashion Industry Report (2018), which defined it as the use of low impact material, but does not specify the materials in question. Therefore, companies define their own sustainable material mix using impact data that is compiled, simplified and visualized in various commercial tools, such as the sustainable material index or the MADE-BY environmental benchmark for fibers (MADE-BY, 2013; MADE-BY, 2017; Sustainable Apparel Coalition, 2017).

However, knowing that a material is less impactful is often insufficient. Fashion brands and consumers also want to be certain that the material they are buying was produced according to certain standards that have been proven less impactful. Therefore, the fashion industry only uses materials that have been certified by a third party as sustainable. For example, organic cotton can be certified by the Global Organic Textile Standard as well as other certification bodies.

Environmental impact analysis and certification determine whether a material can be classified as sustainable. Even though environmental impact data and certification are regarded as the requirements to determine the sustainable material mix, it is still within the power of each brand to make rules regarding the use of these pillars. For example, a company might choose which certification bodies to accept or where to draw the line in a reduction in impact required for a sustainable material. Therefore, in practice, there are small differences between companies in defining their sustainable material mix.

2.2 Multi-Level Perspective Theory

Implementing sustainable materials in the fashion industry can be analyzed as the transition from using just conventional materials to using only sustainable materials or from a conventional material mix toward a sustainable material mix. MLP is an analytical theory to conceptualize the dynamics of transitions on the macro, meso and micro levels. By applying the MLP theory to the transition toward a sustainable material mix, the dynamics between these levels that influence the success of the transition can be detected, which allows for the developments of actions aiming to steer certain dynamics to guide the transition in the preferred direction.

MLP conceptualizes the dynamics of sustainable transitions. MLP combines “concepts from evolutionary economics (trajectories, regimes, niches, speciation, path dependence, routines), science and technology studies (sense-making, social networks, innovation as a social process shaped by broader societal contexts), structuration theory and neo-institutional theory (rules and institutions as “deep structures” on which knowledgeable actors draw in their actions, duality of structure, i.e. structures are both context and outcome of actions, “rules of the game” that structure actions)” (Geels, 2011, p. 26). The MLP framework analyzes sustainable transitions through the dynamics between three analytical levels: niches (where innovation occurs), socio-technical regimes (where established practices occur in a stabilized system), and the exogenous sociotechnical landscape (where discourses influence culture and politics) (Geels, 2004). The analysis focuses on the transition of one regime to another regime. Therefore, the regime is the primary focus of theory. The landscape and niche(s) are derived concepts since they are defined in relation to the regime. The landscape and niche(s) are the external environments, where practices or technologies differ significantly from the regime. When a niche, supported by pressures from the landscape, successfully enters the regime, it internalizes and changes the state of the regime.

The regime (meso) and sub-regimes (micro)

The regime consists of deep structures that make up the dominant context under which a certain practice occurs (Geels, 2004). According to Geels “*The regime concept aims to capture the meta-coordination between different sub-regimes*” (Geels, 2004, p.32). Current dominant structures and practices are institutionalized in all sub-regimes that together make up the entire regime. These sub-regimes are like independent organizations located on the micro level. Regimes in the meso level are relatively stable and are resistant to technological and societal transitions. When a regime destabilizes through pressures from niches and the landscape, there is an opportunity for niche innovations to enter and reform the regime (Geels, Schot, 2007). This reform of the regime happens when a niche successfully enters and changes a sub-regime. When enough sub-regimes change, the regime reforms.

In the transition toward a sustainable material mix, the regime of the fashion industry is strongly characterized by sub-regimes like large fashion brands and retailers that purchase the material and sell it as finished products. Large fashion brands and retailers predominantly use large volumes of conventional fibers, such as cotton and polyester. When a sustainable material niche enters a fashion brand sub-regime, it reforms the sub-regime. When enough sustainable material niches enter a large part of the sub-regimes, the regime of the fashion industry changes. Other actors also influence the sub-regimes. For example, fashion brands either sell their products through their own points of sales or through third party operated channels. These companies can be online webshops, such as Zalando, or multi-brand physical stores, such as de Bijenkorf. Because these companies are influential consumers of the fashion brand, they influence the sub-regimes.

Niches (micro)

In the niche level, different organizations develop innovations that fundamentally differ from the regime structure (El Bilali, 2019). The innovations are incubated until they build up internal momentum through improvements in the product and service. Niches will try to enter the regime via various sub-regimes when there are signs of destabilization through pressures from the landscape.

Niches in the transitions toward a sustainable material mix are sustainable material innovations. These niches are characterized by actors supplying sustainable materials or supporting them in the development process. Suppliers of sustainable materials can be or are a combination of startups, material suppliers and non-profit organizations. These actors can be supported by governmental organizations or NGOs.

The landscape (macro)

The landscape is defined by contextual developments in culture, economics, and politics and is beyond the direct influence of actors (Geels, 2018). The landscape changes under influence of large global developments, such as natural disasters, political upheaval, or an economic crisis. Currently, climate change is the main driver behind many landscape developments influencing sustainable transitions.

The landscape pressures on the regime of the fashion industry can mostly be characterized by the increased level of awareness of civil society about the unsustainability of the fashion industry. This awareness directly influences consumer behavior, which has a strong ability to influence the regime. Consumer demand for product made from sustainable materials, can strongly influence the fashion industry to use more sustainable materials. When the regime is pressured by consumers in the landscape, it becomes easier for sustainable materials niches to enter the regime of the fashion industry.

Transition dynamics

Applied MLP research states that the transition of a regime based on conventional materials compared to a regime based on the use of sustainable materials is an iterative process of buildup and breakdown over a period of decades. Gradually, the old regime destabilizes, and a new regime is developed. According to Avelino, Frantzeskaki, Loorbach (2017), this process can be visualized in a simplified model where niches develop along an upwards curve from experimentation to acceleration, emergence, institutionalization, and stabilization. Simultaneously, the existing regime moves along a downward curve from the first optimization stage to destabilization, chaos, breakdown, and phase-out (Buchel, Roorda, Schipper, Loorbach, 2018). Even though real transitions are non-linear, and phases have various durations, this model gives insight into the stage of a certain transition at a certain moment in time.

Limitations of MLP

The MLP has been criticized by the lack of focus on the agency of the regime: “The MLP accommodates agency in the form of bounded rationality (routines, search activities, trial-and-error learning) and interpretive activities” (Geels, 2011, p. 30). The agency of the regime on its own is dismissed, since the framework indicates that pressure from the macro and micro levels is required to destabilize a regime and allow for change. For example, Geels (2018) argues that firms have limited incentives to implement sustainable solutions, because the goal (sustainability) is a collective good, which implies that a situation is created where firms don’t feel responsible for adopting sustainable solutions. These free-rider problems are evident, but also counter-movements such as social corporate responsibility indicate that firms are driven to change the regime based on their own agency.

In response to the criticism of the lack of focus on agency, Geels states: “the MLP could benefit from stronger incorporation of insights from business studies and strategic management. The literature on strategic alliances can offer relevant insights in collaborations between incumbents and new entrants in the development of niche-innovations” (Geels, 2011, p. 31). In the case of the transition toward a sustainable material mix, the regime changes based both on pressures from the macro and micro level as well as internal agency of the regime. The internal agency of the regime has been expressed in the existing CSR strategies for sustainable materials, and therefore should be considered when analyzing the transition towards a sustainable material mix.

2.3 Operationalizing MLP with the Policy Arrangement Approach

To better understand how a regime shifts from using conventional materials to sustainable materials occurs, the PAA theory by Van Tatenhove et al. (2000) was used to analyze the dynamics influencing the successful implementation of sustainable materials in the regime. First, an introduction of the PAA theory is given in Subsection 2.3.1, followed by an explanation in which elements are combined with the MLP theory in Subsection 2.3.2. In Subsection 2.3.3, the dimensions of the PAA are explained in relation to this study.

2.3.1 The Policy Arrangement Approach

The PAA functions as a meso level theory for analyzing change and stability in a policy domain (Leroy and Arts, 2006). The two main aspects of policy arrangements are organization and substance, which are used to analyze change and stability in the policy domain (Arts & van Tatenhove, 2004). As described in Giddens’ structuration theory, organization has three dimensions: agents, rules, and resources. Substance is expressed in the fourth dimension of discourse. Through these four dimensions, the underlying influences of modernization and complexity of society and can be analyzed. These dimensions are strongly interconnected, and changes in one dimension affect the others.

A policy domain is similar to the regime, since they are both situated on the meso level. Since the MLP analyzes the transition at the macro level taking into account the dynamics between meso, macro, and micro, this thesis uses the PAA dimensions to analyze the changes that occur in the regime. As such, the changes in the regime can be structured according to the dynamics between actors, resources, rules, and discourses. Based on these concepts, factors influencing the success of the transition can be uncovered and conclusions can be drawn that lead toward actions positively influencing the course and speed of the transition.

According to Arts, Leroy, Van Tatenhove (2006), a policy arrangement institutionalizes due to strategic action by the actors involved and due to processes of political modernization. Such institutionalization allows for the interplay between agency of actors and external influences that results in the reinforcement or change of social structures which is limited in the MLP theory. A policy arrangement is the content and organization of these structures seen at a specific moment in time which is likewise addressed as the state of the regime in the MLP. Political modernization refers to social change as a result of economic and political processes such as globalization and individualization, which affect relations between stake, market, and civil society. This is similar to the influence of the landscape on the regime in the MLP theory.

2.3.2 Enhancing and operationalizing MLP with elements of the PAA

Due to advantages of the PAA and limitations of the MLP, the PAA is used in two ways to enhance and operationalize the MLP concepts. First, the concept of agency as addressed in the PAA is used to

enhance the MLP. Because the MLP theory is limited in addressing agency in the regime and sub-regimes, the PAA's way of addressing agency of actors in the regime and sub-regime is selected in order to better analyze the changes that take place in the sub-regime when a sustainable material is implemented. According to Arnouts (2010) certain proactive actors, who are referred to as policy entrepreneurs, have the agency to make significant changes in an arrangement. In the case of sub-regimes in the fashion industry internal actors as well as external actors in the niche have the agency to change the sub-regime. Therefore, the theoretical elements of institutionalization and specifically the agency of policy entrepreneurs is included.

Second, the dimensions of the PAA are used to operationalize regime change. This means that the implementation of sustainable material niches in a sub-regime are analyzed through changes in the four dimensions of the PAA. By operationalizing changes in the sub-regime in terms of actors, resources, rules and discourses, success factors can be uncovered. Finally, The concept of political modernization, significant to the PAA theory, is not used by the study since the similar concept of the Landscape in the MLP is applied instead.

2.3.3 The dimensions of the PAA operationalized

The four dimensions of the PAA were used to analyze the implementation of certain sustainable material niches in the regime. Below the four dimensions are explained and operationalized.

Actors

Actors are those involved in all three levels of the multi-level perspective theory. For example, actors are involved in developing, producing, and selling the sustainable material that happens in the niches (see Table 1). Actors are also involved in implementing sustainable material in the regime and can be in different departments in fashion brands. In the landscape, actors are consumers who potentially purchase a product made from sustainable material.

Actors in the domain of material used in fashion are located in the sub-regime and niche level. For example, important actors are the individuals deciding on material selection and implementation who are situated in the product departments, as well as departments driving sustainability and innovation. Product manufacturers and sourcing and buying officers are also important actors in the landscape. Actors on the niche level provide sustainable materials to the regime and can be producers of sustainable materials, including individual sales managers of material suppliers or operating startups.

Locating the relevant actors and their relationships with each other is vital to study the other dimensions. Analyzing actors helps create an overview of the field and provides context for resources, rules, and discourses.

Resources and Power

The relevant actors and the power relations differ per field and period because they are subject to change (Oteman, Wiering, Helderma, 2014). A lack of power to change specific structures might result in the stability of the domain (Lieverink, 2006). To better understand the power relations between the actors involved, the resources these actors depend on were analyzed.

Resources are systems of power that refer to the ability of actors to mobilize resources to achieve specific outcomes (Arts, Van Tatenhove, 2004). These resources can be tangible or intangible. Park (2015) states that physical resources for intervention and withdrawal include money, technology, and materials. Examples of intangible resources are access to information and knowledge, responsibilities, and decision-making power (Kaufmann, Mees, Liefferink, Crabbé, 2016; Oteman, Wiering, Helderma, 2014).

At the level of the regime, both tangible and intangible resources are important. For example, decision-making power in the organization holds large importance in allowing changes in material selection to happen. However, money to fund the implementation of materials and, indirectly, marketing assets to sell product made with sustainable materials, are also key for the successful implementation. At the level of the niche, physical resources are most important as access to funding and materials to scale production to meet the needs of the regime are crucial in the transition. Examples of applicable resources are shown in Table 1.

Rules

Rules refers to the possibilities and constraints of actors to act appropriately and legitimately. The rules determine the procedures, tasks, and division of competencies to outline how specific outcomes

are achieved (Arts, Leroy, Van Tatenhove, 2006). How quickly these rules can be changed, enforced, or broken influences the sub-regime and is influenced by actors and resources (Mahoney, Thelen, 2009). Actors continually draw upon rules that provide them with guidelines to (re)produce and transform policy arrangements (Arts, Van Tatenhove, 2004).

There are formal and informal rules (see Table 1). Formal rules are fixed in documents. For example, rules that related to the strategic direction determined by organization or sub-regimes, and strongly influence the possibility of change. Many fashion brands have a formal and public strategy on sustainability containing specific information on the use of materials.

Informal rules also hold on an important position. For example, sub-regimes and niches develop their own standards regarding quality, price, and look and feel. Even though alignment exist between different sub-regimes and niches, differences are important informal rules influencing the use of materials in the fashion industry.

Discourses

Discourses are ideas and concepts that influence actions. Discourses on policy concepts or general storylines give meaning to policy arrangements (Arts, Van Tatenhove, 2004). Only groups of people can create and adopt discourses. These discourses influence the actions of more individuals (Lieverink, 2006). Studying the dominant discourses in the different levels of the MLP provides information about the changes in dominant ideas and concepts influencing the transition. The dynamics between discourses and the other three dimensions demonstrate why actors have changed the state of the sub-regime.

The relevant discourse influencing the transition is the idea that sustainable materials will result in sustainable fashion. This discourse is in contrast to the dominant discourse before the implementation of sustainable materials, which is the idea that fashion brands produce clothing in the most economical way, without taking into account the impact on the environment.

DIMENSION	EXAMPLES
ACTORS	Consumers Departments in the sub-regime Product manufacturers Fabric/fiber producers
RESOURCES	Decision-making power in the choice of materials Knowledge on sustainability and fashion Funding for implementation Marketing assets Funding to scale and improve production
RULES	Sustainability strategies Material standards and requirements
DISCOURSE	Sustainable fashion Fashion with optimized quality and price ratio

Table 1: Operationalization of the PAA dimensions

2.4 Conceptual Model

A conceptual model is a structural visualization of the theory applied in the research context. In Figure 1, the relations between the dynamics in the levels of the MLP and the dimensions of the PAA are visualized.

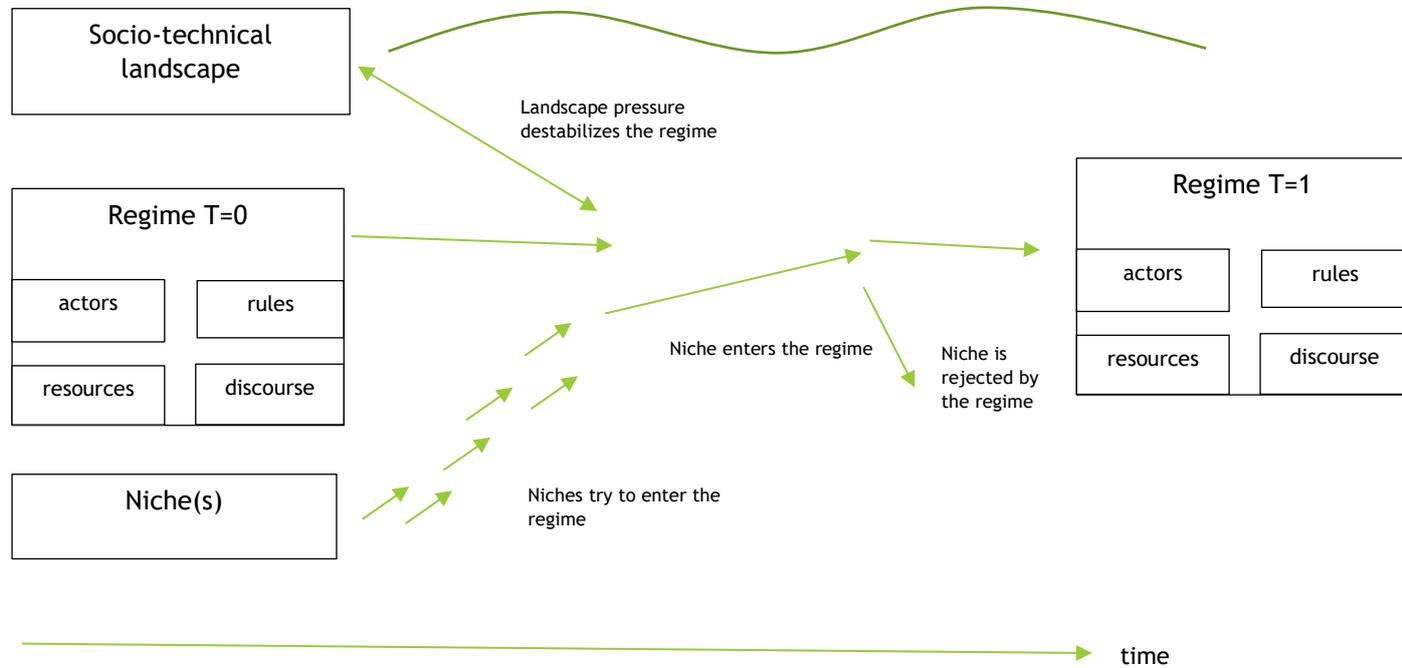


Figure 1: Conceptual model

3 Methodology

This chapter starts by explaining the appropriate research strategy and case selection in Sections 3.1 and 3.2. The process of gathering and analyzing the data required to answer the research question is then explained in Sections 3.3 and 3.4. Finally, Section 3.5 focuses on the revision of the research questions presented in Chapter 1, based on the theoretical framework and methodology.

3.1 Research Philosophy and Strategy

This research aims to explore the success factors for the implementation of sustainable materials to support the transition toward a sustainable material mix. The research philosophy or lens through which the researcher interprets the world influences the researcher's assumptions and expectations. In other words, a research philosophy relates to how knowledge and facts develop in relation to its nature. Because this research aims to understand a phenomenon and its specific characteristics it is most aligned with the interpretivist philosophy (Saunders, Lewis, Thornhill, 2009). Interpretivism focuses on a researcher's personal interpretation of the research (Dudovskiy, 2017). Because the facts are based on the interpretation of the researcher, this research focuses on individuals' experiences involved in the implementation of sustainable materials. The research strategy and analysis methods are therefore a reflection of interpretivism.

An appropriate research strategy must be selected to answer the research question. For qualitative research, different research strategies can be applied. Creswell (2018) describes five approaches to qualitative research design: case study, narrative research, phenomenology, grounded theory and ethnography. To answer the research question, in-depth insights into the transition toward sustainable material use in fashion are required. To analyze the transformation in-depth, a case study research was selected. Case study research explores a subject holistically and provides an in-depth understanding of a specific context (Zainal, 2007; Bassay, 2004). A case study design can focus on one or multiple cases.

To perform a case study to develop in-depth insight into the conditions required for sustainable materials to be successfully implemented in the transition, the scope of the research must be specified. The MLP theory indicates that the transition occurs in the regime. In the case of the transition toward a sustainable material mix in the fashion industry, the regime of the fashion industry consists of many companies that sell and produce clothing. Since this study is not suited to perform a case study on the entire regime, this research focuses on a sub-regime. Since fashion brands are the users of the materials and influence the transition the most, one (Tommy Hilfiger) was chosen.

The case situated in the regime allows for an in-depth case study on the transition. Yin (2003) indicates that the single case study is only appropriate under certain conditions, since the research question cannot be answered correctly if the case turns out to not be suited for the purpose of this research. In the following section, why this case was selected is explained.

Since this research looks at the conditions for successful adoption of sustainable materials in the sub-regime, it requires an embedded single case study design. An embedded case study design analyzes multiple units of analysis in a single case. Since Tommy Hilfiger adopted multiple sustainable materials, certain examples of sustainable materials were chosen. Yin (2003) indicates that an embedded single case study design allows for more flexibility as this research evolves. However, the researcher needs to make sure that the balance in this research between the subunits and the case is maintained properly.

3.2 Case Selection and Units of Analysis

To analyze the implementation of certain sustainable materials in a sub-regime, the right case and sub-units need to be selected. In Subsection 3.2.1, the selection of the single case is presented, and in Subsection 3.2.2, the selection of the sub-units or sustainable material niches belonging to the single case is described. The longitudinal aspect and the two phases of this research are explained in Subsection 3.2.3.

3.2.1 Instrumental case study and typical case: Tommy Hilfiger

There are two types of single case study: intrinsic and instrumental. The intrinsic case study focuses on a unique phenomenon located in one case, while an instrumental case study aims to develop a general understanding of a phenomenon by analyzing a single case (Creswell & Poth, 2018). Because this study aims to analyze the implementation of sustainable material niches in a sub-regime that is

part of the larger regime of the fashion industry, a typical case study was selected. With an instrumental case, the researcher focuses on an issue and then selects cases to illustrate this issue (Creswell & Poth, 2018). Since this study was instigated by the significant problems of material used in fashion, it is important that the cases illustrate this problem.

The case selected can either be a typical or unusual case. A typical case design is appropriate for a single case study, since the case represents a common situation. The results of the case study are meant to be informative for the average institution. A general critique of the case study strategy is the limitation of generalizing the results to other contexts (Yin, 2003). Results of a typical case also cannot simply be generalized, but they serve to inform the general context.

Because the regime of the fashion industry is characterized by several large-scale fashion brands, one brand was chosen. These companies use materials in a similar manner and have deployed similar strategies to improve their sustainable material use (Global Fashion Agenda and the Boston Consulting Group, 2017). For example, H&M, Tommy Hilfiger, Adidas, Levi's have all made commitments to source all their cotton from sustainable sources by 2020 (Levi's Strauss & Co., 2019; Tommy Hilfiger, 2019; H&M Group, 2019; Adidas, 2019). Analyzing just one of these fashion brands will not only give an in-depth understanding of the transition, but the results of the analysis will also inform the general context of the transition toward sustainable material use in fashion. Tommy Hilfiger reached a sustainable material use of 47% in 2018. This is fully in line with the global average of 47% indicated by the Pulse of the Fashion Industry report (2018). Therefore, Tommy Hilfiger was selected.

Tommy Hilfiger, an American brand founded in 1985, has a global distribution network and supply chain. The fashion brand produces a wide variety of products, such as shoes, underwear, apparel and accessories. In the organization different departments are responsible for a product group and Tommy Hilfiger's apparel is managed by consumer type such as men's, women's and kids. These departments have much autonomy in the use of materials in their collections.

Their strategy toward sustainability is branded as "MAKE IT POSSIBLE," which entails public targets set for 2020 around how the company approaches sustainable material use (Tommy Hilfiger, 2019). The company first started using sustainable materials in 2010, and since has implemented several sustainable materials. However, the approach and success of the implementation differed per sustainable material.

3.2.2 Subunits of analysis: four niches

Because Tommy Hilfiger is using various sustainable materials in their practices, multiple materials are part of the embedded single case study. These sustainable materials have different characteristics, are used in different product groups, and are sometimes implemented more successfully than others. All sustainable materials are brought to the sub-regime by certain niches and focus on different types of innovations. As such, the niches will from now on be named after these sustainable materials.

For this study, four examples of sustainable materials were selected as the subunits of analysis: **Better Cotton**, **Tencel lyocell**, **Re:Down**, and **Frumat Apple Skin Waste**. Each of these examples focuses on the four existing fiber types, has different levels of successful adoption (Better Cotton account for 65% of all cotton, while Tencel Lyocell only account for 2% of all cellulosic), and is in a different stage of their development and implementation (Better Cotton has been used for 8 years while Apple PU will be used for the first time in 2019).

Better Cotton

As part of a round table initiative led by WWF (which convened world experts on different commodities), a number of initiatives were born, all with the goal of finding sustainable solutions for farmers, the environment, and the future of each sector. The Better Cotton Initiative was initially supported by a collective of major organizations including Adidas, Gap Inc., H&M, ICCO, IFAP, IFC, IKEA, Organic Exchange, Oxfam, PAN UK, and WWF. The Better Cotton Initiative exists to make global cotton production better for the people who produce it, the environment it grows in and the sector's future, by developing Better Cotton as a sustainable mainstream commodity. Better Cotton is traded using a mass balance system. This means that Better Cotton does not require a certification body to certify all parties in the supply chain. Due to this system, only an output declaration form is required that states how much Better Cotton is purchased by a brand from BCI certified farmers. Members contribute to BCI through a volume-based fee (FBV) that is based on the volume of Better Cotton that is sourced as a percentage of their total cotton use.

Tencel Lyocell

Tencel Lyocell is a fiber produced by the Austrian fiber supplier Lenzing. Conventional cellulosic material, such as Viscose, can be produced using all types of wood as input. This wood can come from areas where the extraction causes environmental issues, such as biodiversity loss. Additionally, the process of transforming wood pulp into fibers is generally energy and chemical-intensive. Lenzing fibers are derived from sustainably managed and certified forests. The wood is made into a pulp and transformed into fibers using natural solvents 99% of which are reused. Lenzing developed the material in 2004, but it only became widely recognized for its sustainable benefits in recent years. The fiber is sold under the brand name TENCEL to ensure the distinction from other cellulosic fibers.

Re:Down

In 2016, Eric Firmann and Tae Kwang founded Re:Down, a company recycling down. Re:Down sells its recycled down in many different qualities to various industries and operates from the United States and Europe (Robin, 2019). In the fashion industry, Re:Down is used as a filling material for jackets. Recycling down is not a new concept. Due to its high value, there is a long cultural history of reusing down in pillows. Until recently, however, recycling down products while maintaining the high quality the fashion industry demands for a competitive price was not possible. Re:Down developed a system to recycle high quality down for a competitive price as a result of price changes in the virgin down market and development in recycling techniques (Henkel, 2016). The aim of the company is to partly solve the waste problem in the textile industry: “We started Re:Down after we realized that down is a precious resource and that there is not enough to supply the growing global demand” (Eric Firmann in Supply Compass, 2018).

Frumat Apple Skins

In 2004, Alberto Volcan was looking to develop new products using the waste from apple juice industry in Tyrol region in northern Italy. The initial idea was to develop paper from the apple waste, however, the quality remained an issue. Alberto joined the industrial biological waste recycling startup Frumat and together they invented a process of creating high-quality paper and vegan leather (Peryan Vegan, 2018). In 2009, the production process was finalized and set in place (Narasimhan, Srikanth, & Poltronieri, 2016). The vegan leather is made from cellulosic extracted from the apple waste combined with polyurethane (PU), a synthetic material commonly used to develop textile that has similar properties as leather. The sustainable vegan leather was created to reduce the burning of apple waste as well as to develop a sustainable alternative to leather, which has a high environmental impact and is related to animal cruelty issues (Techno Fashion World, 2019). The Apple PU was commercially available for the first time in 2015 (Peryan Vegan, 2018). The Apple PU is used by many industries, such as fashion, automobile and furnishing, due to its ability to be worked into different textures (Narasimhan, Srikanth, & Poltronieri, 2016).

3.2.3 Longitudinal case with 2 periods

As explained in H2, transition dynamics focus on different phases of a transition over time. Due to the importance of changes happening over time this research applies a longitudinal approach. In the case of the implementation of sustainable material niches, it is important to analyze the transition over the entire time frame. When a study focuses on the entire period and follows its development path and pace, it uses a diachronic approach (Hay, 2002).

Because the sub-regime began using sustainable materials in 2008, the period from its start to its current state was analyzed. This time span, between 2008 and 2019, allows for an in-depth analysis of the different phases in the transition. Because the first two sub-units, or sustainable material niches, were implemented between 2008 and 2014, and the last two between 2015 and 2019, this research can be divided into two phases. This allows the two phases to be compared. The first phase is longer due to the slower pace.

3.3 Data Gathering

The information required to answer the research questions is based on the experiences of actors involved in the four subunits of analysis. These actors are operating at the level of the sub-regime and niches. At the level of the sub-regime, the actors include those involved in the implementation, such as the corporate responsibility department and innovation department, the users of the material in the design and development stage, such as designers and product developers, and the actors who bring the product to the market, such as merchandisers and marketers. At the niche level, the actors

include the founders of the sustainable material, the manager of sustainable material suppliers, and supporting NGOs.

Multiple data sources were used to retrieve information on the experiences of the people involved in the practice and changing the practice. According to Verschuren and Doorewaard (2015), a researcher can use various methods to collect data, such as interviews, studying documents, and observations. This study used semi-structured interviews with actors representing all organizations and departments involved, document analysis of publicly available documents, such as sustainability reports, and confidential presentations used for internal communication, and observations of meetings between the niche and sub-regime actors.

For the reader, researcher, or participant to determine if findings are accurate, it is essential that the research be valid (Creswell, Miller, 2000). The use of multiple data sources is important to ensure the validity of the research. Creswell (2014) recommends triangulating data sources. This indicates that at least three different methods of data collection need to be used to ensure the validity of the research. The reliability of this research is ensured by a detailed description of the data collection process, so that the research can be replicated based on the information given in this chapter (Lewis, 2015).

Interviews

To gain an in-depth understanding of the experiences of people involved in the projects, semi-structured interviews were held with actors involved in the implementation of the selected sustainable materials. Since each sustainable material involved different actors, they were mapped out based on the document analysis. At least one actor of each organization or department involved in the implementation was interviewed (Appendix 1). At the niche level, the important organization(s) and the sub-regime level important departments were mapped to develop a holistic understanding of the implementation stage from all angles.

Even though semi-structured interviewing was required to obtain in-depth knowledge of experiences, using this method puts the internal validity of this research at risk (Barriball, While, 1994). To ensure the validity of this research, appropriate tools, processes, and data were selected to answer the research question (Leung, 2015). To enhance validity, every interview was conducted in the same manner using a semi-structured interview guide. Additionally, the interviews were structured according to the four dimensions of the PAA theory (see Appendix 2). In the process of the research, the interview guide updated as new insights arose. All interviews were recorded with the permission of the participant. According to Yin (2009), the documentation of data and procedures increases the reliability of this research.

Document Analysis

The analysis of important documents provided background information that helped the researcher conduct the interviews. For example, documents provided factual information necessary to describe the case and subunits accurately. Since this information did not have to be obtained through the interviews, it allowed for more in-depth, open questions essential to understanding how the interviewee experienced the implementation of the sustainable material.

The publicly available documents, such as sustainability reports of Tommy Hilfiger and sustainable material suppliers, served to provide factual information on the efforts taken by the niche and the sub-regime to implement sustainable materials. Information on the strategic goals and current status of sustainable material use provided the context to the experiences of individual actors. Internal documents, such as presentations and emails between the actors in the sub-regime, were used to map all relevant actors and establish the formal resources used to communicate.

Observations

Before the interviews took place, three observations were made during meetings with the niche and sub-regime actors (Appendix 1). For two of the four sustainable materials, these meetings occurred during the time of this research. The observations were open observations to guide the research and obtain all possible information. Based on this information and the document analysis, the interviews served to obtain more detailed descriptions of the implementation processes as well as information on the personal experiences of the interviewees.

Notes were made during the observations on the content discussed during the meetings as well as on the interpretation of the interactions between the actors. It is important to analyze the interaction between the actors, as it holds important information regarding the level of collaboration

between the niche and the sub-regime. The interview also served to confirm whether the assumptions made during the observations were accurate and factual.

3.4 Data Analysis

To develop conclusions based on the information collected, the data was analyzed systematically through an in-depth description of the regime and sub-regime before and after the implementation, as well as the process of implementing the four sustainable materials. Based on the descriptions of the implementation process, the success factors were determined and are described in the conclusion.

All the data collected was analyzed using the program Atlas TI. The interview transcriptions, observation notes, and documents were upload and are coded. Coding groups show similarities in the data and can, therefore, specify patterns (Saldana, 2008). For all the data collected, two cycles of coding were applied: open coding and axial coding. Creswell (2018) states that open coding is the process of going through data, and coding everything that seems relevant in the form of words, sentences or sections. During the open coding over 400 codes were established and reorganized to analyze the first patterns in the data.

During the second cycle of coding, open codes were placed into code groups. Axial coding describes a code group's properties and dimensions and explores how the groups relate to each other (Creswell & Poth, 2018). The code groups are structured according to the different levels of the MLP (landscape, (sub)regime, and niche) and the dimensions of the policy arrangement approach (actors, resources, rules, and discourses). These code groups formed the foundation of the case description. After the creation of the code groups based on the theoretical framework, the code group created based on the success factors used to build the conclusion.

3.5 Revised Research Questions

Based on the theoretical framework and selected case-study method, the research question and sub-questions were revised to the specific theories and case. In conducting an in-depth analysis of the transition, this research used the MLP and PAA to focus on the sub-regime of Tommy Hilfiger instead of the entire regime of the fashion industry.

What success factors are responsible for the implementation of sustainable material niches at the Tommy Hilfiger sub-regime?

To answer the research question, the following sub-questions were formulated:

1. *What is the state of the Tommy Hilfiger sub-regime before the implementation of the sustainable material niches in terms of actors, resources, rules, and discourse?*
2. *To what extent does the Tommy Hilfiger sub-regime change when a sustainable material niche is implemented, in terms of actors, resources, rules, and discourse?*
3. *What (if any) are the success factors in these changes, distinguishing between factors that originate from the niches and from the landscape?*
4. *What is the state of the Tommy Hilfiger sub-regime after the implementation of the sustainable material niches in terms of actors, resources, rules, and discourse?*

The sub-questions are answered in Chapter 4. Section 4.1 starts with the general description of the state of the regime and sub-regime just before the implementation of the four selected sustainable materials, answering sub-question 1. Next, a detailed description of the entire implementation stage of each material over time is presented to identify the success factors in Section 4.2, answering sub-questions 2 and 3 for each separate material. Afterward, in Section 4.3, the current state of the regime and sub-regime is described after the implementation of all materials, answering sub-question 4. In conclusion, the main research question is answered Chapter 5 based on the answers to the sub-questions.

4 Embedded Case Description

In this chapter, the case and its subunits are analyzed chronologically, addressing the context of their previous and current situations. The full implementation process is described using the dimensions of the PAA and dynamics in the MLP.

4.1 Tommy Hilfiger at the start of implementing sustainable material niches

This subsection answers sub-question 1 “*What is the state of the Tommy Hilfiger sub-regime before the implementation of the sustainable material niches in terms of actors, resources, rules, and discourse?*” through a detailed description of the Tommy Hilfiger sub-regime and an analysis using the dimensions of the PAA and dynamics in the MLP. Tommy Hilfiger, a sub-regime, it is influenced by changes in the regime of the fashion industry. For this reason, the state of the regime is introduced first.

4.1.1 The state of the fashion industry regime before the implementation of sustainable material niches in the Tommy Hilfiger sub-regime

In 2008, the regime of the fashion industry was characterized by sub-regimes, such as large fashion companies and brands producing fashion faster and cheaper than ever before. These companies used large amounts of conventional materials, such as cotton and polyester, which have been used for clothing production for decades (Ellen MacArthur Foundation, n.d.). However, due to the pressure on companies and the farmers producing the materials to produce high volumes for low prices, the process becomes more impactful on the environment.

During this time, there was no pressure from the landscape to start implementing sustainable materials in the regime of the fashion industry. The consumer in the landscape was only marginally aware of the negative impact caused by the current way of producing fashion. This is due to few scientific studies or journalistic investigations focused on the environmental impact of clothing production (Fletcher, 2008; Allwood, 2006; Madsen, 2007). Also governments worldwide did not have policies or programs in place to improve conditions in the production of textiles and usage of large volumes of conventional materials (Fletcher, 2008).

Even though the most actors take no action regarding sustainability, a small group of actors, such as small ecological brands, NGOs and activists, took the first steps to make fashion sustainable because of their awareness of fashion’s environmental impact and personal motivation to improve these conditions. These actors were influenced by the discourse around sustainable fashion and sustainable materials. For example, NGOs like Solidaridad and brands such as People Tree started researching more environmentally friendly materials, which resulted in the implementation of organic cotton on a small scale (Sourcing Journal, 2018).

There was only a small amount of organic cotton or other sustainable materials available in the regime, since the demand is driven by a few pioneering brands. Besides the limited availability of the sustainable materials, the price of these materials was high. To increase the availability and reduce the price, the small ecological brands closely collaborated with actors such as NGOs on small holder farmers projects to develop the sustainable materials (Sourcing Journal, 2018).

4.1.2 The state of the Tommy Hilfiger sub-regime before the implementation of sustainable material niches

Reflecting the state of the regime described above, in 2008 the Tommy Hilfiger sub-regime produced its products using only conventional materials. The materials the sub-regime used were grown or produced globally under diverse environmental and social conditions. The materials were sold to actors that produce the fabric and final product, which were then sold to Tommy Hilfiger.

Before the implementation of sustainable materials at Tommy Hilfiger, the sub-regime, like the majority of other companies in the regime, produced clothing based on the discourse of producing and selling desired clothing based on the brand’s recognized aesthetic and established quality and price offer. Quality and price requirements guide the actors, such as teams of designers, product developers, and merchandisers, who were responsible for selecting and implementing the materials. The financial resources required for purchasing materials solely focused on getting the best quality. Since the discourse on sustainable fashion had not influenced the sub-regime yet, sustainable alternatives like organic cotton were not used. Tommy Hilfiger’s objective was to produce and sell

clothing, not to produce and sell clothing in a sustainable way (Gudrun Gudmundsdottir, personal communication, 25-06-2019).

In 2009, the first incentives regarding sustainability came from a few individual actors within the sub-regime, who aimed to reduce the companies' environmental impact and were influenced by the discourse on sustainable fashion and sustainable materials (Susan Irvine, personal communication, 24-06-2019). The first ideas about using organic cotton had been initiated but had not yet materialized. In 2010, Tommy Hilfiger joined the Dutch Governmental program that supports fashion brands to start using sustainable materials. This is the first time the landscape puts pressure on the sub-regime to implement sustainable materials. During this time, Tommy Hilfiger starts working together with the actor MADE-BY, a non-profit consultancy agency that was assigned by the program. MADE-BY at this time launched a publicly available environmental benchmark for fibers. This resource compares LCA data in a simplified benchmark that can be used by sub-regimes to create rules in the form of a sustainable material strategy and guide decision-making to reduce impact in their fiber selection (MADE-BY, 2017).

As part of the program, Tommy Hilfiger set rules in the form of a target to implement some sustainable materials into its collection. The implementation of the first sustainable materials was achieved in collaboration with the actor the underwear division, who succeeded in using organic cotton in one or two styles. This move marked the first step Tommy Hilfiger took toward using sustainable material. As one respondent claims: "It was not very successful, but it was a start and it made people think: "let's do something about it"" (Susan Irvine, personal communication, 24-06-2019). By joining the Dutch governmental program for sustainable materials in fashion, the actors in the sub-regime were supported by resources in the form of expertise provided by the NGO MADE-BY and rules in the form of targets that were mandatory for brands who participate in the program.

In 2011, the sub-regime created rules in the form of the first strategy around sustainability. This three-year plan contained ten commitments. One of those commitments was to have organic cotton in the collections. Between 2011 and 2014, some organic cotton was implemented in the collection, but the company also started exploring other sustainable materials (Gudrun Gudmundsdottir, personal communication, 25-06-2019). As shown in Figure 3, the first experiments with the implementation of a sustainable material were the beginning of the transition toward a sustainable material mix within Tommy Hilfiger.

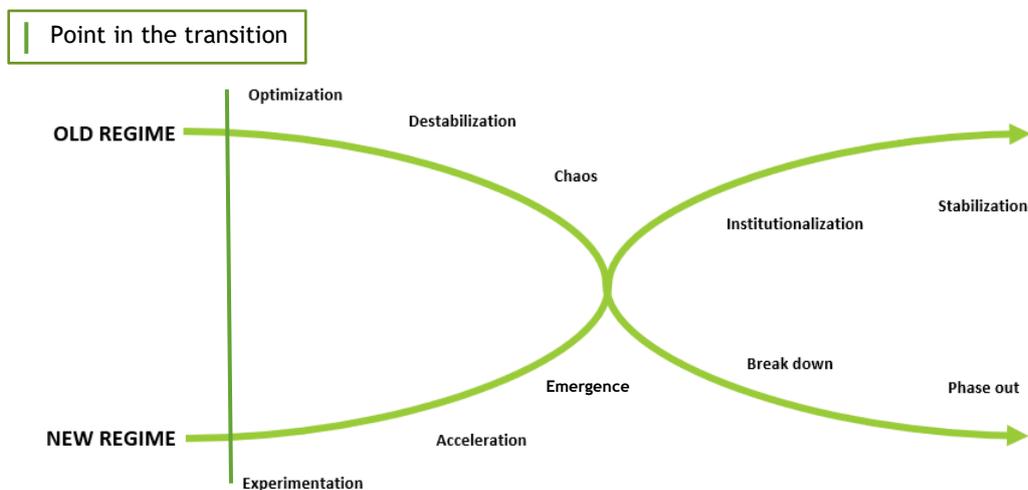


Figure 2: 2011, a snapshot of the transition dynamics in the overall transition toward a sustainable material mix. Adapted from Buchel, S., Roorda, C., Schipper, K., & Loorbach, D. (2018). *The Transition Toward Good Fashion. Drift.*

4.2 Implementing sustainable material niches at Tommy Hilfiger

This section answers sub-question 2 "To what extent does the Tommy Hilfiger sub-regime change when a sustainable material niche is implemented, in terms of actors, resources, rules, and discourse?" and sub-question 3 "What (if any) are the success factors in these changes, distinguishing between factors that originate from the niches and from the landscape?" individually for the

implementation of each niche. The cross analysis between niches is presented in Chapter 5, thus answering the main research question.

4.2.1 Better Cotton

Because of the high price and low availability of organic cotton, Tommy Hilfiger explored other forms of sustainable cotton. Since cotton is the most-used fiber for Tommy Hilfiger, efforts to implement sustainable materials have largely focused on it. In 2012, the CR department scouted Better Cotton from the Better Cotton Initiative (BCI). BCI is an organization that invented a system under which sustainable cotton can be grown. This system focuses on selling Better Cotton for the same price as conventional cotton and is funded by contributions that are required for fashion brands to become members of BCI and purchase Better Cotton. This has the advantage that it does not affect the margins of the products, contrasting with organic cotton, where the price of the fiber is higher and is reflected in the price paid for the garment. As a result, in 2013, Tommy Hilfiger became a member BCI. The cost for joining the program was paid from the budget of the corporate responsibility department.



In 2013, BCI set up the Better Cotton Fast Track program (BCFTP) in collaboration with its largest member brands and IDH, the sustainable trade initiative. IDH is a governmental organization that accelerates and scales the sustainability of trade commodities such as cotton. As part of the program, IDH provides funding and manages the implementation of the funding on a farm level (Better Cotton Initiative, 2019). The role of the brands was to provide extra funding, and in return, the program offered a platform for collaboration. Tommy Hilfiger joined the BCFTP in 2014 because it saw the potential of being connected to other brands that were further in the journey of implementing BCI. At this moment, the BCFTP includes ten brands; each invested 100,000 euros, which is doubled by IDH, for a total of 2 million euros. To secure the 100,000 euros the CR department pitched the proposal to the CFO and received the approval for the funding. The money that was raised through the BCFTP was invested in training farmers on the BCI principles, resulting in an increase in the availability of Better Cotton.

One of the other requirements of fashion brands being member of the BCFTP is the creation of a public target around the use of Better Cotton. To scale the use of Better Cotton, a public commitment to the use of the material provides the program with security. Also, a public target serves to stimulate the members to take use of Better Cotton seriously and set internal structures that enables them to meet the public comments they make. This moment fell at the same time as the development of the Sustainable Evolution strategy, which already aims to include a target for 100% sustainable cotton by 2020. Therefore, Better Cotton was included in this public target. Internally, a yearly target was set for the period of 2014 to 2020, which was managed by the CR department.

During the first years of implementing Better Cotton at Tommy Hilfiger, the CR department was challenged to get important actors on board and take responsibility. One of the actors, the sourcing offices, which serve as intermediary trading partners between the manufacturers and the brand, did not want to take responsibility for working toward the increase of the use of Better Cotton. During this time, the sourcing offices did not understand the value of BCI and were not motivated to take this responsibility. Or, as one respondent in the CR department claimed: “We were like: this is sourcing, they are the contact with the suppliers, they have to do it, but after two years of fighting we realized it was not going to work and we have to do it ourselves” (Gudrun Gudmundsdottir, personal communication, 25-06-2019). As a result, the CR department took all responsibility and started to communicate directly with the manufacturers to explain to them how the BCI systems work and to make sure they order Better Cotton.

In the period between 2014 and 2016, Tommy Hilfiger focused on training manufacturers as well as internal actors who are responsible for selecting materials, such product developers, fabric managers and product development teams. Spreading the knowledge of how BCI works required a lot of training and debate, as its concept is not as well-known. Around this time, BCI developed visual

materials, like videos and posters, to explain its principles and system. Also, other brands in the BCFTP provided insights into successful training practices. This ensured that over time, all actors started to understand the concept and take responsibility.

In 2016, the BCFTP was transformed into the Growth & Innovation Fund, because BCI found itself in its second stage of maturity and scaling. The annual fund of 12.6 million euros was established to continue the work to mainstream BCI as a commodity (IDH, 2019). The continuous interaction with the other brands in the program helped to share best practices and increase knowledge on how to effectively drive the increase of BCI.

As BCI gained more momentum, the sourcing offices started to take over more responsibility for driving the BCI results and communicating the requirement for BCI and progress with the manufacturers. To drive better results for BCI, in 2017, BCI leads were appointed in the product teams to take responsibility for the BCI results. Because of the large scale of vendors, allocating them to a BCI lead was challenging, and this resulted in not all vendors being pushed equally (Femke Jonkmans, personal communication, 12-06-2019). However, the annual targets pushed the BCI leads and other actors to achieve them.

In 2018, the concept of BCI was more widely understood, and sustainability in general was gaining momentum at Tommy Hilfiger: “There is now the element that people are starting to see if we don’t do something now that we could face challenges in purchasing the right materials which could potentially lead to the loss of consumers in the future” (Susan Irvine, personal communication, 24-06-2019). This also translated in the first communication about BCI directly with the product, in the form of tags. Due to the increasing focus of consumers on products that are made from sustainable materials, the brand communicated their efforts around BCI to the consumers through these tags and information on their website.

Changes in the Tommy Hilfiger sub-regime after Better Cotton implementation

The discourse of sustainable fashion in the landscape influenced the sub-regime to implement a sustainable alternative to conventional cotton. This discourse on sustainable fashion and sustainable materials became increasingly dominant in the landscape due to the increasing attention by the scientific community, the media and the general public regarding the unsustainable conditions in textile production. Due to the influence of the discourse, for the first time the sub-regime seriously considered implementing a sustainable material at scale.

Because organic cotton was significantly more expensive than conventional cotton, and therefore, did not meet the rules concerning price standards at Tommy Hilfiger, the sub-regime explored other sustainable forms of cotton in 2012. Because Better Cotton is sold cost neutral, it was seen as the best sustainable alternative to cotton at the time as it would least impact the current financial cost structure of the products. To implement Better Cotton at scale, the company allocated financial resources to become a member of the Better Cotton Fast Track program (BCFTP). Until this time, the sub-regime had not allowed financial resources for the implementation of sustainable materials to be invested, but it became willing to do so because of the potential of sourcing it cost-neutral at a large scale.

By collaborating with other actors in the regime through the BCFTP, the sub-regime obtained resources in the form of expertise on the sourcing and implementing of Better Cotton. This expertise was used to define an approach to implement Better Cotton through the entire business. Nevertheless, within the sub-regime, it remained difficult to get actors onboard who were not yet influenced by the discourse around sustainable fashion. Over time, the CR department, which is the driving actor, managed to educate other actors in the sub-regime, such as designer and product developers, on the value of using Better Cotton, which resulted in a more successful implementation process.

The rule set by the BCFTP to have a public target on the use of Better Cotton strongly influenced the allocation of resources to achieve this target. For example, expertise and funding enabled training sessions with the actors involved. This was the first time a target was created regarding the implementation of a sustainable material next to the existing financial targets. The targets also influenced the actors to take the implementation of Better Cotton seriously.

Over the course of the implementation, the discourse of sustainable fashion started to influence consumers in the landscape. The increasing consumer demand in the landscape for products made from sustainable cotton also influenced actors in the sub-regime to actively implement the material. To connect to this newly established consumer demand, marketing resources were made available to develop hangtags to indicate the sourcing of Better Cotton.

Factors influencing the implementation of Better Cotton

At the start of the implementation process in 2008, material selection in the sub-regime is strongly determined by quality and price standards of materials. The fact that Better Cotton is cost neutral and therefore meets rules set by the sub-regime regarding prices of materials can be seen as a first factor that contributes to the successful implementation of this material. It made that Better Cotton was selected as the main alternative to conventional cotton. The system allowed the material to be sourced at the same price as conventional cotton which made the material suitable in comparison to other more expensive alternatives such as organic cotton.

Second, Better Cotton was able to enter the sub-regime because an internal actor, the CR department, acted as a policy entrepreneur. It was able to make sure the sub-regime became a member of BCI. The CR department was also able to convince other actors such as the CFO who contain strong decision making power.

The third factor is the dedication of financial resources by IDH and the sub-regime. These resources were required by the BCFTP and as a result, Better Cotton was scaled and could be sold in larger quantities compared to organic cotton. The larger scale of availability of the material resulted directly in the larger use of the material and therefore created momentum within the sub-regime.

Fourth, the existence of targets as part of the strategic approach on the use of Better Cotton pushed all actors in the sub-regime to become responsible for implementing the material. These public targets were a mandatory element of the BCFTP and resulted in designers and product developers actively increasing the use of Better Cotton. Due to the competitive culture within the sub-regime, these targets effectively motivated all actors. The fact that these targets were made public showed that the sub-regime valued achieving the targets.

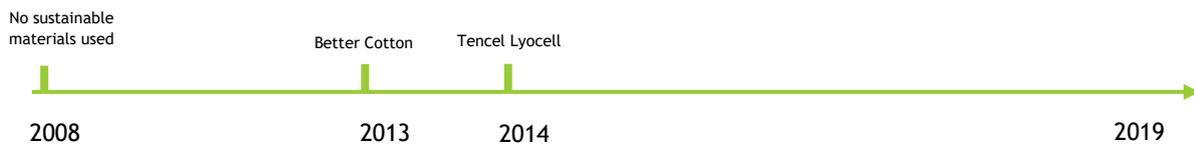
The fifth factor of broad actor involvement, in the second phase of the implementation, leads the strong increase in the use of the material. This is linked to the existence of the public targets as well as the increasing influence of the discourse on sustainable fashion on actors in the regime. In comparison to the first phase, where the CR department was the sole driving actor, the second phase benefits from the shared responsibility between multiple actors in the sub-regime.

Increasing consumer demand for sustainable products is the sixth factor influencing the successful implementation of the material during the second phase. Between 2017 and 2019, the influence of the discourse on sustainable fashion starts to influence consumers in the landscape, consumers started to express interest in products made with sustainable materials. The implementation of BCI hangtags in 2017 supported this, since it allowed consumers to be aware of the use of the material.

SUCCESS FACTOR	IN TERMS OF PAA DIMENSIONS AND MLP LEVELS	PRESENT OR ABSENT
Competitive price	Rules set by the sub-regime on material prices are met by the niche	Present
Dedication of actor(s)	CR department acts as a policy entrepreneur actor in the sub-regime	Present
Dedication of funding	Financial resources are dedicated by actors in the regime and sub-regime	Present
Internal & external target as part of strategic sustainable material approach	Internal rules on the use are created by the sub-regime	Present
Broad actor involvement	All actors in the sub-regime are actively involved and influenced by the discourse on sustainable fashion in the landscape	Present
Connection to consumer awareness	Sub-regime is able to connect to consumers in the landscape influenced by the discourse of sustainable fashion	Present

Table 2: summary of factors influencing the implementation of Better Cotton

4.2.2 Tencel Lyocell



In 2014, the MADE-BY environmental benchmark for fibers was used to increase the use of sustainable materials in non-cotton fibers. Tencel Lyocell is officially recognized as a sustainable material that is favorable over other cellulosic fibers. At this point, Tencel was already used by Tommy Hilfiger in very small quantities, since the material has been on the market for over 25 years. Nevertheless, the material was used without knowing about its sustainability credentials.

Around this time, Lenzing, the producer of Tencel Lyocell, started conversations with designers and product developers in the sub-regime at material fairs and trade shows to explain the sustainability credentials. According to a respondent working for Lenzing, “It’s interesting to see that when the design teams learned about the sustainability credentials it was like they were getting this light bulb on like we are doing this ready?” (Oya Barlas Bingül, personal communication, 26-06-2019). Despite the efforts of Lenzing to communicate the sustainability of the material, only a few actors in the sub-regime were reached and no increase in the use of the material occurred.

The CR department around this time conducted training sessions with the product departments around different types of sustainable materials classified by the MADE-BY environmental benchmark for fibers (Susan Irvine, personal communication, 24-06-2019). During these training sessions, the sustainability credentials were explained. However, the training sessions involved around ten sustainable fibers, which limited their impact regarding Tencel Lyocell.

In 2015, the brand merchandising team implemented internal targets on the number of pieces that needed to contain sustainable materials. Tencel Lyocell was part of the fibers included, but since the target was made in a way that each department could choose the sustainable fibers from the list, it was not directly driven toward a significant increase in the use of Tencel Lyocell.

To increase the use, the CR department set up a meeting with Lenzing and the menswear denim design team. During this meeting, Lenzing received feedback from the design team and developed a denim fabric that was more in line with the quality requirements. Nevertheless, these collaborations did not result in a significant increase in the use of Tencel for menswear denim, mainly due to its higher price compared to cotton (Femke Jonkmans, personal communication, 12-06-2019). The higher price of the fiber remains the largest challenge to implement Tencel Lyocell in the collections for all products, even with the increased awareness around sustainability and increase in the use of sustainable materials overall.

When the internal targets created on the general use of sustainable materials were made public in 2018, it did not increase the use of Tencel Lyocell specifically. Because of the specific long-standing target on cotton, other materials were only marginally addressed. According to a respondent, “As much as we measured the other sustainable materials, cotton was always the material that people seem to take more notice off” (Susan Irvine, personal communication, 24-06-2019). At this time, organic cotton also became more widely available and more cost-efficient. As a result, the product teams focused more on Better Cotton and organic cotton at this time compared to other materials (Hannah Evans, personal communication, 20-06-2019).

By this time, other fashion brands had taken action to implement Tencel Lyocell at a larger scale. For example, brands and retailers partnered with Lenzing to improve price and availability through forecasting (Oya Barlas Bingül, personal communication, 26-06-2019). According to Lenzing, “Actually, this partnership approach creates a truly unique benefit: a shared feeling of togetherness, excitement and mutual appreciation. To us, there is no better way to be successful” (Lenzing, 2019, p. 1). Until today, Tommy Hilfiger has not tapped into this partnership approach to drive the increase of the use of Tencel.

Another form of partnership Tommy Hilfiger has not utilized is their E-branding service, which focuses on visualizing the sustainability of the material to the consumer. As consumers are placing value in brands that offer responsible products, Lenzing sees opportunity in brands communicating about the benefits of Tencel Lyocell. Therefore, Lenzing offers brands the possibility to brand products with statements about the sustainability credentials of Tencel Lyocell as well as the use of the fibers logo. Despite its successful use by other brands, Tommy Hilfiger does not yet use the E-branding system.

Changes in the Tommy Hilfiger sub-regime after Tencel Lyocell implementation

When Tencel Lyocell was consciously implemented one year after Better Cotton, it only marginally changed the sub-regime due to the limited uptake of the material. The discourse of sustainable fashion in the landscape influenced the sub-regime to search for sustainable materials to be implemented. As a result of the use of the MADE-BY benchmark for fibers, Tencel Lyocell was considered a sustainable material. However, due to the focus of the sub-regime on the implementation of Better Cotton, few measures were taken to support the implementation of Tencel Lyocell.

The sub-regime decided to focus on Better Cotton instead of Tencel Lyocell because Tencel Lyocell is more expensive than conventional alternatives and is therefore not in line with the rules regarding prices. The material did not receive priority in the allocation of resources for implementing sustainable materials. However, due to the increasing awareness and influence of the discourse on sustainable fashion, spread by the implementation of Better Cotton, training sessions were organized by the CR department to inform other actors, such as designers and product developers, of the benefits of other sustainable materials, such as Tencel Lyocell. These training sessions also increased the awareness on the benefits and availability of sustainable materials beside Better Cotton.

During the first stage of implementation, an internal target was created for the overall use of sustainable materials. This target was later made public. The rules in the form of these targets marginally increased the use of Tencel Lyocell, because the targets focused on many different materials and the specific target on cotton remained the main focus.

Compared to other fashion brands, Tommy Hilfiger has not tapped into the collaboration opportunities Lenzing offers. These collaborations have proven effective in increasing the use of the material in other sub-regimes. As a result, the use of the material does not increase over time and has had limited effect on changing the sub-regime.

Factors influencing the implementation of Tencel Lyocell

Even though Tencel Lyocell was already used by the sub-regime, it entered the sub-regime as a strategic sustainable material through the use of the environmental benchmark for fibers developed by MADE-BY. Tommy Hilfiger set rules on which sustainable materials to focus on based on this tool. Tencel Lyocell is part of this tool because it performed an LCA. Therefore, the first factor influencing its implementation is the ability of the niche to meet the rules set by the sub-regime on the classification of sustainable materials.

The second factor limiting the successful implementation of the material is its high price. In contrast to Better Cotton, Tencel Lyocell is more expensive than conventional alternatives. Because of the inability to meet the rules regarding price set by the sub-regime, the material was considered to have less potential.

The third factor limiting the uptake of Tencel Lyocell is the absence of an actor or actors within the sub-regime who actively worked on the implementation. During the first years of the transition, the sub-regime had a strong focus on the implementation of Better Cotton, which was driven by the CR department. Due to the strong focus on Better Cotton, the CR department took less responsibility and action for other sustainable materials.

The fourth factor limiting the uptake of Tencel is therefore the absence of a dedicated target on the use of the material. Because of the successful creation of a rule in the form of a yearly target for Better Cotton, a similar approach was taken to increase the uptake of other sustainable materials. However, because the target was created for the use of multiple sustainable materials, it did not result in an increase of the use of Tencel Lyocell specifically.

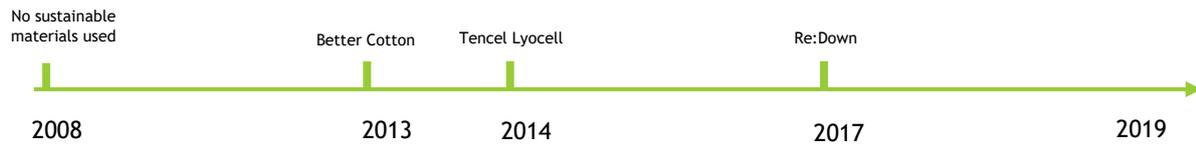
The fifth factor limiting the uptake of Tencel is the inability to connect the consumer for sustainable products in the landscape. Even though other fashion brands collaborate with Lenzing to communicate the use of the material and connect to the increasing consumer demand in the landscape, Tommy Hilfiger has not utilized this opportunity.

SUCCESS FACTOR	IN TERMS OF PAA DIMENSIONS AND MLP LEVELS	PRESENT OR ABSENT
Material is adopted as strategic sustainable material	Rules on the selection of sustainable materials set by the sub-regime are met by the niche	Present
Competitive price	Rules on the selection of sustainable materials set by the sub-regime are not met by the niche	Absent

Dedication of actor(s)	No actor(s) in the sub-regime act as policy entrepreneurs	Absent
Internal & external target	No rules on the use are created by the sub-regime	Absent
Connection to consumer awareness	Sub-regime is unable to connect to consumers in the landscape influenced by the discourse of sustainable fashion	Absent

Table 3: summary of factors influencing the implementation of Tencel Lyocell

4.2.3 Re:Down



In 2017, the innovation department at Tommy Hilfiger scouted recycled down—a material that can be used for the filling of winter jackets—and presented it at the innovation fair for the spring 2019 season. During the innovation fair, the product departments had a positive response to recycled down, but since it was not suitable for the spring season, it was implemented for the fall season of 2019. In the preparation for the implementation of all innovations for the fall season, other sustainable materials for filling winter jackets were discovered (like Sorona, which is partly bio-based, and Thermore, a recycled polyester filling). Due to the availability of the other options, a portfolio approach was developed to offer multiple options at different price points, under the umbrella term sustainable warmth.

The concept of sustainable warmth was brought to the rest of the business through a creative briefing, which was developed with Lee Holman (the creative director of Tommy Hilfiger). In this portfolio approach, recycled down was the highest quality and price point. During the preparation stage, the price of virgin down was rising because of challenges around bird flu. Therefore, recycled down could compete with sustainable virgin down on the price level, which made it easier to implement by the product teams.

The innovation department decided to purchase the recycled down from Re:Down, as the initial supplier they scouted was a swimsuit and underwear supplier that offered recycled down as a side business. As stated by a respondent from the innovation department, “We thought, let’s at least start putting the two options next to each other and list the plus sides of both. Re:Down was just more responsive and much more genuine than the other supplier” (Vincent Delalandre, personal communication, 28-06-2019). Also, Re:Down’s previous collaboration with Patagonia, a renowned sustainable fashion brand, meant it had the necessary certification Tommy Hilfiger requires for recycled materials. The innovation team consulted the CR department to verify that Re:Down was a sustainable option. The CR department verified that Re:Down had a Global Recycling Standard (GRS) certification. Because this was directly available and the material fell in line with other recycled materials the company was already using, it was approved from a sustainability standpoint.

Even though Re:Down was approved by the CR department, it was not in line with the strategy to source 100% responsible down. In 2017, Tommy Hilfiger and its mother company PVH developed an animal welfare policy around animal fibers. This policy stated its commitment to source all its down from virgin Responsible Down Standard (RDS) sources. Because the use of recycled down conflicted with this statement, the CR department consulted with PVH to adopt recycled down into its official approach for sustainability for down. This was successful, as Re:Down had the certification and proof of concept in place (Gudrun Gudmundsdottir, personal communication, 25-06-2019).

A sustainable approach was developed for down because the Tommy Hilfiger Nordic country office stated that they would not purchase any unsustainable down jackets. Because Nordic countries are a large market for down jackets, the developments toward integrating sustainable solutions for down were prioritized (Laura Hor, personal communication, 28-06-2019).

Besides giving approval, the CR development was not involved in the implementation of Re:Down. The innovation team was responsible for communicating with the divisions and making people aware of the sustainable benefits and the story behind the material. The CR department was not involved because it only set goals for increasing sustainable material use of the main marketing material (i.e., the consumer-facing material, such as the shell fabric for a jacket). Because the target

did not include filling material, the CR department did not dedicate many resources to finding and implementing sustainable filling materials.

During the implementation stage, the innovation team reached out to the legal department to ensure that there are no legal restrictions around using and selling Re:Down. At first, the legal team was not very responsive, as they were reluctant to spend a lot of resources on a new material for which they were not fully aware of the scope. After continuous communication, the legal team discovered that Re:Down could not be sold in South Korea. Since South Korea is not a large market, this did not significantly impact the implementation process.

As a second step, the use of Re:Down had to be implemented. The product teams responded positively. The recycling of duvets was easily visualized for the product teams. Because everyone could understand what it was and why it is sustainable, people got enthusiastic about using it.

This easiness to understand and the visual concept was also recognized as suitable for a consumer-facing message. Since the implementation of the Make it Possible strategy, Tommy Hilfiger decided to communicate about certain sustainable products in marketing campaigns under the term “Make sustainable warmth possible.”

Re:Down was selected for a large marketing campaign, which also allowed product teams to implement Re:Down more successfully. In general, the product that receives attention in marketing campaigns sells better, and this resulted in a pre-order of 13,000 pieces instead of the forecasted 5,000 (Vincent Delalandre, personal communication, 28-06-2019). One of the marketing assets was developed as a video, which visualized the concept of Re:Down and provided commercial visibility to the product. For the product teams, it was rewarding to develop a sustainable product that received a marketing platform and resulted in commercial success.

To ensure that Re:Down was used after the fall 2019 season, the innovation team advised the product teams to work with the same sustainable warmth options to ensure a consistent message for outerwear. The innovation department has a strong relationship with the product developers and the designers but is less connected to some of the merchandisers in the product teams. The innovation team had a close relationship with the merchandiser from womenswear, who was very motivated to include Re:Down into the collection. This resulted in a larger uptake of Re:Down in the womenswear department than other departments. Nevertheless, for the next seasons the use of Re:Down increased in all departments.

Changes in the Tommy Hilfiger sub-regime after Re:Down implementation

When Re:Down was implemented in 2017, the sub-regime had already made progress on the implementation of Better Cotton and had taken small steps toward implementing other sustainable materials, like Tencel Lyocell and recycled polyester. At this time, multiple actors within Tommy Hilfiger started actively searching for other sustainable materials.

The strategy around sustainable down alternatives at first did not include Re:Down. The CR department convinced the other actors to update the strategy to include Re:Down. As a result, the existing rules on which materials are considered sustainable was broadened. This was an important step to allow new materials to successfully enter the sub-regime.

During the first phase of implementing sustainable materials, the CR department was the main actor. As a second driver for change, a new actor, the innovation department, searched for sustainable materials that could be used for the insulation of jackets and scouted the material. This changed the dynamics between actors in the sub-regime.

Even though Re:Down is slightly more expensive than conventional down, it meets all quality and price standards set by the sub-regime. The higher price of the material did not limit its uptake mainly due to the fluctuations in the price of conventional down and the ability to connect to newly formed consumer demand.

This increase in consumer demand influenced the actors' willingness to implement the material. Because the innovation department works closely together with actors, such as designers and product developers, the message around the benefits and value of Re:Down was shared. This resulted in a spread of the general discourse around sustainable fashion in the sub-regime.

The increasing consumer demand in the landscape also resulted in the allocation of marketing resources to support products made with Re:Down. This was the first time the sub-regime used marketing assets to support the sales of products made with sustainable materials. All products that receive marketing support sell better, which influenced the implementation of the material in future seasons. As a result, although the material is slightly more expensive and does not fully meet the rules regarding price, it was commercially successful due to the marketing resources.

Factors influencing the implementation of Re:Down

The first factor influencing the implementation of Re:Down is the broad actor involvement. The increasing consumer demand for sustainable products, as well as the influence of the current implementation phase of Better Cotton and other sustainable materials, resulted in an increase in the influence of the discourse on actors within the regime. As a result, various actors took an active role in the implementation of Re:Down. This active participation of a wide range of actors is the first factor contributing to the successful implementation of the material.

The second factor is the use of marketing resources to connect to the consumer demand in the landscape. The increasing influence of the discourse on consumers in the landscape also results in new resources being dedicated by the sub-regime. When Re:Down was implemented consumers were increasingly looking for products made with sustainable down alternatives. To connect to the consumer demand, the sub-regime dedicated marketing resources to communicate the products use of sustainable materials to increase sales. The successful use of marketing materials supported the uptake of the material after its first season.

The third factor influencing the implementation is the ability to meet price requirements set by the sub-regime. Even though the price of the material is relatively high for the sub-regime, fluctuation in the price of conventional materials makes its price viable. The potential to connect to the consumer demand for sustainable down also increases the value of the material.

The fourth factor is the ability of the niche to meet the rules for sustainable material set by the sub-regime. Because the niche was initially not in line with the rules regarding the strategic direction for down, the sub-regime revised its rules to enable the implementation. Because the niche had the right certifications, it could be included in the sub-regime’s strategy.

SUCCESS FACTOR	IN TERMS OF PAA DIMENSIONS AND MLP LEVELS	PRESENT OR ABSENT
Material is adopted as strategic sustainable material	Rules on the selection of sustainable materials set by the sub-regime are met by the niche	Present
Competitive price & quality	Rules on the selection of sustainable materials set by the sub-regime are met by the niche	Present
Dedication of broad actor group	All actors in the sub-regime are actively involved and influenced by the discourse on sustainable fashion in the landscape	Present
Connection to consumer awareness	Sub-regime is able to connect to consumers in the landscape influenced by the discourse of sustainable fashion	Absent

Table 4: summary of factors influencing the implementation of Re:Down

4.2.4 Frumat Apple Skins



In 2017, a research and development specialist in the footwear department discovered Frumat, the company producing the Apple Skins material, through his network of suppliers and regular visits to innovation fairs. This actor was mostly intrigued by the story and the examples of a potential product that could be made from the material. The material was at that time most suitable for accessories and a small trial was run. Even though the quality and the appearance of the product were good, it got dropped because of the high price; around the same as leather and much higher than conventional synthetic leather (also called PU). This was seen as not commercially viable, since leather is a luxurious material that increases or at least retains its value over time, unlike PU.

Even though the product was dropped in 2017, at the end of 2018 a second attempt was made to use the material in the Tommy Hilfiger collection. Due to the improvements in the material over time it had become more suitable for footwear. The footwear department liked the quality of the

material as well as the sustainability angle. Even though the price of the material was still much higher than a conventional PU, the merchandisers strategically planned the material to be used in a style that combined other sustainable materials to make a product that could be marketed as Tommy Hilfiger's most sustainable sneaker to date. Another consideration was that it could not be sold in large quantities due to the higher price point, but this also reduced the overall impact on the margin.

During the implementation stage, there was a lack of communication between Frumat and the footwear department. The CEO of Frumat was not very responsive, and because of the short time a product is developed at Tommy Hilfiger, it was challenging to reach agreements and receive the material in time to create the prototypes. The lack of responsiveness can be related to Frumat's capacity. Another element is the prioritization between different industries. Because the Apple Skin waste material is also used by the automotive and furniture industry, which order larger quantities, Frumat had to prioritize its resources.

In 2018, Frumat joined the Fashion for Good-Plug and Play accelerator program. This program was set up by the NGO Fashion for Good, which aims to support the uptake of sustainable startups by large fashion brands, and serves to connect startups and brands and train and educate startups (Fashion for Good, 2018). Even though Tommy Hilfiger was already aware of Frumat, participating in this program resulted in more interest in the material from other fashion brands. This wider connection to the fashion industry allowed Frumat to better understand the requirements in the industry and its way of operating.

When the first prototypes were delivered and agreements were reached regarding quantities and price, the research and development specialist mentioned these approaches the CR department to validate the sustainability angle of the material and receive input on the possibility of marketing the product as sustainable. Because Apple Skin is a technological innovation and does not fall into the established categories like recycled or organic, the material was not assessed on its environmental impact through an LCA. Frumat did not have any third-party certification that validated their process. Therefore, the CR department did not allow for the material to be classified as sustainable. Nevertheless, due to Frumat's credibility by working with other large companies, like Volkswagen, and its using waste to create new material, the CR department encouraged the use of the material.

The CR department decided that the shoe could be marketed with the story of using apple waste to create new material, even though it was not considered a strategic sustainable material. Since using apple waste is a visual element, it worked well for communicating with consumers. Tommy Hilfiger normally only communicates about the product with sustainable materials if the material makes up of at least 50% of the product. Since the percentage of apple waste in the material is only 23%, it did not receive as much marketing attention. Nevertheless, in collaboration with the marketing department, assets were developed to tell the story on social media. By marketing the product and aligning on the message, the footwear department could strengthen the sales of the product and defend the high price.

Changes in the Tommy Hilfiger sub-regime after Frumat Apple Skins implementation

Because Frumat Apple Skins is an innovative material, it required time to develop it to meet the rules regarding quality set by the sub-regime. Even though the rules regarding price were not yet met, the material was implemented on a small scale. Because of the previous successful implementation of Re:Down, the sub-regime became more flexible regarding the rules on price, since the high price could be compensated for by using marketing resources to achieve commercial success.

Apple Skins also did not meet the current rules set on the strategic direction for sustainable alternatives to leather. Due to the dedication of several actors within the sub-regime (the CR department and the footwear department), however, the material was still implemented. The implementation of niche materials that have large sustainability benefits but do not yet meet the rules for sustainable materials opens up the sub-regime to the implementation of new sustainable materials.

Because the niche did not meet the rules for sustainable materials, it also did not meet the minimum requirements for marketing support. However, because of increasing consumer demand in the landscape for products made with sustainable alternatives the product received of marketing resources. The dedication of marketing resources, like with the implementation of Re:Down, caused the sub-regime to focus its overall marketing resources increasingly on marketing sustainable products.

In addition, that Frumat was scouted by the footwear department in close cooperation with the designers and product developers changed the dynamics regarding the responsibilities and tasks

between actors in the sub-regime. The CR department was mainly responsible for the entire implementation for Better Cotton and Tencel Lyocell, while for Re:Down the innovation department took the lead. For the implementation of Frumat Apple Skins, this responsibility was largely taken up by the product department itself. This allowed a more direct approach to involving the right actors. The innovation and CR departments still supported the implementation projects but were not responsible for driving it. This resulted in more actors taking responsibility for finding and implementing sustainable materials under the influence of the increasing discourse on sustainable fashion.

Factors influencing the implementation of Frumat Apple Skins

When the material was scouted, it was not implemented because the niche did not meet the rules regarding quality and price set by the sub-regime. Therefore, the first factor influencing the implementation of Frumat Apple Skins was the significantly higher price and different quality compared to conventional materials. Since the quality of the material was improved after the first attempt, it was taken up by the sub-regime. The higher price resulted in a smaller uptake of the material.

The second factor limiting the uptake of the material is the lack of dedication from the niche. Due to the small scale and low number of employees at Frumat, the niche faced challenges in maintaining communication with the sub-regime. Due to the lack of responsiveness, the sub-regime struggled to receive the required materials to proceed in the prototyping stage, which limited its ability to increase the uptake of the material.

Third, the material was not included in the sustainable material strategy which limited the implementation. Because no LCA or certification was available proving the lower environmental impact of the Apple Skins material, it was not taken up as a strategic sustainable material. This inability of the niche to meet the rules set by the sub-regime for sustainable materials limited the implementation of the material at the larger scale.

The fourth factor supporting the implementation is the connection to consumer demand in the landscape. Similar to Re:down, the large consumer demand for products made from sustainable materials drove Apple Skins' successful implementation. To connect to the consumer demand, marketing resources were used to support the sales of the product. This fourth factor on the ability to connect to the increasing consumer demand compensated for the higher price and inability to meet the rules on sustainable materials. Nevertheless, due to inability to meet the rules for sustainable materials, fewer marketing resources were dedicated compared to Re:Down.

The fifth factor of the dedication of a large group of actors and that the main actor is operating close to the product enabled its successful implementation. The implementation of Frumat Apple Skins was managed by a large group of actors and the main responsibility was taken by an actor in the product department, which supported the successful implementation of the material.

SUCCESS FACTOR	IN TERMS OF PAA DIMENSIONS AND MLP LEVELS	PRESENT OR ABSENT
Competitive price & quality	Rules on the selection of sustainable materials set by the sub-regime are not met by the niche	Absent
Dedication of actor(s)	Actors in the niche don't dedicate resources to the sub-regime	Absent
Material is adopted as strategic sustainable material	Rules on the selection of sustainable materials set by the sub-regime are not met by the niche	Absent
Connection to consumer awareness	Sub-regime is able to connect to consumers in the landscape influenced by the discourse of sustainable fashion	Present
Dedication of broad actor group	Broad group of actors in the sub-regime act as policy entrepreneurs	Present

Table 5: summary of factors influencing the implementation of Frumat Apple Skins

4.3 Current Sustainable Material Use by the Tommy Hilfiger sub-regime

This section answers sub-question 4: “*What is the state of the Tommy Hilfiger sub-regime after the implementation of the sustainable material niches in terms of actors, resources, rules, and discourse?*” First, however, it shows how the regime itself has changed as compared to 2008.

4.3.1 The state of the fashion industry regime after the implementation of sustainable material niches in the Tommy Hilfiger sub-regime

In 2019, the regime of the fashion industry has significantly changed its approach to the use of sustainable materials compared to 2008. Actors such as fashion brands have actively sourced sustainable material. For larger brands and retailers, the use of sustainable material is still limited to a small range within the collection (Lehmann, et al., 2018). For smaller brands with a focus on sustainability, such as Kings of Indigo, Ecoalf and Veja, the collection is generally made from a 100% sustainable materials (Kings of Indigo, 2020; EcoAlf, 2020; Veja, 2020).

This increase in using sustainable material has mainly been caused by the increase in consumer demand for products made with sustainable materials, occurring in the landscape. This is largely stimulated by increasing media attention to sustainability and fashion. Resources like documentaries, such as the True Cost and Riverblue, inform consumer on sustainability in fashion (Devaney, 2019). Additionally, new actors, such as platforms that rate companies on their sustainability performance, have emerged (Rank A Brand, 2020). This increase in available information on the topic has stimulated consumers to focus more on sustainability when purchasing clothing.

Finally, the availability of sustainable materials has increased. New niches have developed, and existing niches have expanded. Currently, fashion brands strongly rely on the support of actors such as NGOs like Fashion for Good in the sourcing of sustainable material niches. NGOs bring resources, such as expertise, that support brands in the decision-making process for certain materials and navigating between available options in the niches (Emma Scarf, personal communication, 28-06-2019).

4.3.2 The state of the Tommy Hilfiger sub-regime after the implementation of sustainable material niches

By 2018, Tommy Hilfiger has implemented a variety of different sustainable materials. Overall, sustainable materials make up 47% of all materials. This shows that the transition toward a sustainable material mix is accelerating and close to the tipping point, as shown in Figure 3. The implementation of certain materials has been more successful than others in terms of the scale that they are currently used. For example, Better Cotton and Tencel Lyocell have both been implemented from an early stage, but Better Cotton has a significantly higher share of the total cotton use (65%), than Tencel Lyocell’s share in cellulosic material use (2%). Additionally, materials implemented during the second phase have reached different scales—Re:Down is implemented on a much larger scale compared to Frumat Apple Skins.

The state of the regime as described above shows that the discourse on sustainable fashion has strongly influenced Tommy Hilfiger consumers. The increasing influence of the discourse on consumers in the landscape makes the sub-regime more open to the second phase of sustainable materials. The pressure from the landscape increases the number of actors in the sub-regime that take an active role in implementing sustainable materials. To connect to the newly developed consumer demand, new resources, such as marketing assets, were dedicated. This stimulated the sales of product made with sustainable materials and therefore strongly influenced the success of the implementation.

The responsibility for scouting and implementing sustainable materials has shifted from the CR department toward a shared responsibility between the product, innovation and CR departments. The various actors bring different resources, which supports the successful implementation of sustainable materials. The active involvement of multiple actors is a result of the increase of the importance of the discourse on a sub-regime level. With more awareness of the important of sustainability, all actors involved in the implementation process are willing to put in more resources to implement sustainable materials.

The sustainability of materials has become one of the factors for selecting fabrics for many departments in Tommy Hilfiger due to the increase in consumer demand for sustainable products. This challenges the sub-regime to find suitable sustainable materials. When there isn’t a material available that meets all rules regarding sustainability, quality and price, the sustainability factor

decreases. With the creation of rules regarding the strategic direction on sustainable material use and targets, the sustainability factor has become more important and rigid. Nevertheless, the rules regarding quality and price remain important.

Also, rules from the strategic direction around sustainable materials evolved as the sustainable evolution strategy was replaced by a new strategy called MAKE IT POSSIBLE. This change was made because the previous strategy was focused on 2020, and a new approach for 2030 needed to be defined. The MAKE IT POSSIBLE strategy adopted the 2020 target of 100% sustainable cotton but also included a target stating that the brand will make more products with sustainable materials each year. This target related specifically to the divisional targets that were already used by the brand merchandising team. Since the classification of a sustainable material was reliant on the MADE-BY benchmark from 2009, this was revised in 2019 to include newly developed niches. This new classification opens the field for new sustainable materials to be implemented by Tommy Hilfiger.

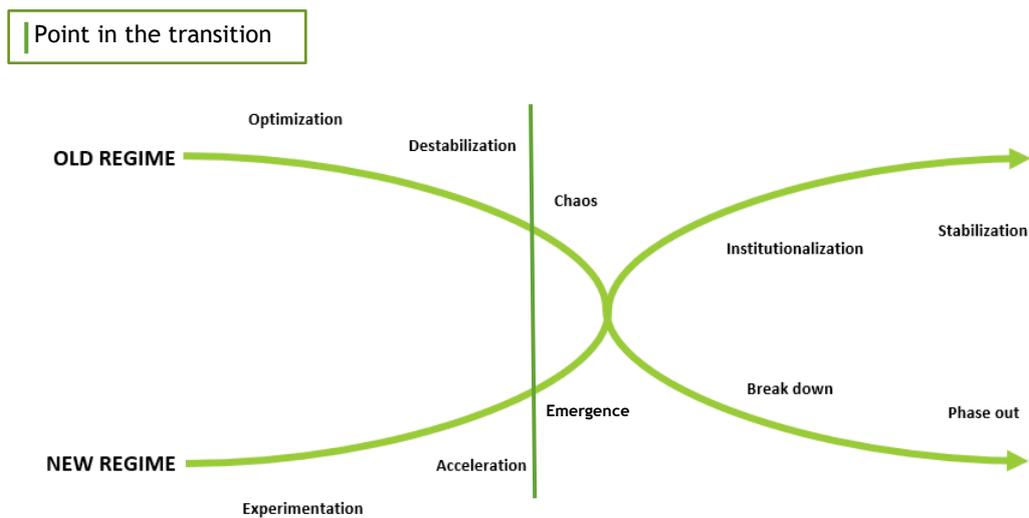


Figure 3: 2019, snapshot of the transition dynamics in the overall transition toward a sustainable material mix. Adapted from Buchel, S., Roorda, C., Schipper, K., & Loorbach, D. (2018). *The Transition Toward Good Fashion. Drift.*

5 Conclusion

This research aimed to provide insight into the factors influencing the successful adoption of sustainable materials in the fashion industry and asked the following research question:

What success factors are responsible for the implementation of sustainable material niches at the Tommy Hilfiger sub-regime?

Section 5.1 elaborates on the current state of the sub-regime in comparison to its state before the implementation of sustainable materials. This section is based on the analysis of sub-questions 1, 2, and 4 given in Chapter 4. In Section 5.2, the success factors are described using the dimensions of the PAA and MLP based on the analysis of sub-question 3. In Section 5.3, a theoretical reflection is presented using the implementation methods proposed by the governance of the CSR framework by Klettner, Clarke, and Boersma (2014) to enhance the practical recommendations for the use of the outcomes of the research. Section 5.4 closes with a methodological reflection, including recommendations for future research that could contribute to the transition toward a sustainable material mix.

5.1 The Tommy Hilfiger sub-regime before and after the implementation of sustainable material niches

This study has shown that while implementing sustainable material niches, the Tommy Hilfiger sub-regime has changed. The aim to create sustainable fashion is currently incorporated in the discourse, influencing the selection and use of materials. In the past, Tommy Hilfiger aimed to make clothes whether or not they were sustainable. As a result, materials were only selected based on quality and price. Even though quality and price are still important factors for selecting certain materials, sustainability now also influences the decision-making process. This new dominant discourse brought a new factor into the material selection process. This development is strongly linked to the development of consumer awareness regarding sustainability in the landscape.

The rules regarding the implementation of sustainable materials have been incorporated in the strategic direction of the sub-regime. The aim to create sustainable products also resulted in a strategy with public time-bound targets. Currently two targets focus specifically on the increase in using sustainable materials. These targets serve as rules for the selection of materials. Responsibilities for achieving the targets are currently allocated in different departments within the company. At the start of implementing sustainable materials, the responsibility was largely placed with the corporate responsibility department. Over time, this has changed to a shared responsibility between the corporate responsibility department and other departments in the company. For example, the corporate responsibility team is currently responsible for tracking progress toward the targets and advising on the selection of certain materials for certain products, while designers, merchandisers and product developers are responsible for implementing the materials and making sure the targets are met.

To implement sustainable materials, specific financial, marketing and human resources have to be dedicated. Resources such as funding for programs and partner organizations that support the increase in the availability of sustainable materials have been allocated to achieve the targets. These types of resources have never been required for using materials at Tommy Hilfiger before. In the second phase of implementing sustainable materials, marketing resources become more important to give products made with sustainable materials a commercial advantage. These resources already existed, however, the way they are allocated has changed due to the focus on the discourse of sustainability. Besides financial and marketing resources, human resources in the form of sustainable material experts have been allocated during the implementation phase. Expertise is an important resource to guide and drive the implementation.

Implementing sustainable materials requires the dedication of specific actors. In the first stage of the implementation, a few specific actors drove the implementation stage. The CR department was the main actor behind the implementation of Better Cotton and Tencel Lyocell, which posed challenges due to the limited resources they could provide and the involvement of a large group of actors in the process. For the second phase of implementation, the responsibility of implementing sustainable materials has been distributed within the sub-regime. When multiple actors get involved in the process and bring different types of resources, sustainable materials are more successfully adopted.

5.2 Success factors for the implementation of sustainable material niches at Tommy Hilfiger

Based on the factors influencing the implementation of the four individual niches analyzed in Section 4.2, four success factors for implementing sustainable material niches in the sub-regime of Tommy Hilfiger were identified. These success factors have proven to be important in all four niches and therefore are important to sustainable material implementation in general. First, for the sub-regime to implement a sustainable material, it needs to meet the price and quality standards of the sub-regime. Second, when a niche enters the sub-regime, it needs to align with the strategy for sustainable materials set by the sub-regime. Third, the sub-regime needs to connect to the consumer demand for sustainable products in the landscape. Increasing consumer demand is required to overcome the imbalance with the rules regarding price and quality and add a new dimension to the selection process of materials. Fourth, a broad actor involvement and the existence of policy entrepreneurs in the sub-regime are required to support the successful implementation of the sustainable material.

5.2.1 Competitive Price and Quality

The first success factor of a competitive price and quality relates to the ability of the niche to meet the rules regarding price and quality set by the sub-regime. A competitive price and quality is one that is strongly in line with the quality and price of conventional alternatives that define the standard in the sub-regime. As shown in table 6, all four niches show that the presence or absence of a competitive price or a price and quality influence the success of the implementation. During the first phase of implementation the focus remains on price, while during the second phase a combination of quality and price influence the implementation.

NICHE	SUCCESS FACTOR	PRESENT OR ABSENT
Better Cotton	Competitive Price	Present
Tencel Lyocell	Competitive Price	Absent
Re:Down	Competitive Price & Quality	Present
Frumat Apple Skins	Competitive Price & Quality	Absent

Table 6: summary of factors influencing the implementation of all sustainable material niches

Because sustainable materials are developed in a niche, they are not always aligned with the sub-regime's rules regarding quality and price. However, the ability of the niche to approximately align with the rules regarding quality and price is a success factor for implementation. Rules set by the sub-regime regarding price and quality standards are rigid factors influencing the selection and implementation of materials in general. Due to the size of the sub-regime, it upholds strict quality standards, competitive margins, and large quantities, which influence the materials being used. Because the brand's success is reliant on consumers' validation of the products, these standards are the most important factor for successfully implementing a new material in the design and production process. However, when other success factors gain more importance, the quality and price standards can become more flexible.

Since the rules on quality and price standards are based on the established use of conventional materials, sustainable materials have to align with these rules as much as possible to be adopted by the sub-regime. Over time, the sub-regime has become more flexible in the rules regarding quality and price for sustainable materials. Nevertheless, since the sub-regime depends on these rules for its success, a sustainable material has to come close to meeting them. The sustainable materials that are most in line with the quality and price requirements have shown to be implemented successfully. This is illustrated by the successful implementation of Better Cotton, which is cost-neutral, and the limited success of the implementation of Tencel Lyocell, a material much more expensive than its conventional counterparts.

The Better Cotton Initiative developed a system in which cotton farming practices could be drastically improved without directly increasing the cost of the material. This largely influenced the successful implementation of Better Cotton. Because its price is in line with conventional cotton, it could more easily be implemented at scale than organic cotton. Due to the Better Cotton system, it could also be produced at a larger scale than organic cotton which enabled the sub-regime to source 65% of its cotton as Better Cotton in 2018.

Tencel Lyocell’s price is significantly higher compared to conventional lyocell or viscose. As a result, the material has only been used in smaller quantities and for limited products that allowed the use of a more expensive fabric. The fact that Better Cotton could better meet the rules on price resulted in a strong focus on Better Cotton, which automatically limited the focus on Tencel Lyocell.

In the second phase of implementing sustainable materials, the rules on quality and price set by the sub-regime have become more flexible. Frumat Apple Skins is more expensive and a different quality than its alternatives, but it still entered the sub-regime. However, Frumat Apple Skins was implemented on a smaller scale than Re:Down, which is strongly in line with the price and quality requirements of the sub-regime. The ability of Frumat Apple Skins to be implemented by the sub-regime was caused by the increasing pressure from the consumers in the landscape and the successful implementation of sustainable materials in the first phase.

The large uptake of Re:Down was strongly influenced by its competitive price. Since the price of conventional down fluctuates, it was seen as a commercially viable alternative. Re:Down also met all testing requirements, which was mainly caused by the company’s previous collaboration with other fashion brands. As a result, the sub-regime aimed for implementation of the material on a larger scale.

As a result of the inability to meet the quality requirements set by Tommy Hilfiger, Frumat Apple Skins was not implemented on the first try. When the quality improved, it was implemented a year later. Despite its high price, the material was implemented on a small scale to meet the consumer demand for products made with sustainable leather alternatives, which is further explained in the Subsection 5.1.3.

5.1.2 Sustainable Material Strategy

The second success factor of sustainable material strategy relates to the integration of the niche in the strategy for sustainable materials developed by the sub-regime. The factor sustainable material strategy is a combination from adoption of the niche into the strategy as well as the existence of internal and external targets as part of the strategy as shown in table 7. In the first phase of implementing sustainable materials the existence of targets in the strategy were an important factor influencing the success of the implementation. During the second phase this no longer strongly influences the implementation as a result of the increasing influence of the discourse of sustainable fashion, as explained in the following success factors.

NICHE	SUCCESS FACTOR	PRESENT OR ABSENT
Better Cotton	Internal & external target as part of strategic sustainable material approach	Present
Tencel Lyocell	Material is adopted as strategic sustainable material	Present
Tencel Lyocell	Internal & external target	Absent
Re:Down	Material is adopted as strategic sustainable material	Present
Frumat Apple Skins	Material is adopted as strategic sustainable material	Absent

Table 7: summary of factors influencing the implementation of all sustainable material niches

To implement sustainable materials, the sub-regime developed rules in the form of a sustainable material strategy. Without the strategic rules on using the niche material in the sub-regime, a niche will not be successfully adopted. The sub-regime’s sustainable material strategy defines when a material is classified as sustainable (based on the availability of LCAs and certifications by the niches) and contains targets for using sustainable materials. The niches ability to meet these rules influences its successful implementation. Materials that cannot meet the rules receive less attention and resources.

Once materials have been classified, targets and key performance indicators (KPIs) are set, which are important to achieve certain goals in a commercial organization like Tommy Hilfiger. At the sub-regime, success is largely measured in financial KPIs and management roles are strongly orientated toward achieving targets. For sustainable materials to be successfully implemented, they require a similar approach.

The analysis shows that the sustainability strategy created in 2011 set the first rules for implementing sustainable materials. At first, the strategy only focused on organic cotton, but in 2013,

it added Better Cotton. As a result of pressure from the regime, which in turn was influenced by developments in the landscape (see the next success factor), an ambitious public target was set for 2020 with yearly internal goals. Because the target was made public, it was taken seriously by the actors in the sub-regime. The yearly goals also made actors work more seriously toward achieving these targets. Making multiple actors in the sub-regime accountable for the performance of these targets strongly supported the implementation at scale.

No public target was set for Tencel Lyocell during the first phase of implementation. However, to increase the uptake, an internal target was set on the use of all sustainable materials combined. Because multiple materials were combined in one target, actors could implement the materials most suitable for their products. This resulted in the increasing uptake of organic cotton and recycled polyester, since these materials could better meet the rules regarding quality and price. The targets set were not ambitious, and therefore it did not result in a significantly increased use of Tencel. The goals being kept internal and the large focus on the Cotton target meant that this target did not support the uptake of Tencel.

During the second phase, new materials entered the sub-regime that were not among of the classified sustainable materials. The CR department assesses whether a material met the rules by the availability of LCA data and certification. Because Re:Down had a GRS certification, which is required for all recycled materials, it was considered a sustainable material and added to the strategy. As a result the target on down, which previously focused on responsible down, now included Re:Down. This resulted in the wider uptake of the material and the dedication of marketing resources to connect to the consumer demand in the landscape (see next success factor).

Frumat Apple Skins did not meet the rules for sustainable materials set by the sub-regime. However, the sub-regime aimed to use it because it uses waste material and so continued its implementation. Additionally, the increasing consumer demand in the landscape strongly supported the sub-regime implementing the material even though it did not meet the rules (see next success factor). Because of its inability to meet the rules, however, the material was implemented on a small scale and was not included in any targets, which limited the uptake of the material.

5.2.3 Connection to Consumer Awareness

The third factor of connection to consumer awareness relates to the ability of the sub-regime to connect the use of the niche to the increasing consumer demand for sustainable products. This consumer demand is located in the landscape and influenced by the discourse on sustainable fashion. As shown in table 8, the absence or presence of this success factor influences the implementation of all four sustainable material niches.

NICHE	SUCCESS FACTOR	PRESENT OR ABSENT
Better Cotton	Connection to consumer awareness	Present
Tencel Lyocell	Connection to consumer awareness	Absent
Re:Down	Connection to consumer awareness	Present
Frumat Apple Skins	Connection to consumer awareness	Present

Table 8: summary of factors influencing the implementation of all sustainable material niches

Even though rules set by the sub-regime regarding quality and price requirements are the most important factor influencing the successful implementation of sustainable materials, the discourse regarding sustainable fashion created a new dimension to the selection and implementation of materials. Since the sub-regime is reliant on the validation of the product by consumer appreciation, situated in the landscape, the increase in consumer demand for products made with sustainable materials influenced the material choices.

Consumer behavior in the landscape regarding fashion products has changed over the past fifteen years. For example, Consumers have become more aware of the unsustainable practices of fashion companies, as actors such as NGOs and the media have highlighted this information. Currently, all consumers are aware of some of fashion’s negative impact, and a large group consider sustainability in their purchasing decisions. A large group of consumers starting to value sustainability destabilized unsustainable practices within the sub-regime and created space for more environmentally friendly fashion products. Nevertheless, the rules regarding quality and price dominate the way the sub-regime makes material choices, and only sustainable material niches that almost meet the requirements can be still selected.

To connect to this increase in consumer demand in the landscape, it's important that the sub-regime communicates about the use of sustainable materials. Tommy Hilfiger only started to dedicate financial and human resources to utilize marketing to do this in certain products three years ago through product hangtags and social media posts. In 2016, resources were dedicated to develop the first communication on products in the form of hangtags. Communicating about the sustainable material to the consumers in the landscape supported the uptake of sustainable materials, specifically for Better Cotton. However, due to the limited dedication of marketing resources and not utilizing Lenzings E-branding service, the use of Tencel Lyocell only marginally increased.

During the second phase, consumer demand for sustainable products, influenced by the discourse on sustainable fashion, has strongly increased. This resulted in the increased dedication of marketing resources to connect products to this consumer demand. Re:Down was the first material to receive such marketing attention, which resulted in a significant increase in the uptake of the material for the next season. For Frumat Apple Skins, the ultimate deciding factor to implement the material was the ability to communicate the benefits of material to the consumer through a marketing campaign. In general, any product that receives marketing attention sells better, and therefore, it is a major advantage to use marketing resources to push the product. Receiving dedicated resources for marketing support strongly influences the implementation of all sustainable materials today.

5.2.4 Dedication of Actor(s) or Actor Groups

The fourth factor of dedication of actor(s) or actor groups is related to the existence of policy entrepreneurs and dedicated actor groups in the sub-regime. These actors are strongly influenced by the discourse on sustainable fashion. In the first phase of implementation the dedication on a single policy entrepreneur influences the success of the implementation. In the second phase a group of dedicated actors is key the success of the implementation of sustainable materials. The combination of these two factors, as shown in table 9, results in success factor of dedication of actor(s) or actor groups.

NICHE	SUCCESS FACTOR	PRESENT OR ABSENT
Better Cotton	Dedication of actor(s)	Present
Tencel Lyocell	Dedication of actor(s)	Absent
Re:Down	Dedication of broad actor group	Present
Frumat Apple Skins	Dedication of broad actor group	Present

Table 9: summary of factors influencing the implementation of all sustainable material niches

The entry of a sustainable material in the sub-regime depends on an actor who scouts the material and takes responsibility for its implementation. These actors are influenced by the discourse on sustainable fashion. However, since many different actors, such as designers and merchandisers, are involved in the selection and use of materials, it's important that multiple actors are actively involved in the implementation stage. A broad actor involvement can only be realized if all actors are influenced by the discourse on sustainable fashion, but when led by a main actor or policy entrepreneur, it leads to sustainable materials being successfully implemented in the regime.

When actors in the sub-regime are strongly influenced by this discourse, they understand the value and benefits of using a sustainable material even though the material might not fully meet the rules regarding price and quality. In contrast, an actor who is not influenced by this discourse will only select and implement materials based on these rules. When all actors are indirectly influenced by the discourse in the form of the increase in consumer demand for sustainable products in the landscape, they will understand the benefits of using the material to connect to the this demand. Additionally, when more actors take an active role in the implementation, it's more successful due to the input of different types of resources and shared responsibilities.

Actor involvement has increased over the course of implementing sustainable materials. During the first stage, actors such as the CR department and the CFO were influenced by the discourse. As a result, they took responsibility of implementing the first sustainable materials. However, they received limited support from other actors in the product or sourcing departments. Nevertheless, due to the agency of the CR department, Better Cotton was successfully implemented in the first phase. The CR department dedicated resources to educate the other actors involved on the discourse and its relation to the material.

For Tencel Lyocell, the absence of actors taking responsibility for the implementation resulted in the limited uptake of the material. Due to its higher price, the CR department focused its efforts on the implementation of Better Cotton and did not take on the same role for Tencel Lyocell, and no other actors in the sub-regime took up this responsibility.

In 2017, the discourse on sustainable fashion influenced significantly more actors within the sub-regime due to previous implementation of sustainable materials and influence from the landscape. This ensured that actors such as designers and product developers took an active role to implement sustainable materials. The active involvement of multiple actors led to the wide spread of the message and more successful implementation. Due to the active role of the innovation department, the footwear department and individual designers, product developers and marketeers, the implementation of Re:Down and Apple Skins was more successful due to the shared responsibility and dedication of resources between multiple actor groups.

5.3 Theoretical Reflection

By analyzing the transition toward a sustainable material mix at the Tommy Hilfiger sub-regime through the dynamics of the multi-level perspective and changes in the sub-regime over time through the dynamics of the four dimensions of a policy arrangement, the success factors for implementation were revealed. Based on the current state of the sub-regime and the awareness of the success factors, strategies can be developed to dedicate resources toward improving the conditions in the sub-regime to successfully implement suitable materials. The practical relevance of this research can be enhanced by applying a third theory to analyze implementation strategies for sustainable materials, taking into account the success factors.

Even though the transition has accelerated from the experimental phase, stronger governance of the transition on the sub-regime could have resulted in more equal transitional results between sub-regimes and stronger results in the overall transition. The governance of this transition by actors within the sub-regime could be improved and directed toward creating favorable conditions for implementation. To achieve this, the right actors need to supply the necessary resources and be empowered by correct rules.

Klettner, Clarke, and Boersma (2014) have developed a framework that draws on different concepts in the field of CSR in action (Castka et al. 2004; Kleine and von Hauff 2009; Yuan et al. 2011; Asif et al. 2011; Veleva 2010). Their analytical model indicates that CSR should be developed and implemented via a cyclical process of commitment, leadership, implementation, and communication (Klettner, Clarke, & Boersma, 2014). In the first stage, senior management needs to commit to adopting a CSR strategy that works toward clear goals. Second, senior management must take leadership and put leadership structures in place that cover the entire business. Third, incentives need to be created to monitor and ensure implementation. Fourth, communication reaching the entire business on the progress toward achieving the goals needs to be put in place. Based on this cyclical model, recommendations are given taking into account the conditions leading to a newly established sub-regime of the sustainable material mix.

5.3.1 Commitment

The regime has committed to the transition toward a sustainable material mix by its publicly available sustainability strategy Sustainable Evolution and later Make it Possible. Because one of the four pillars of this strategy focuses on making all materials part of a sustainable loop by 2030, the regime has committed to achieving the full transition in a little over ten years. Since 2014, targets have been set internally for the amount of product that needs to contain sustainable materials. Next, a public target was created in 2018 that focuses on increasing the use of sustainable materials in addition to cotton. However, because the target that focuses on this increase on a yearly basis is weak, it has not resulted in significant achievements. Another public commitment was made by signing the Global Fashion Agenda's 2020 commitment to circularity. For this commitment, a public target was set around using post-consumer textiles in the collections. By making these public commitments in the form of an individual strategy and industry-wide initiatives accompanied by public targets for 2020, the direction for the transition has been set in the public domain. An annual benchmarking initiative run by the non-profit organization Textile Exchange is rating brands and retailers on their progress in the transition toward a sustainable material mix. Even though Tommy Hilfiger has participated in the initiative, its results have never been used to strengthen their commitment or report upon its progress.

Even though the sub-regime has set a clear commitment to the transition toward a sustainable material mix, its use of public target setting has not been successful in speeding up the transition. Because the increase in the use of sustainable materials has not been quantified, Tommy Hilfiger has not achieved progressive results. Nevertheless, Tommy Hilfiger has been effective in steering the transition with a strong focus on sustainable cotton. The target for the increase of sustainable materials should be specified with a clear annual trajectory per fiber. This will require lots of research, but it is essential to strengthen the effect of the target. The results of the Textile Exchange Benchmark can be used to set strategic targets per fiber, as they will indicate how current results compare with similar companies.

5.3.2 Leadership

Leadership strategies on the implementation of sustainable materials by the sub-regime have not been formally developed and differ per material. At the beginning of the transition, leadership was concentrated in the CR department. In the case of BCI, this was initiated because of failed attempts to create leadership at the sourcing offices. With the support of business leaders, such as a proactive CFO, the CR department successfully led the implementation. In the case of the other sustainable materials, a lack of leadership was demonstrated. Because of the high demands of the implementation of Better Cotton, the CR department did not take leadership or put in place leadership structures for the other sustainable materials. This resulted in limited use of Tencel Lyocell.

Recently, more defined leadership roles have been assigned to leaders. In the case of achieving the targets for implementing sustainable materials, the presidents of Tommy Hilfiger's product department are responsible. However, this has not yet trickled down to establishing committees or task forces for implementing sustainable materials. Without the creation of a broader group of people from different departments, improvement of awareness and ensuring consistency remains the responsibility of the CR department. The work of task forces around certain strategic areas in the sub-regime has proven successful in the implementation of sustainability: "Companies describing a committee or network for sustainability below senior executive level also appeared advanced in their thinking. These committees comprise representatives from different business units or locations who meet regularly to improve awareness and ensure consistency in the implementation of sustainability strategies across a large organization." (Klettner, Clarke, & Boersma, 2014). Therefore, opportunities around the establishment of a task force for implementing sustainable materials should be explored.

5.3.3 Implementation

The implementation of sustainable materials in the sub-regime as a whole has not been carried out through one integrated approach or framework but has differed per materials, and its success depended on the existing commitment and leadership. The approach to implementing has differed mainly because of the lack of assigned leadership overseeing the implementation of all materials. Another reason is the lack of a clear framework that sets the overarching rules for implementation: "One of the barriers faced by many companies is that they lack the frameworks through which to implement, measure and monitor a comprehensive approach" (Klettner, Clarke, & Boersma, 2014). In 2019, a framework was established for the definitions and rules around the use of all sustainable materials. This framework is key to steering implementation actions.

The rules also need to support measuring progress. Systems need to be set up such that progress measurements can be as accurate, recent, and widely available as possible. Until now, progress was only reported on an annual basis through extensive manual effort performed by the CR department. By automating reporting tools to improve visibility and accuracy, the sub-regime can steer implementation activity to achieve better results. Monitoring progress can also reveal poor and excellent performance. Remuneration schemes based on non-financial performance could be established that take into account the progress on implementing sustainable materials. For example, the sub-regime is currently implementing performance on other sustainable initiatives into performance reviews of actors. As a result, a wider range of incentives based on progress and monitoring should be explored.

Besides the establishment of the framework, the sub-regime also requires a certain level of knowledge and awareness to successfully implement sustainable materials. Because the CR department is the expert in this field, it should train the other actors on the sustainability credentials of the materials. Because the sub-regime contains many actors that require this type of knowledge,

the CR department should explore effective ways of training and sharing knowledge to achieve the required awareness.

5.3.4 Communication

When measures are taken to monitor progress, communication and report strategies should be applied accordingly. Internal and external visibility of the progress toward implementing sustainable materials and the targets set for this is key to ensure transparency and credibility. Reporting progress also stimulates the implementation activities through awareness of possibilities to improve: “These examples illustrate the various issues faced by companies in communicating their efforts toward sustainability, namely how much information should be disclosed, through what medium, and whether it should be targeted toward particular stakeholders” (Klettner, Clarke, & Boersma, 2014). Currently, the CR department is responsible for monitoring and reporting progress. Reporting remains mainly on annual basis and is retrospective. This approach to reporting has proven to be ineffective, as most product teams work to design, develop and produce clothing in advance. A more current basis of making information available on progress would enhance the guidance on implementation activities and could even steer the design and development early on the process.

Progress can be reported on through specialized communication on sustainable materials and can be integrated into existing forms of reporting progress within the sub-sub-regime. Integrating reporting on sustainable materials into existing reporting tools related to the development of the product would support the implementation. According to Klettner, Clarke, and Boersma (2014), it can stimulate companies to broaden their focus from financial performance to a more value-driven measurement system that builds on social, environmental and financial impacts.

5.4 Methodological Reflection

Future research on the transition toward a sustainable material mix should focus on analyzing a broader scope of sub-regimes. For this research, the sub-regime has been narrowed down to a particular organization, while the transition is occurring in the larger fashion industry consisting of many different organizations. Even though the conditions for implementing sustainable materials depend the specific organization, research comparing how different organizations in the fashion industry can optimize conditions for the transition throughout the industry. Additionally, by analyzing the entire fashion industry regime or multiple sub-regimes, the overall understanding of the phenomenon and the transition will be enhanced. Understanding the transition in the entire regime can guide organizations in establishing the right collaborations and sharing of knowledge. By analyzing multiple organizations as cases within the regime of the fashion industry, differences and similarities will become apparent. By analyzing the differences and similarities, meaningful collaborations can be established and a combined approach to tackling similar challenges can be created.

Another focus for future research could be on the barriers for niches to supply sustainable materials that can be implemented under favorable conditions in the sub-regime. Having a good understanding of the conditions in the sub-regime for implementing sustainable materials can guide niches to develop their products and business accordingly. However, niches might not always be able to achieve this. Having a better understanding of the barriers faced by niches and how to overcome these barriers could allow for multi-actor strategies. By combining research focused on the conditions in the sub-regime and barriers for the niches, meaningful collaboration between the two can be established to support the uptake of sustainable materials in the sub-regime.

Appendix 1: interviews and Observations

Interviewees

Sustainable materials general:

Susan Irvine

Director corporate responsibility, Tommy Hilfiger

Celica Hummel

Director kidswear, Tommy Hilfiger

Lynn Grey

Merchandiser womenswear, Tommy Hilfiger

Better Cotton:

Gudrun Gudmundsdottir

Manager corporate responsibly, Tommy Hilfiger

Femke Jonkmans

Product coordinator menswear, Tommy Hilfiger

Tencel lyocell:

Martijn van der Bas

Product coordinator womenswear, Tommy Hilfiger

Oya Barlas Bingül

Business development manager, Lenzing

Hannah Evans

Product coordinator womenswear, Tommy Hilfiger

Re:Down:

Laura Horvat

Senior coordinator corporate responsibility, Tommy Hilfiger

Vincent Delalandre

Product innovation manager, Tommy Hilfiger

Frumat Apple Skin Waste:

Fred van der Put

Research and development manager footwear, Tommy Hilfiger

Emma Scarf

Accelerator program ventures analyst, Fashion for Good

Observations

Observation 1:

Meeting between Adam Hamidat, corporate responsibility manager at Tommy Hilfiger, and Elea Papaemmanuel, cotton program manager at IDH

Observation 2:

Meeting between Adam Hamidat, corporate responsibility manager at Tommy Hilfiger, and Theodora Panayides, membership coordinator at BCI

Observation 3:

Meeting between Fred van der Put, footwear research and development manager at Tommy Hilfiger, and Hannes Parth, CEO at Frumat

Appendix 2: Interview Guide

Two interview guides were developed. The interview guide was used for the semi-structured interviews with the actors involved in implementing the sustainable material at the level of the regime and the niches.

Introduction	
Intro	<ul style="list-style-type: none"> • Introduce myself • Introduce my research and the case • Show appreciation for their time and effort • State that the interview will take around 60 minutes
Goal and purpose of the interview	<ul style="list-style-type: none"> • Gain insight into barriers and opportunities for upscaling the specific sustainable material from their experience and perspective
Subjects	<ul style="list-style-type: none"> • The interview is chronologically structured according to the subjects' involvement in the use of the specific sustainable material
Confidentiality	<ul style="list-style-type: none"> • With permission, the result from the interview will be kept anonymous • The data will only be available to myself and my supervisor and the thesis will be available to the university for assessment but not be published in any format. All information is stored safely to prevent fraud.
Recording	<ul style="list-style-type: none"> • With permission, the interview will be recorded in audio to transcribe it for analysis
Subjects, main and sub-questions	
1. Introduction	<ul style="list-style-type: none"> • Can you introduce yourself and your professional background? • How have you become aware of sustainable material? • How are you involved in this development and implementation of sustainable material? • Can you give some examples of the tasks and activities you were involved in?
2. Context of the development of the sustainable material and its successful adoption	<ul style="list-style-type: none"> • How was the development first initiated? • Why was this material selected over other materials? • Can you explain the process of implementing sustainable material? • Can you give some examples of the most important moments during this time?

	<ul style="list-style-type: none"> • Who else was part of the implementation process of the sustainable material? • How would you describe the collaboration between the stakeholders? • Can you briefly describe how decisions are made? • Who had the authority to make decisions? Why? • What could you or others have done to more successfully implement the material? • What went well during the implementation?
Conclusion	
Closing the interview	<ul style="list-style-type: none"> • Are there any issues you missed during this interview? • Would you like to share information that has not been discussed yet?
Ask for other contacts	<ul style="list-style-type: none"> • Can you provide me with contact information for other stakeholders involved in the development of sustainable material? • Would it be ok if I used your name when contacting them?
Confirmation	<ul style="list-style-type: none"> • Would you like to receive the results of the thesis?
Show appreciation	<ul style="list-style-type: none"> • Thank you for your time and input • Can I contact you for any additional information? • I will send the requested material by ...

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