

Sustainability in fashion production – How are the pioneers doing it?

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<p>The topic of the thesis is sustainable fashion production, which is a current and important topic. Fashion production is linked to various negative social and environmental impacts such as unfair working conditions, high use of harmful chemicals, water, land and energy, and emissions to air and water. This is why more sustainable ways of producing are needed. Sustainable fashion is gaining more visibility and pioneers of the industry are leading the way towards a more sustainable future of fashion production.</p> <p>The aim of the thesis was to find out what are the key aspects of sustainable fashion production including different ways of producing more sustainably, ways of ensuring sustainable practices in the production and ways of evaluating the impacts of production. The thesis focused on social and environmental sustainability in clothing and small accessories.</p> <p>In the theoretical framework, the social and environmental aspects of fashion production are presented and more sustainable alternatives are given. Also, monitoring and impact measuring are covered. Fashion production has various negative impacts on people and the environment. Sustainable alternatives in fashion production include fair working conditions, local production, use of more sustainable materials, avoiding the use of harmful chemicals and designing durable products that can be recycled. Certifications and personal relationships with manufacturers form the basis for monitoring sustainability throughout the production chain.</p> <p>The research was conducted as qualitative research as it was most suitable for collecting a lot of valuable insights of the topic. The research method was theme interviews and the interviews were conducted via Skype or e-mail. The interviewees were representatives of six European fashion companies that are considered pioneers in sustainable fashion production. The research was conducted in winter of 2019.</p> <p>The research results show that there are many ways of producing fashion more sustainably. Producing locally or in developing countries according to fair trade principles, preferring more sustainable materials and designing durable items are examples of more sustainable options. Personal relationships with manufacturers are important in ensuring sustainability in production. There are also many challenges related to sustainable fashion production including traceability and profitability.</p>	
Keywords Sustainable, fashion, production	

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1 Introduction

The topic of my thesis is sustainability in fashion production and was chosen based on my personal interest in the topic. I have several years' experience of fashion retail and lately I have combined my interest in fashion and my specialisation studies, sustainability studies. During my internship in the field of sustainable fashion, I recognised the need for more precise information on sustainability in fashion production. The need to research and understand different ways of producing more sustainably and what are the key aspects in sustainable fashion production today. This will help me position myself as an expert in the field of sustainable fashion.

The topic is extremely current and important, and news of the negative impacts of fashion industry and fashion production are published regularly. The various negative impacts include both social and environmental impacts such as unfair working conditions, high use of harmful chemicals, water, land and energy, and emissions to air and water. These are the reasons why more sustainable ways of producing are needed urgently. Luckily sustainable fashion is gaining more foothold and visibility, and industry pioneers are leading the way towards a more sustainable future of fashion.

To better understand sustainable fashion production, it is important to be familiar with fashion production and the challenges related to it. In the theoretical framework, these will be introduced accompanied by more sustainable alternatives. Other important aspects of sustainable production are monitoring the operations in order to ensure sustainable practices as well as evaluating the impacts of production. These are also introduced in the theoretical framework. The research was conducted as qualitative research by interviewing representatives of six different fashion companies that are considered pioneers in sustainable fashion production.

1.1 Research objective

The aim of the thesis was to find out what are the key aspects of sustainable fashion production and thus gain valuable insights for myself and others interested in the topic. The research question was "How do sustainable fashion companies implement sustainability in their production?". The answer for the research question was looked for with the help of the following sub-questions: "In what ways is the production of the companies sustainable?", "How do the companies ensure sustainability in their production?" and "How do the companies evaluate the social and environmental impacts of their production?"

The research was delimited to concern brands that are already considered sustainable and represented in different sustainable fashion online marketplaces, for example. The thesis focused on clothing and small accessories, shoes were not included. It focused on social and environmental sustainability, leaving economical sustainability out.

Table 1. Overlay matrix, the connection between the research questions, theoretical framework and results

Sub-question	Theoretical framework (chapter)	Results (chapter)	Interview questions
1. In what ways is the production of the companies sustainable?	2.1, 2.2, 2.3, 2.4	5.2, 5.3, 5.4, 5.5	4, 5, 6, 7, 8
2. How do the companies ensure sustainability in their production?	3.1, 3.2, 3.3	5.6, 5.7	9, 10, 11, 12
3. How do the companies evaluate the social and environmental impacts of their production?	3.4	5.8	13, 14, 15

1.2 Sustainable fashion production

Sustainable development was defined in 1987 in the Brundtland report as follows: “Sustainable development is development that meets the need of the present without compromising the ability of future generations to meet their own needs” and was then adopted by the United Nations’ World Commission on Environment and Development (WCED). Sustainable development means environmental protection, social equity and economic growth. (World commission on environment and development 1987.)

This thesis focuses on environmental and social sustainability in fashion production. According to Fletcher (2014) “sustainability in fashion and textiles fosters ecological integrity, social quality and human flourishing through products, action, relationships and practices of use”. Sustainable fashion has the possibility to create value for people and the planet. It can create better working conditions for manufacturers and decrease

environmental impact through cleaner production. It can offer people safer products by using fewer chemicals in production and product satisfaction through high-quality products. (Niinimäki 2015.)

Sustainable production from an environmental perspective should focus on efficient and careful use of natural resources, using renewable energy and maximizing recycling efforts. From a socio-economic perspective, it should focus on improving working conditions by aligning with international codes of conduct, good ethics and best practices. Fashion companies should also encourage more sustainable consumption patterns and caring and washing practices. (Green Strategy 2018.)

Köhrer and Schaffrin (2016, 7) describe sustainable fashion as a claim to quality going beyond the material, processing and design of fashion. A claim of neither damaging the environment nor people, ideally even serving them. And also, transparency as an important pillar evoking trust. Sustainable fashion production includes social aspects such as humane working conditions and fair wages all along the supply chain and at the same time, ecological aspects play an important role. Cultivating natural fibres, recycling materials and avoiding the use of chemicals, for example.

Niinimäki (2015) states that when it comes to sustainable fashion, there is no simple solution on how to make things better, but many different approaches to improve the current situation. Green Strategy (2018) agrees: "There are many ways for fashion companies to offer a more sustainable fashion, and for consumers to consume more sustainably". The Business of Fashion & McKinsey & Company (2017, 62) complements the previous ones by stating: "Sustainability champions will lead the way, showing the fashion industry how to drive innovation and value by integrating sustainability across the entire value chain"

2 Fashion production and sustainability

In this chapter, social and environmental impacts of fashion production are introduced starting with working conditions and continuing to environmental impacts, materials and use of chemicals. More sustainable options are included in the subchapters and finally, sustainable design and production introduced in their own subchapter.

The most important references for the theoretical framework are Sustainable Fashion and Textiles by Kate Fletcher (2014) and A New Textiles Economy report by Ellen MacArthur Foundation (2017). Fletcher is a sustainable designer, consultant, writer and key opinion leader in sustainable fashion. Her work has been at the forefront of the field for the last 15 years. She is also a reader in sustainable fashion at the London College of Fashion. (Gwilt & Rissanen 2011, 9).

The amount of clothes produced has doubled in the past 15 years. In 2015, 150 billion pieces of clothing were produced (Transparent 2018, 41). The same year, textile production was responsible for 1,2 tonnes of CO₂ equivalent, which is more than the CO₂ emissions caused by all international flights and maritime shipping combined. (Ellen MacArthur Foundation 2017.) Fashion and textile production involves one of the most complicated industrial chains in the manufacturing industry. The journey from raw textile fibre to finished product draws on energy, water and other resources as well as labour and cumulatively makes for a high impact sector. (Fletcher 2014, 51.)

2.1 Working conditions

The global garment industry provides work for tens of millions of workers worldwide, especially for young women. Approximately 80 percent of the garment workers are women (Clean Clothes Campaign 2012). It has great potential to contribute to social and economic development significantly. It also creates huge export opportunities for developing countries. (Better Work 2016, 5.) Global Fashion Agenda & The Boston Consulting Group (2017, 15) estimates that the industry employs approximately 60 million people and agrees that it has a huge potential for creating social change for millions. Roughly one out of three manufacturing workers in key Asian production countries are employed by the fashion industry.

The industry, however, suffers from poor working conditions such as long working days, low wages, insufficient occupational safety and health standards as well as verbal and sexual harassment of workers. (Better Work 2016, 5.) The list continues with forced

labour, child labour, lack of job security, discrimination and denial of trade union rights. NGOs and unions such as Better Work, Clean Clothes Campaign, Fair Wear Foundation, Fairtrade International and Labour Behind the Label are working to make the conditions visible and improving them. Still, the human rights violations and unfair working conditions are a huge challenge in the fashion supply chains. (Fashion Revolution 2015, 8.)

The sector faces high volatility, low predictability and low-profit margins. Production is often subcontracted to suppliers in different countries, which creates a forceful competition that brings the costs down. The fashion industry is one of the most labour-intensive industries regardless of the advances in technology and workplace practices. Tragic accidents, the Rana Plaza building collapse in Bangladesh in 2013 (killing 1134 and injuring 2500 people) and a factory fire in Pakistan in 2012 (killing 260 people), have called the world's attention to garments workers' working conditions in general. (International Labour Organization; Terwindt & Saage-Maass 2016, 3.)

The current minimum wages in the fashion industry in many Asian countries and also in Eastern Europe and Turkey are far from the amount that can be considered a living wage. In addition to that, many factories fail to comply with the minimum wage laws. (Global Fashion Agenda & The Boston Consulting Group 2017, 16.) The minimum wage in most garment-producing countries is not enough to live on. It is estimated that for example in Bangladesh, the minimum wage covers 60 percent of the costs of living in a slum. (Fashion Revolution 2015, 10.) Low wages can cause issues such as the workers having to work extremely long hours, bad housing conditions, low nutrition and a bad quality of life (Stoetz & Kane 2015).

However, the working conditions vary significantly among different suppliers as some factories can be described as sweatshops while others offer a lot more humane opportunities to pursue livelihood among workers. Strong evidence also shows that improving the working conditions is actually an investment rather than a cost. Factories with better working conditions, higher compliance and well-equipped supervisors are more productive and profitable. All stakeholders – brands, retailers, factories, policymakers, NGOs and workers and their representatives are needed to find solutions across the global supply chains. (Better Work 11, 51.) The profitability of factories who participated in the Better Work's (a partnership between the International Labour Organization and International Finance Corporation) programme to improve working conditions increased by 25 percent (Transparent 2018, 17).

The International Labour Organization (ILO) is a UN agency and responsible for international labour standards. Government representatives, employers and workers shape together its policies and programmes. (Black 2012, 203.) ILO promotes decent work in the fashion industry by, for example, promoting social dialogue on main challenges and opportunities in the sector, sharing knowledge on recent trends and developments, supporting the implementation of international labour standards and workplace compliance, and strengthening partnerships and policy coherence among different stakeholders at global and regional levels. (International Labour Organization 2019.)

2.2 Environmental impacts and materials

The environmental impacts of fashion production include the use of scarce natural resources like water and land, use of harmful chemicals in the raw material production and processing phase, energy use in the processing phase, emissions and effluents in the processing phase, emissions from transport, and a large amount of waste products. (The Textile Institute 2015, 553.) Textile production starts with fibre production, extracting and processing of fibres, and is followed by spinning, the yarn preparation. In the next phase, the yarn is knitted or weaved into a fabric. Bleaching, dyeing and finishing are done before the last step, which is cutting and sewing the fabric into a finished garment. (Quantis 2018, 11.)

Materials can be divided into animal fibres, cellulose-based or plant-based fibres and synthetic fibres, each of them having their own advantages and disadvantages. Animal-based fibres leather, wool and silk have significant environmental impacts such as land use and methane emissions, and they also raise ethical questions. On the other hand, these fibres are durable and have low impact during use. Cellulose-based or plant-based fibres such as cotton, viscose, flax (linen), hemp and lyocell account for a third of all textile fibres. They have several advantages as they are renewable, biodegradable, mechanically recyclable, lightweight and strong. The disadvantages include for cotton, for example, the consumption of large amounts of water and chemicals. Synthetic fibres polyester, nylon and acrylic are durable and require less water and land, but the production is energy-intensive and depends on oil feedstock. They are also nonbiodegradable and shed plastic microfibrils during use. (Global Fashion Agenda & The Boston Consulting Group 2018, 36.)

Cotton and polyester together account for 80 percent of all fibres used in fashion production. This is a challenge as diversity is an important value in sustainable

development. It is not possible to define whether natural or synthetic materials are more environmentally friendly as they both have their environmental impacts. Producing cotton, viscose and acrylic is water intensive and cotton, viscose, acrylic and polyester is energy intensive. Many synthetic materials are non-renewable, but the advantage of them is that they can be recycled easily. (Niinimäki 2013a, 20.)

Growing and processing cotton requires large amounts of water, which is especially problematic in water-scarce areas. Growing one kilogram of cotton requires 3800 litres of water. In the cultivation, large amounts of pesticides and fertilizers are used, which causes various environmental impacts such as reduced soil fertility, biodiversity loss, water pollution and also severe health problems due to exposure to toxic pesticides. Other social problems related to cotton cultivation include poor workers' rights and low wages. Genetically modified seeds are used in the cultivation, the spinning process requires a lot of energy and the fibre does not absorb dyes easily meaning that it requires a lot of chemicals in the dyeing process. (Ellen MacArthur Foundation 2017, 120; Fletcher 2014, 11.)

Producing one kilogram of polyester requires only 17 litres of water. However, manufacturing polyester requires almost twice as much energy (109 MJ per kg) as is needed for producing cotton. Producing plastic-based fibres for textiles accounts for 342 million barrels of oil usage per year. Plastic-based materials, such as polyester, nylon and acrylic, shed microfibers during the wash. Every year around half a million tons of microfibers caused by the washing of clothes end up in the ocean creating negative environmental and health impacts. (Ellen MacArthur Foundation 2017, 119; Fletcher 2014, 17.)

Material blends are used to improve the appearance and properties of a garment or to reduce production costs. They are made by combining different fibres such as polyester and cotton or acrylic and wool. Elastane is often added to add stretch to the item. The challenge with material blends is the difficulty of recycling the materials after use and another one is that adding synthetic materials to natural fibres makes the material no longer biodegradable. (Ellen MacArthur Foundation 2017, 94.)

The MADE-BY Environmental Benchmark for Fibres (table 2) classifies fibres according to six parameters, which are greenhouse gas emissions, human toxicity, ecotoxicity, energy input, water input and land use. Fibres with an insufficient amount of data available are ranked as unclassified. (Common Objective 2018.) Even though the benchmark has been criticized to simplify the complex topic, it provides an overview of the environmental

impacts of different fibres (Federal Office for the Environment 2017, 12). In the following paragraphs more sustainable materials organic cotton, hemp and linen, recycled materials and lyocell are introduced.

Table 2. MADE-BY Environmental Benchmark for Fibres (adapted from Common Objective 2018)

CLASS A (More Sustainable)	CLASS B	CLASS C
<ul style="list-style-type: none"> • Mechanically Recycled Nylon • Mechanically Recycled Polyester • Organic Flax (Linen) • Organic Hemp • Recycled Cotton • Recycled Wool 	<ul style="list-style-type: none"> • Chemically Recycled Nylon • Chemically Recycled Polyester • CRAiLAR® Flax • In Conversion Cotton • Monocel® (Bamboo Lyocell Product) • Organic Cotton • TENCEL® (Lenzing Lyocell Product) 	<ul style="list-style-type: none"> • Conventional Flax (Linen) • Conventional Hemp • PLA • Ramie
CLASS D	CLASS E (Less Sustainable)	UNCLASSIFIED
<ul style="list-style-type: none"> • Modal® (Lenzing Viscose Product) • Poly-acrylic • Virgin Polyester 	<ul style="list-style-type: none"> • Bamboo Viscose • Conventional Cotton • Generic Viscose • Rayon • Spandex (Elastane) • Virgin Nylon • Wool 	<ul style="list-style-type: none"> • Acetate • Alpaca Wool • Cashmere Wool • Leather • Mohair Wool • Natural Bamboo • Organic Wool • Silk

Organic cotton is produced according to organic agricultural standards sustaining the health of ecosystems, soil and people. The use of toxic chemicals and genetically modified organisms (GMOs) is prohibited. Organic cotton production creates various potential environmental savings compared to conventional cotton. It consumes 91 percent less water and 62 percent less energy, the eutrophication potential is 26 percent smaller, acidification of land and water is 70 percent smaller and the impact on climate change 46 percent smaller. Organic cotton production creates also various social and economic benefits, especially when being also Fair Trade. Currently, the use of organic cotton makes up only less than one percent of the global cotton use. (Textile Exchange 2016a.)

Hemp and flax (linen) are durable fibres that require a small amount of water, pesticides and fertilizers to grow. They grow fast, improve the soil structure and grow also on land

that is unsuitable for food production. The disadvantage of hemp and flax is energy-intensive spinning. The cultivation of hemp is banned in many countries due to the narcotic properties of the plant even if the hemp used for fibres contains only little narcotic properties. Hemp and flax are environmentally friendly alternatives to cotton and even more when produced organically. (Ellen MacArthur Foundation 2017, 121; Niinimäki 2013a, 20.)

The use of recycled polyester reduces the use of fossil resources. Polyester can be either mechanically or chemically recycled. Using PET-bottles as the raw material reduces landfill and thus, soil contamination and water and air pollution. (Textile Exchange 2016b.) Compared to virgin polyester, recycled polyester can save 80 percent toxins, 60 percent energy and create 40 percent less CO₂ emissions. The disadvantage of recycled polyester, as of virgin polyester, is the microfibre shedding during use. (Global Fashion Agenda & The Boston Consulting Group 2018, 40). Also, nylon, cotton and wool can be recycled either from old garments or other waste material. All the recycled materials create savings in chemical and energy use and CO₂ emissions. The water use for recycled cotton is also low compared to virgin cotton. (Federal Office for the Environment 2017, 11–12.)

Lyocell (Tencel) is a cellulosic fibre usually made from the wood pulp of eucalyptus. It is fully biodegradable, and the wood pulp is sourced from sustainably managed forests. It has also various other advantages such as the use of non-toxic and reusable production solvents, no bleaching required prior to processing as well as reduced chemical, energy and water consumption in the dyeing phase. The disadvantage of lyocell is that the production process is highly energy-intensive. Lyocell is a better alternative to polyester, conventional cotton and viscose. It is a soft and strong fibre and can be washed in low-temperature. (Ellen MacArthur Foundation 2017, 120; Fletcher 2014, 39–40.)

2.3 Use of chemicals

The textile industry is a major user of hazardous chemicals and industrial fresh water polluter worldwide. The effluents from dyeing and processing of clothes are polluting rivers and waterways, especially in the Global South. (Greenpeace 2018.) In the production, huge amounts of chemicals are used, some of them being hazardous and posing a threat to human health, nature and animals. Chemicals are present in every part of textile processing. The consequences are unpredictable and far-reaching. The diseases and health problems include cancer, infertility, obesity, diabetes and allergies among others. Both the workers and consumers are at risk. (Chemsec 2019a.)

Cotton production uses 2,5 percent of the world's arable land but accounts for 16 percent of global pesticide use. It accounts also for four percent of global nitrogen and phosphorus fertilizer use. (Ellen MacArthur Foundation 2017, 38.) Moreover, cotton production makes up 25 percent of global insecticide consumption. These insecticides are classified either moderately hazardous or, in some of the poorest countries, highly hazardous by the World Health Organization. (Fletcher 2014, 13.)

Pesticides, a common name for herbicides, insecticides and fungicides, defend crops from damage caused by insects, weeds and mould. Solvents are used in large quantities at many stages of production to dissolve substances such as dye pigments. Surfactants are also used in many stages of production in various roles. Dyes and pigments are used for coloration, often in large amounts and discarded into wastewater. Plasticisers are used to soften plastic, for example, PVC, for screen-printing designs and coating fabrics. Water and stain repellents are used for outdoor textiles and flame retardants to make products less flammable. Biocides prevent living organisms thriving on clothes during transport or storage and give anti-odour properties. (Ellen MacArthur Foundation 2017, 56–57.)

REACH is a regulation by the European Union to protect human health and environment from the consequences of the use of chemicals and at the same time, improve the competitiveness of the chemical industry in the EU. It regulates the manufacture, import, marketing and end use of chemical substances. (ECHA 2019.) The Detox campaign launched in 2011 by Greenpeace draws attention to the chemicals used in fashion production. It aims at getting people to challenge fashion companies to eliminate the use of hazardous chemicals in their products and supply chains. (ECHA 2013.)

Chemsec, a non-profit organisation aiming at free the world from hazardous chemicals, advises companies to communicate their suppliers about safer alternatives. So-called positive lists have been developed by several chemical suppliers. Another good option is to consider whether the use of chemicals could actually be avoided. (Chemsec 2019b.) Green chemistry focuses on minimizing the use of hazardous chemicals and maximizing the efficiency of chemicals (Fletcher 2014, 60).

Natural dyes, made from plants, animals and shells, are an important alternative for petrochemical-based dyes. If harvesting of them is carefully managed they offer environmental and social benefits such as low carbon footprint and employment for rural communities. However, they are only suitable for dyeing natural fibres and most often require fixing agents for affiliation for the fibre. The dyes have variations in colour tone and

require longer and slower dyeing treatments. The classic dyestuffs madder, cochineal, weld, cutch and indigo offer a good range of colours and there are other sources like nettles, rhubarb roots and walnut hulls as well. (Fletcher 2014, 64–65.)

2.4 Sustainable design and production

Environmental considerations must be included in the earliest stage of product design and production process (Greenpeace 2017, 19). A study identified that the design phase is in a key position looking at the sustainability of a product as decisions regarding quality, appearance, materials and manufacturing processes are made in the phase in question (Villa Todeschini, Nogueira Cortimiglia, Callegaro-de-Menezes & Ghezzi 2017). When making design and manufacturing decisions, it is important to consider how the product will be used, how will it age, how will it be disposed of and what will be the environmental impact of the product. Sustainable design has also the power to affect consumption patterns and change them towards more sustainable. (Niinimäki 2015.)

The Textile Institute (2015, 555) lists more sustainable design options such as using biodegradable fabrics, designing fabrics to be easily dismantled for recycling, designing durable clothes that can be altered and using recycled materials. Sandy Black (2012, 87) in *The Sustainable Fashion Handbook* presents ten strategic approaches for more sustainable textile design created by Textiles Environment Design (TED):

1. Design to minimize waste
2. Design for cyclability
3. Design to reduce chemical impacts
4. Design to reduce energy and water use
5. Design that explores clean/better technologies
6. Design that takes models from nature & history
7. Design for ethical production
8. Design to reduce the need to consume
9. Design to dematerialise and develop systems & services
10. Design activism

Textile waste is not only a problem that occurs after the use phase but happens also in the cutting room (Fletcher 2014, 130). In conventional design, the amount of cutting room fabric waste is usually 15 percent. Zero waste fashion design means that no waste is created during the design phase. (Rissanen 2013.)

In a linear way of thinking, the disposal phase is usually the end of a product's life. In Cradle to Cradle concept, developed by William McDonough and Michael Braungart, the life is extended to the second cycle as well. (Fletcher 2014, 130.) It is a design concept with the idea that materials can be used again, and no waste is created. Natural fibres like

cotton and wool and semi-synthetic fibres enter into the biological cycle and artificial fibres like polyester enter into the technological cycle. A piece of garment is designed to have only 100 percent materials or materials that can be separated. Tencel, for example, is a material that complies with the concept of Cradle to Cradle. (Köhler & Schaffrin 2016, 102.) Ellen MacArthur Foundation (2017, 50) in its report, presents a circular economy model for textiles. A new, circular textile industry that would phase out substances of concern and microfiber release, transform the way clothes are designed to break free from their disposable nature, make effective use of resources and move to renewable inputs.

Designing durable materials and products is an important part of sustainability as the lifetime of the product can be lengthened this way. This decreases the necessity of buying new products and saves resources and reduces waste. According to the Ellen MacArthur Foundation report (2017, 46), if a piece of garment would be used twice as often as it is currently used on average, it would lower the CO₂ emissions by 44 percent. The durability can be increased by preferring robust materials that do not show the signs of wear easily or avoiding the use of prints and patterns that will be out of fashion in short. (Fletcher 2014, 193–195.)

Niinimäki (2013b, 45) brings up a challenge related to sustainable production. The possibilities, especially for small- and medium-sized companies, might be limited. Finding sustainable materials that can be ordered in small amounts can be a challenge. Best practice means that the designer chooses the best environmental and social option that is available. Bigger companies have more power to influence sustainable practices in the field.

3 Monitoring and measuring

This chapter introduces practices, tools and concepts that are considered to help to ensure and monitor sustainability in the production chains. These include codes of conduct, factory audits and visits, standards and certifications, transparency, traceability and local production. Finally, impact measuring and different tools are introduced shortly. All of these topics are featured in the research results as well.

A study found out that supply chain design is crucial for good environmental performance in fashion supply chains. Practices that aim at minimizing the environmental impact for bigger companies included selecting suppliers based on environmental criteria, asking suppliers to comply with the company's code of conduct, establishing long-term relationships with the suppliers for continuous improvement and checking the environmental conditions in a transparent and continuous approach. Smaller companies are not always able to use certified suppliers. An alternative option for them is producing locally to form a close and direct relationship with the suppliers, and to reduce the impact of transportation. Even if the manufacturing is local, the raw materials may come from far away and in this case, Fair Trade helps to ensure the environmental and social sustainability. An alternative to local production is producing entirely in developing countries according to Fair Trade practices. (Caniato, Caridi, Crippa & Moretto 2012.)

3.1 Codes of conduct and audits

Codes of conduct define the basic workers' rights and minimum standards. Monitoring is essential to ensure the code is really implemented in an effective way. (Fletcher 2014, 66.) In the following table (3) the code of conduct by Ethical Trading Initiative is presented. The code of conduct by the Business Social Compliance Initiative (BSCI) and the one by Ethical Fashion Initiative, for example, include very similar guidelines.

Table 3. The Base Code by Ethical Trading Initiative (adapted from Ethical Trading Initiative 2018)

1. Employment is freely chosen	2. Freedom of association and the right to collective bargaining are respected	3. Working conditions are safe and hygienic
4. Child labour shall not be used	5. Living wages are paid	6. Working hours are not excessive
7. No discrimination is practised	8. Regular employment is provided	9. No harsh or inhumane treatment is allowed

According to Krüger, Himmelstrup Dahl, Hjort & Planthinn (2012), a better alternative for codes of conduct is working in collaboration with the manufacturers. Working together and establishing a tight relationship and mutual understanding takes time. The company's sustainability requirements and goals need to be well communicated to the supplier.

Factory audits are done to determine how factories comply with labour standards. In non-compliance situations, the auditors make recommendations for improvements. (Fair Wear Foundation 2012.) The audits are done by an auditing team and they should include reviewing documentation offered by the management to check whether the working conditions and wages are in line with the labour standards, inspecting the factory building to evaluate safety and health aspects, and interviewing the manager and some of the workers to find out if the documents respond to the reality. (Clean Clothes Campaign 2005, 23).

According to Finnwatch, certificates and auditing systems are important and most reliable in monitoring the social responsibility in high-risk countries. They do, however, have a lot to improve. Companies should consider certificate and auditing systems just as one tool for ensuring the human rights in their supply chain and compliment them with other methods such as direct dialogue and lasting relationships with the suppliers, common projects for improving the working conditions or co-working with NGOs and trade unions. Instead of focusing on the number of audits, companies should focus on the quality of them. The audits should be well prepared, and employees and stakeholders should be heard outside of the manufacturing plants. These so-called off-site interviews are the most efficient way of tackling auditing frauds. (Finnwatch 2016.)

3.2 Standards and certifications

In the next paragraphs most known standards and certificates, and the ones that are mentioned in the research results will be introduced. International Standards Organisation (2019) defines certifications as follows: “the provision by an independent body of written assurance (a certificate) that the product, service or system in question meets specific requirements”.

The Global Organic Textile Standard (GOTS) is the world's leading processing standard for textiles that are made from organic materials. It certifies the entire supply chain starting from the raw material and includes both environmental and social criteria. Textile products containing a minimum of 70 percent of organic fibres can be GOTS certified. (Global Organic Textile Standard 2016.) OEKO-TEX does independent testing for harmful substances for fibres, yarns, fabrics and textiles. In OEKO-TEX STANDARD 100 testing for harmful substances is done to ensure compliance with the legal maximum values for harmful chemicals in finished products. (OEKO-TEX 2018.)

Fair Wear Foundation (FWF) is a non-profit organisation that works to verify and improve workplace conditions for garment workers in 11 production countries in Asia, Europe and Africa. Members of FWF begin a journey of making step-by-step improvements that lead to sustainable solutions. (Fair Wear Foundation 2019.) Fairtrade Textile Standard sets criteria for fair working conditions, fair wages and reducing the environmental impact of production throughout the whole supply chain. It is for Fairtrade cotton and other responsible fibres. Fairtrade mark for cotton is for fair cotton farming in terms of fair pay and ban of GMOs. (Fairtrade International 2019).

World Fair Trade Organization is a global network of fair-trade organizations, companies and individual members. The WFTO Fair Trade Standard is formed based on 10 Fair Trade Principles and conventions by ILO. (World Fair Trade Organization 2018.) These principles include creating opportunities for economically disadvantaged producers, transparency and accountability, fair trading practices, payment of a fair price, no child labour nor forced labour, ensuring good working conditions, providing capacity building, promoting fair trade, respecting the environment, and commitment to non-discrimination, gender equity and freedom of association (Black 2012, 203).

ISO develops international standards such as ISO 14001, but the actual certification process is done by external bodies (International Organization for Standardization 2019a). ISO 14001 specifies requirements for a company's environmental management system

and helps to manage environmental responsibility. It does not state specific environmental performance criteria. (International Organization for Standardization 2019b.) Social Accountability International's (SAI) certificate SA8000 checks compliance with social standards throughout the whole production chain (Social Accountability International 2019).

3.3 Transparency, traceability and local production

Transparency towards consumers and all other stakeholders is important in the field of sustainable fashion. It has become challenging to identify the origin of an item as the production can happen in several countries and the supply chains are complex. Being transparent, a company can share information about its sustainable actions, but the information should be true and objective and even the negative aspects or the ones that are still in progress should be shared. (Niinimäki 2015.) Supply chain transparency is a powerful tool for improving workers' rights and building trust (Human Rights Watch 2017).

A global movement, Fashion Revolution, aspiring to unite the industry and change the way clothes are sourced, produced and consumed believes in the power of transparency as a means for change. "Transparency involves openness, communication and accountability. Transparency means operating in such a way that it is easy for others to see what actions are performed." The campaign believes that greater transparency in the supply chains will help revealing weaknesses related to environmental and social issues and then eventually they will diminish. Transparency is the beginning of revolutionizing fashion. This is why the campaign encourages people to ask fashion brands and retailers: "Who made my clothes?". (Fashion Revolution 2015, 15.)

Traceability of the supply chain is a prerequisite for understanding the social and environmental impacts of production. It enables companies to identify risks, challenges and opportunities to increase efficiency, and helps to build strong and trusting relationships with suppliers. (Global Fashion Agenda & The Boston Consulting Group 2018, 34.) Recent technologies, such as blockchain, enable companies to trace their products by creating a link between the products and their digital entities. In theory, this means that every time the product changes hands, it can be recorded reliably, offering full traceability. (Transparent 2018, 8.)

Some companies have decided to produce locally to prevent the risk of subcontracting, for example. Global supply chains create risks whereas local production decreases risks and better ensures quality in the production. Environmental laws are tighter in EU countries

when compared to Asian countries and many chemicals that are banned in the EU are still widely used in factories in developing countries. (Niinimäki 2013a, 24.) In local production, also the environmental impacts caused by transportation are avoided (Fletcher 2014, 166).

3.4 Impact measuring

A crucial first step for finding more sustainable production patterns is to identify the spots where interventions have the greatest potential to improve the social and environmental impacts (Sustainable Development Goals 2019). Life Cycle Assessment (LCA) is a methodology for assessing the environmental impacts of a product during its whole lifespan. According to the ISO, LCA is the “compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle”. The steps in LCA are goal and scope definition, inventory analysis, impact assessment and interpretation. (The Textile Institute 2015, 553.) S-LCA refers to Social Life Cycle Assessment and can be used to assess the social impacts of a product during its whole life cycle. The data can be quantitative or qualitative. (United Nations Environment Programme 2009.)

The Higg Index, developed by the Sustainable Apparel Coalition, enables measuring and scoring the company's or product's sustainability performance. It consists of different tools and one of them, the Higg Brand and Retail Module (Higg BRM), is suitable for businesses all sizes to measure the social and environmental impacts of their operations as well as making improvements. (Sustainable Apparel Coalition 2018.) The B Impact Assessment tool by B Lab is a tool that can be used to measure a company's impact on its workers, community, environment and customers. It is a free tool currently used by over 50 000 companies, including the sustainable fashion pioneer Patagonia. (B Lab 2019.)

In a study by Caniato & al. (2012) bigger companies measured their environmental performance with the following KPIs: use of recycled and organic materials, product waste and chemical substances reduction, water and energy use reduction and the decrease of CO₂ emissions and water pollution. Smaller companies were having greener processes but did not measure their environmental performance as being a small company, it was difficult to set up a system for measuring.

4 Empirical part

The aim of the thesis was to find out what are the key aspects of sustainable fashion production. In this chapter the implementation of the empirical part is explained. Research method, implementation and data analysis are explained carefully to increase the trustworthiness of the research.

4.1 Research method

The research was conducted as a qualitative research. Qualitative research focuses on the world of meanings. The most common data collection methods for qualitative research are interview, survey, observation and gathering information from various documents. The data for the thesis was collected by theme interviews, in other words, semi-structured interviews. Interviews are suitable for researching different phenomena and looking for answers to problems. The aim is to collect as much information of the topic as possible and the interviewees can be chosen according to their expertise. Interviews provide illustrative examples (Hirsjärvi & Hurme 2015, 36). Theme interview proceeds by themes chosen in advance and by some complementary questions. The themes are formed based on the theoretical framework. The advantage of theme interview is the fact that additional questions based on the answers can be asked. (Tuomi & Sarajärvi 2018, 62–65.)

This method served the research best as the aim was to collect a lot of valuable insights from the companies. Theme interview was suitable as the interviewees, the companies, and their sustainability approaches were different compared to each other. Same themes were discussed, and the questions were asked mainly in same order. Some additional questions were asked to clarify the answers and some questions were passed if the topic had been discussed already earlier. The interview themes were different ways of producing more sustainably, ways of ensuring sustainable practices in the production and ways of evaluating the impacts of production.

4.2 Research implementation and data analysis

Six company representatives were interviewed for the research. All of the interviewed companies, fashion brands, are considered pioneers in sustainable fashion and are represented in sustainable online marketplaces. In order to get a comprehensive result for the research, brands with different backgrounds and different sustainability approaches

were chosen. These companies were chosen also due to having interesting product selections.

The interviewees were contacted by e-mail during January and February 2019, and the interviews conducted during February and March 2019. The interview questions (appendix 1) were sent to the interviewees beforehand to offer the possibility of getting familiar with the questions. This is recommended for the success of the research (Tuomi & Sarajärvi 2018, 63). Four of the interviews were conducted via Skype as it best imitates a face-to-face discussion, which was not possible due to long distances. All the Skype interviews were recorded and took approximately 40 minutes each. Two of the interviewees were not available for Skype interview, but offered to participate in the research via e-mail instead.

The data was analysed according to the guidelines of Saaranen-Kauppinen & Puusniekka (2006). The recorded interviews were listened and transcribed carefully straight after each interview. All the transcribed data and the received e-mail responses were read through several times in order to form a general impression of the material. The next step was coding the material with different colours. The coded material was then reorganized to different themes. Quotations were chosen to represent explanatory samples from the data. Finally, the data was outlined to a form of reporting. The analysis was done carefully to be able to present all the relevant and valuable information in the research results.

5 Research results

In this chapter, the research results will be presented starting with introducing the interviewed companies. The pictures in the chapter visualize the products of the companies, and the companies have given permission to use their pictures in this thesis report.

5.1 Pioneers of sustainable fashion production

The founder of la petite mort was interviewed via Skype. La petite mort was established in 2016 in France by the Peruvian founder Andrea Sanabria Oviedo. It all started when Andrea realized that a lot of high-quality organic cotton was coming from Peru. She wanted to create a link and share knowledge between her two home countries France and Peru, establish a sustainable alternative in both, and present Peruvian high-quality raw materials and work in Europe. The product selection consists of basic and urban essentials, clothes and accessories, that are wearable almost all year round and do not follow the current trends. La petite mort wants to offer affordable products and does this by creating smaller items like accessories also. The company's market reach includes many European countries, Peru and the United States.

The co-owner of Store of Hope was interviewed via Skype. The interviewee has been co-owner of the company since 2016/2017 and had been involved in the operations few years before that. Store of Hope is a Finnish brand, established in 2012 by clothing designer Eeva Valopaasi. Eeva has been involved in various projects in developing countries and the story of the brand began from a development project that aimed to empower underprivileged women in Nepal. They believe that western consumption habits and love for fashion should be channelled to something beautiful and valuable, to decreasing inequality. Their current product selection consists of accessories, mainly jewellery and scarves, inspired by natural materials from Nepal and Asia region. Their main market is in Finland, but they have started to expand to Europe as well.

The marketing director of Rhumaa was interviewed via e-mail. The interviewee has worked for the company since establishment. Rhumaa, a brand from the Netherlands, was established in 2014 by Daniel Beernink. The story of Rhumaa started after Daniel fell in love with people, their stories and street art in South Africa during his business internship. Later he made a trip to India and crossed paths with sweatshops and badly managed factories. This is why he wanted to build an ethical and sustainable, storytelling fashion brand that could benefit others and be connected to South Africa. Rhumaa's

signature style is sophisticated, timeless and minimalistic. Their collections are made in collaboration with African artists, details and natural textures bringing the art to life. They are selling to 11 countries in and outside of Europe and into more than 100 retailers. Their main market is in Northern Europe.

One of the founders of Elementy was interviewed via Skype. Elementy is a Polish brand, established in 2015 by Bartosz Ladra and designer Marta Garbinska-Wlodarczyk. They wanted to create something new and different that is based on transparent relationships with customers as well as local production and craft, just like it used to be a long time ago. An alternative to fast fashion. Their mission is to encourage people to consume more consciously. The name of the brand describes their style; something classical that is going to suit a majority of wardrobes, something which is not based only on current trends and will not be out of fashion in any time soon. They started from Polish markets and have now expanded fast to many countries in Europe.

A person responsible of quality control and technology was interviewed from LANIUS via e-mail. The interviewee has worked for the company since the beginning of 2016 and had done an internship there earlier. LANIUS was founded in Germany in 1999 by designer Claudia Lanius. Their product selection consists of options from casual every day to business and festive looks for women. They have 300 retailers in Germany and an additional 100 elsewhere in Europe.

The founder of Náz was interviewed via Skype. Náz from Portugal was established in 2016 by designer Cristiana Costa. It comes from a mountain part of Portugal that used to be a huge textile center before facing a downfall and creating a lot of unemployment for experienced workers. Having worked in factories during her studies Cristiana was familiar with the poor and unfair working conditions that are often reality in Portugal as well. From the beginning, she knew that everything must be fairly made in Portugal, and as it did not make sense being only socially concerned, she established a socially and environmentally sustainable brand. Náz focuses on being democratic: the products are for everyone and for everyone to feel good in them. They are minimalistic and adapt easily to different styles. They sell in many European countries and in Japan, having 22 retailers altogether.

5.2 Defining and implementing sustainability

For la petite mort sustainable clothing is something very useful with a long life. This is one of the reasons why the company sticks to essentials and does not follow the trends.

“To me, something sustainable is something I’m going to be wearing a lot. I’m going to really maximize its life. Sustainability to me is making the most of what we have in terms of resources.”

La petite mort wants to make sure that the products are having a small environmental impact, they are made with social respect and made of materials that are healthy for the people wearing them.

For Store of Hope sustainability means taking full responsibility of the operations, thinking through the consequences, even the indirect consequences, and choosing the best long-term alternative. Most importantly, not creating inequality nor exploiting people or environment. Aiming at creating solutions that are socially and environmentally sustainable. They want to emphasize social sustainability as human rights are really close to heart for Store of Hope. As they operate in developing countries, they want to ensure that what they are doing is sustainable for the people they work with no matter what might happen to Store of Hope in the long run.

Sustainability is in the core of their operations. Their whole idea is to work in a reverse way, starting from the needs of their makers. Every design project is build based on a potential skill or group of makers willing to develop their life and work.

“For us, it’s more about with whom we want to produce, what materials do we have in hands and what is the best that we can create from this.”

Rhumaa is focused on making a positive impact on people and the environment and working towards sustainable goals. They believe that change takes time and many hands and with positive thinking and action everyone can do their part. They prioritize sustainable design and product innovation by using sustainable fabrics and with upcycling, repurposing and recycling efforts, using leftover fabrics to create new products, for example. They choose manufacturers that operate with fair trade certificates and other sustainable practices to ensure quality fabrics and socially responsible processes.

As for Elementy, sustainability means producing locally and being close to their customers, and this way avoiding long transportation chains. Sustainability means responsible production; producing with respect for workers, paying decent wages and aiming at using quality materials like Tencel that are not heavy for the environment. They design classical products that will not be out of fashion in few seasons being more environmentally friendly this way. For them, it is important to be conscious and transparent of their operations and support their customers in making conscious choices as well.

“... we just want to share more knowledge with people and the power is always in peoples' choices, so we want our customers to be fully aware. We never use this negative communication to make them feel ashamed.”

For Lanius, sustainability is a future-oriented, ongoing process with respect for humans, animals and the environment. For them, it means harmonizing ecological materials with fair working conditions. They produce fair, high quality and ecological collections twice a year based on years of experience, production relations, their own quality standards, their values, and existing certifications and textile symbols. The company and many of their items are GOTS certified. They value the certificate the most as it includes both ecological and social aspects.

Sustainability is the basis, the core for Nüz, social sustainability being most important. They do not do anything without thinking about the consequences of what they are doing. They use high-quality materials that will last for a long time and when they do trendy pieces, they use 100 percent materials instead of blends so that they can be recycled later. If they do not have a sustainable or a good way of doing something, they do not do it at all. The interviewee sums up this part of the research quite well:

“Everyone still has a lot of the idea that sustainability is only one thing but there are a lot of ways to be sustainable ... they (sustainable brands) are all sustainable in their own way.”

5.3 Manufacturing locations

The production of la petite mort takes place in Peru within a small circle. All the production steps from fibre production to a finished product happen there. Peru has a tradition of being a raw material supplier and manufacturer but, according to the interviewee, the developed countries do not really see it as a place for creation. This was one of the reasons for establishing la petite mort in the first place.

All the products of Store of Hope are currently produced in Nepal. Their first manufacturers were the ones they did the development project with and the others have been found during their visits in Nepal. Their cashmere manufacturer is a family company employing around twenty workers. Finding a cashmere manufacturer that would operate or be willing to operate responsibly was a great challenge at first.

Rhumaa products are produced in Europe, predominantly in Portugal, where the factories are fully operated by women. Around twenty women work there delivering high-quality craft with a good eye on details. The small size of the company enables transparency and

close relationships. They have a factory in Turkey that has an organic fabric warehouse, organic cutting department, organic production line, and GOTS and OCS certificates. The clothes manufactured there are certified 100 percent vegan. Rhumaa chooses manufacturers carefully and prefers working with suppliers nearby to decrease emissions from transport.



Figure 1. Jumpsuit made of cotton and cupro (Rhumaa 2019)

The products of Elementy are locally produced in Warsaw and the majority of them in their workshop in the district of Praga. Lanius has one manufacturer in Lithuania, Poland, Italy, Spain and India, two in Bulgaria and Peru and three in Portugal, Turkey and China. Most of their products are manufactured in Europe to avoid long-distance transportation. The manufacturers in China are pioneers in sustainable production and they have a long, trustful relationship. The manufacturers in Turkey are highly specialized in their products and certified in sustainability.

The products of Náz are manufactured in Portugal in different factories. The interviewee clarifies that for them, suppliers are partners. They rather work with small factories, which they choose carefully by visiting them to see how things are made and how people feel.

“I don’t believe in certifications because sadly in this industry they are not trustworthy, so I rather work with small factories, family businesses, where the owners are there working, where everyone goes together and sits at the table to have lunch, where like one of them bakes a cake and brings for the afternoon with tea for everyone.”

They spend a lot of time in the factories working with their partners, developing products and getting to know how they could do something better. They only work with a few big factories, the ones manufacturing lyocell and cupro, which they know being trustworthy. Their recycled products are fully produced in the mountain area of Portugal.

5.4 Material selection

La petite mort uses Pima cotton and alpaca wool, both from Peru. The organic cotton in Peru is highly appreciated and exported and this is why the company wanted to encourage the Peruvians to take it in their local markets as well. The founder did a year of research and testing with materials to ensure high quality for the products. She chose alpaca wool for the winter time pieces as it is produced a lot in Peru and she has known the material, how it reacts and how to work with it almost all her life.

The material selection is a bit different for Store of Hope as jewellery form a big part of their products. They use natural materials like pearl, silk thread, and locally produced stones and glass beads from Nepal and Asia region. They also use bone, that does not match with the values of some of their customers, but they use it as it is a beautiful material and a waste material available in large quantities. They do not use plastic or synthetic materials also due to their love for natural materials that they have as craftswomen. Sometimes, to ensure the continuum of their production and work for their producers, they have to make compromises if the preferred materials are not currently available. For the scarves, they use a blend of cashmere and wool.

Rhumaa uses a variety of materials: lyocell, cupro, cupro-viscose, viscose, organic cotton, cotton, silk, linen, alpaca wool, cotton-cashmere, merino wool, wool, and wool blends. They also use recycled polyester for lining and introduce new materials as and when they can. They choose fabrics with natural, functional and desirable quality.

Elementy uses sustainable materials like Tencel and locally produced wool, but also cotton and viscose, for example. The interviewee explains that as a small company it is not always possible to use only the more expensive Tencel and organic cotton as they want to be sensitive with the needs of their customers and offer them affordable alternatives as well. They do, however, want to take steps in the direction of using more organic cotton in their collections.



Figure 2. 2 in 1 dress and coat made of Tencel (Elementy 2019)

Lanius also uses a wide range of materials: alpaca wool, organic cotton, hemp, vegetable tanned leather free of PCP, azo dyes and chrome VI, rhubarb leather, linen that is mainly organic, modal, Econyl made of recycled fisher nets, silk, Tencel and mulesing-free Ecowool. They invest intensive research and development work into their materials to become even better, more sustainable and to offer more beautiful qualities.

Näz uses a lot of dead stock, leftover materials, including materials like lyocell, natural fibres and sometimes other materials according to the availability. They also use linen that is locally produced, cupro, lyocell, organic cotton, hemp and recycled materials such as recycled wool. Finding a local manufacturer for linen was a great challenge at first. They always first buy the dead stock, then start developing the collection and see what is missing and then look for other sustainable options to complete the collection. They prefer 100 percent materials that are made in Portugal. They are developing new fabrics in the mountain area and hope to get the factories up and running again.

5.5 Managing the use of chemicals

La petite mort does raw material dyeing in an industrial way, but the colors cannot include certain ingredients like chrome in order to get certified. The company has tried using natural dyes but has not found a balance where the colors would stick well and has decided not to use them until it finds a customer friendly solution. In the manufacturing phase, there are no chemicals involved. The screen printing is done with certified water-based colours and embroidery with a cotton thread.

In the production of Store of Hope, only little chemicals are used, and the dyeing of cashmere is done with the EU standardized Swiss Dye, which is one of the best options creating good results. They are happy that their supplier started using the particular dyes according to their wishes. The challenge in Nepal, in Kathmandu, is the lack of proper infrastructures like sewer and filter systems. They have created some kind of own filters but are aware that there is still a lot to develop. Their operations are small, so the environmental impact would anyway be rather small. Rhumaa manages the use of chemicals by factory audits and visits to check the production processes. Their partners have certificates of compliance and GOTS, REACH and OEKO-TEX certificates.

Elementy starts by summing up that in the actual manufacturing phase, cutting and sewing the materials, no chemicals are involved. When it comes to the materials, they try to buy from known European factories trusting that they obey the environmental laws. The interviewee believes that the challenge with chemical management would be related to materials coming from developing countries and knows that some of their materials are produced in Asia even though they are buying only from companies in Europe. According to Elementy, organic textiles are still limited in amount, so they are not able to choose them only. The materials they buy are often having ISO certificates, but not all of them. They believe that in a couple of years they will be able to buy only certified textiles.

Lanius makes sure that their products meet the GOTS parameters regarding the use of chemicals, even if they would not be GOTS certified, and does spot tests during the production. In the design phase, they do not develop styles that would need harmful treatment or finishing. Náz explains how the water is reused again and again in the treatment of lyocell and cupro and no chemicals end up in the waterways. In cold dyeing chemicals do not end up to water either as all of the dye is used and the output is clean water. Their material recycling is done in a mechanical process with no chemicals involved. When it comes to dead stock, they are not aware of the chemical management. They use unbleached linen and are currently testing natural dyes for linen, but the colours are still bleeding a bit, just like la petite mort described as well.



Figure 3. Organic cotton dress (Lanius 2019)

5.6 Ensuring sustainable practices in production

The cotton supplier of la petite mort is certified by GOTS and the founder has visited the farm. Otherwise she has to trust the certifications as it is impossible to be there all the time. The founder has known the tradition of alpaca wool for several years and knows the general conditions adding that they are tough. She knows that her supplier is doing a lot of social work and is happy with them. The production chain of la petite mort is really small. The founder knows her manufacturers and talks with them a lot about the production. She visits them every time she is in Peru, which is once a year normally.

Store of Hope tells that when it comes to material production, there are challenges in tracing the production chain. Some material for the jewellery is easier to trace than others. They are educating their workers to be able to develop the material side better and have planned to educate them to work more with raw materials instead of mainly focusing on finishing the products. Their cashmere thread is ordered from China. The supplier has some sort of certification, but they are being a little sceptical about it and that is why they are looking for a more reliable thread supplier. Finding responsible suppliers and sourcing materials has been challenging in Nepal.

Store of Hope has close relationships with their producers being in weekly contact with them. The producers do not have certificates as they operate with small companies only. Together with the producers they start creating conditions for working responsibly or develop the operations to be even more responsible. They have their own written standard that works as a basis of their operating principles. It is a plan of implementing their values in their current and future operations, created together with their advisory board. Environmentally friendly operation mode is written as one of their values, but they focus less on developing the environmental side at the moment. They are supporting their producer to get Fair Trade certified as there is a lack of know-how, language skills and money to get it by themselves. They prefer supporting small, local producers instead of working with bigger and certified companies that often have western ownership. They believe that developing local entrepreneurship will lead to more effective change in the long run.

Rhumaa sources materials that are made from natural fibres and produced with a low impact on the environment. The fabrics are derived from eco-friendly sources, such as sustainably grown fibre crops or recycled materials. They work with partners that are focused on improving the social and environmental sustainability of their manufacturing process.

They choose manufacturers and suppliers that are certified or otherwise can prove that they are working in a sustainable manner. The factories are audited, and they visit them often to ensure fair working conditions. They know the people working on their products and relationships with them are highly important to Rhumaa. They work closely with their partners and communicate on a daily basis.

“According to Fair Wear Foundation Portugal is a low-risk country which means that the employees’ working conditions and wages are to standard. We visit our factories in Portugal regularly and work closely with our partners in Portugal. By doing this we get a good impression of whom we work with and if it is up to the environmental and social standards we aim for.”

Elementy tells that sometimes they do not know that much about the origin of their materials as being a small company, they are forced to buy from a middleman.

“... and they don’t give us information, we are not even in a position from we can kind of force them to share that knowledge with us, so we buy that stuff ... maybe in the future, if we are going to become a bigger company, we will have this leverage ... it would be great...”

Sometimes they do order directly from factories and know everything about the origin and that the producers have to obey the high standard EU laws regarding environmental and labour issues. Plenty of the clothes of Elementy are manufactured in their own workshop and when it comes to outsourcing, tight relationships with their partners form the basis of ensuring fair working conditions. They know the companies they work with and visit them very often. Polish companies have to obey the local law, respect the labour and environmental laws, and pay taxes.

Lanius is able to trace its supply chain to the origin of the fibre itself. For them, the key to ensuring sustainable practices is choosing the suppliers carefully and knowing them in person. They work with suppliers that aim at sustainability in production. Their suppliers are certified by GOTS, SA8000 and WRAP, follow BSCI Code of Conduct and are audited by Fair Wear Foundation, except small family businesses, that work according to Lanius’s own social standards and are visited regularly. Moreover, they work with an explicit code of conduct with all of their suppliers.

When it comes to the recycled materials, Nüz is able to trace the whole process. They know and visit the factories producing cupro and Tencel, linen and certified organic cotton they can trace from the fabric on, and about the dead stock material, they know where the fabrics are made. Nüz visits the factories often, also without notice, and works with its

partners to ensure that the working conditions are great. According to the interviewee, the law in Portugal is strict about employment, but there are also a lot of factories that have no windows, that are cold and dark, and the workers are being psychologically abused. Factories being close, there are not huge impacts from transportation. The big factories they operate with obey the laws and have environmental certification. The smaller ones they control themselves and recycle all leftovers from production, for example. Năz is also supporting its producers in growing and getting certifications, which then enables them to work with bigger companies as well.



Figure 4. Shirt made of lyocell (Năz 2019)

5.7 Challenges in sustainable production

The first challenge for la petite mort as a small company was finding the certified suppliers and creating a small circle. The suppliers often ask for minimum orders because otherwise, it would not be economically sustainable for them. As one challenge the

interviewee names teaching and explaining the French market the processes in a simple way. When it comes to alpaca wool, for example, they sometimes consider it the same as regular wool and are worried about the treatment of the animals.

The biggest challenge is profitability and getting enough customers. Producing small collections sustainably and trying to make everything correct is very expensive and does not create big revenues. Against the expectations of *la petite mort*, the people into sustainable fashion are not its biggest customers as they actually aim at consuming less or have unrealistic demands in terms of sustainability. Most of its customers do not find sustainability that important but like the quality materials and style of the products. This is why *la petite mort* has been communicating less about sustainability and more about the style and hopes that the customers will get interested in sustainability eventually.

One of the most significant things for Store of Hope has been realizing that even though they would like to take into account all different aspects of being ethical, they have to prioritize them, as so many things are fundamentally wrong that it is impossible to fix everything at the same time. That is a challenge and sometimes causes the feeling of being insufficient when thinking about everything one would like to develop, but then realizing that it is not that easy and requires a lot of research and work. Another challenge is the unstable operating environment, a developing country, as politics and natural phenomena, for example, can cause delays sometimes. The risk increases as the size of the operations and the amount of invested money increases as well. This is why they have thought about spreading the operations to another developing country as well.

Rhumaa names producing the highest sustainable quality combined with durability as being often the biggest challenge and continues that the mix is key and something they always keep in mind during design, product development and production. Elementy explains that big companies are much more profitable because they often produce in cheap-labour countries and pay their manufacturers a lot less having remarkably bigger mark-ups. They aim at being transparent by showing people how big mark-ups they are doing and showing the real cost of producing fashion.

“...make them aware as well that you know, it’s fun to have cheap clothes, but again, the cost is hidden somewhere else, most likely in the side of the workers or somewhere else and maybe we should at least consider a different way of doing that. That something has to change in that.”

They also wish to have laws or a tool that would enable smaller companies getting more information about the origin of the materials. The power to ask their suppliers specific

questions like what is the name of the factory that produced the fabric. At the moment they are not getting the answers.

For Lanius, the biggest challenge is keeping track of the many steps a garment passes from fibre to finished product, but still, worth the effort. The interviewee gives an example of the main steps of a cotton shirt:

1. Cultivation of (cotton) fibre
2. Harvest/picking of cotton
3. Spinning the yarn
4. Weaving or knitting the fabric
5. Dyeing/printing and finishing of the fabric
6. Manufacturing the garment (cut, sew, iron)

The steps can be very different and branched, the first four steps often including three different locations or countries. These six steps are then followed by packaging, transporting, warehousing and selling.

The interviewee from Náz starts by saying that there are a lot of challenges and the industry is hard. The challenges include delays in production, lack of funding as a small brand, lack of support as a sustainable company and competing with huge brands that sometimes can offer better prices and have more resources for product development. In Portugal, sustainable consumerism is only starting to grow. Being a small company with only two people working is a huge challenge as well.

The interviewee talks also about general challenges regarding fashion production in Portugal. There is a lot of subcontracting happening, to Bangladesh for example, after which “made in Europe” tags are added to the items. This is why it is really important to visit the factories to ensure everything is really done there and in a fair way. The minimum wage in Portugal is only around 600 euros.

“That’s absolutely nothing compared to most of the countries and that’s why they are producing in Portugal. It’s not because it’s fair. It’s because at least they have a tag saying it’s made in Europe and it’s really cheap, it’s not because it’s ethical at all, of course, we are really good in Portugal, our textile industry is really good, but still.”

5.8 Evaluating the impacts of production

None of the interviewed companies is measuring its social and environmental impacts either due to small operations, lack of resources or a proper tool for measuring. Some of them, however, do have ways to evaluate the impacts to a certain point.

La petite mort likes to evaluate the social impacts by reading annual reports of the activity of its suppliers. For the founder, it is important to know that her suppliers are doing social work and taking care of the environment in their communities. She tells that it would be interesting to measure and know the impact of the supply chain and this way be able to decrease the impact of transport for example, but the time for that would be when la petite mort would start working in a bigger scale. At this point, the founder feels that her activity is so small that it is not relevant, neither has she the capacity to get involved in the measuring.

Store of Hope is still more in the process of creating and has not reached the phase of doing a follow up yet. At the moment they do not have any KPI's, lack of resources being the biggest challenge. They look forward to growing into a phase where they would have resources for deeper development that is based on evaluating the current operations. They evaluate their social impact by being in weekly contact with their suppliers. They evaluate carefully how changes in their collections would affect the suppliers and interview their workers individually from time to time. As a small, ethical company, they also emphasize the value and importance of having a multidisciplinary advisory board that supports and helps to evaluate the operations.



Figure 5. Tassel earrings with bone bead (Store of Hope 2019)

Rhumaa also refers to being a small company with limited hands and tells that until the company grows and is able to support the process of measuring, they need to work with supplier relationships, visits and discussions around the topic. Elementy states that at the moment they do not have any tools for doing follow up. They are interested in finding a tool like blockchain to increase traceability and to be able to present the customers different parts of the life cycle of their clothes. Unfortunately, they have not found a fully operable product yet and as a rather small company do not have the money to make it by themselves. Lanius specifies that they do have different tools but have not found the perfect tool yet.

“At the moment we have no tool to keep track on the actual impact of our production, which is accurate enough to communicate to the outside. We are testing and working on different tools to make this possible for the future.”

Näz also tells that they do not have impact measuring organized yet and that they want to create a sustainability report and be more transparent. They are filming every production process and developing a partner map for their website including the videos. Being transparent about everything is their main goal this year.

6 Discussion

The aim of the thesis was to find out what are the key aspects of sustainable fashion production. In this chapter conclusions of the research will be drawn, suggestions for further research given, the trustworthiness of the research evaluated, and finally, the whole thesis process and learning will be evaluated.

6.1 Conclusions and suggestions for further research

According to the primary data, there are many ways of producing more sustainably and this came up clearly from the research results as well. Sustainability as a concept can be interpreted in many different ways to start with. Some of the interviewed companies were focusing more on social sustainability, whereas others both on social and environmental sustainability.

The theoretical framework and the research results bonded together with many aspects. When it comes to manufacturing, producing locally or alternatively in a developing country to empower the people there seemed to be the most sustainable alternatives. For *la petite mort*, *Store of Hope*, *Elementy* and *Näz*, the manufacturing locations were deeply bonded to the company's sustainability values, whereas *Rhumaa* and *Lanius* did not justify their manufacturing locations so much based on their values, but rather based on the skills and certifications of the manufacturers. Avoiding long transportation chains was important for many of the companies.

Some of the interviewed companies were using only the most sustainable materials presented in the theoretical framework, whereas others had also high-impact materials in their selection. *Elementy*, for example, discussed that the material side is still in progress and *Rhumaa* and *Lanius* had a wide selection of materials. The durability of items was brought up in the theoretical framework and research results as a means to decrease the environmental impacts. The use of chemicals was mainly managed with certifications and regulations, and challenges related to chemical management were related to non-certified materials produced in Asia, for example.

All of the interviewees agreed on the importance of close relationships with producers in terms of ensuring environmentally sustainable practices and fair working conditions. Personal relationships were emphasized in the theoretical framework also. The bigger companies brought out the importance of certificates whereas the smaller ones preferred supporting and working with smaller producers. The results included also contradictions.

For example, Náz, as a Portuguese brand, brought out many social challenges related to fashion production in Portugal whereas some of the other companies believed in standards and EU law being sufficient in ensuring fair working conditions. Luckily all the companies reported on visiting their producers instead of just relying on the standards and certificates.

One of the most interesting topics in the results was the various challenges these companies face in their operations. Many of those were also present in the theoretical framework. One thing came out clear; producing sustainably is a huge challenge. Tracing the origin of the materials seemed to be one of the biggest challenges as well as profitability and competing with bigger companies. The result of the impact evaluation was in line with my assumptions; smaller companies are not measuring their impact due to small operations, lack of resources or lack of a proper tool. However, evaluating and measuring the impacts seemed to be important for all of the companies.

As the theoretical framework and the results brought out; being transparent about the operations is the key to change. The whole core of the operations of Elementy was based on being transparent and also Náz wanted to focus on being fully transparent. It was really valuable that the interviewees, especially in the Skype interviews, were so open to discuss all the challenges and development targets they have. All of the interviewed companies can be described as pioneers in sustainable fashion production and they are leading the way towards a more sustainable future of fashion. Differences between the companies and aspects that still require development can be seen in the research results. Sustainability in fashion production, the title of my thesis, was chosen over sustainable fashion production, as it describes the topic and the research results more accurately.

When thinking about sustainable fashion, production is only one part of the whole picture, consumption being another remarkable part. A sustainable future of fashion requires a change in the way clothes are consumed and taken care of. This offers a lot of interesting topics for future research. From the production side, topics such as circular economy, recycled materials or impact measuring could also be researched in more detail. The topic of my master's thesis will probably be one of the previously mentioned.

6.2 Trustworthiness of the research

Concepts reliability and validity are connected with quantitative research and they have been often considered not suitable to use with qualitative research. However, the trustworthiness of research should always be considered. Trustworthiness can be

increased by explaining the research implementation carefully. (Hirsjärvi, Remes & Sajavaara 2010, 232.)

The thesis process and the research method were well described to increase the trustworthiness of the research. The research data was carefully analysed to include all the relevant information in the research results. The research target was rather small, six companies, and thus the results cannot be generalized. The interviews conducted via e-mail stayed somewhat superficial and no illustrative stories were included in the results. In the Skype interviews, the things affecting the results were the vigilance of the interviewer and how the interviewees understood the questions. The companies are also different with regards to the size of the company and operations, and one of them has been established remarkably earlier than the other five. What increases the trustworthiness of the research, is the fact that the interviewees were experts of the topic.

6.3 Evaluation of the thesis process and learning

The thesis process has been great in terms of deepening my knowledge of the topic and developing my professional skills. The process started in Autumn 2018 and the thesis was ready in spring 2019. As I wanted to be thorough in my work, it took quite a lot of time. The first challenge was forming the research questions even though the topic was clear for me since the beginning of the process. Writing the theoretical framework was also unexpectedly challenging. I read a lot and was familiar with the topic, but still choosing the relevant information and references for the thesis report felt challenging from time to time.

The most interesting part of the process was the empirical part. First, it was a challenge to get the interviews scheduled with the companies. Many of them were busy at the time of my research. However, waiting was worth it, as the interviews with the company representatives and the research results turned out to be even more valuable than I had expected. Seeing the finished research results felt like a prize for the whole process. Writing the discussion was a great way of evaluating and summing up the process. The discussion chapter is also valuable for the reader as it includes the most interesting and important parts. Also, the theoretical framework and empirical part offer a lot of interesting insights for people interested in the topic.

I am content with the topic of my thesis and the whole process. It was a challenging, but educational process in many phases. The knowledge and expertise I gained are highly valuable for my future studies and career. It was a pleasure to work around a topic that was extremely interesting for me. During the process, my path crossed with the global

Fashion Revolution campaign and I started volunteering as a communication specialist in Finland's team. I also applied for the master's programme of Creative Sustainability in Aalto University and got selected to continue my studies in the programme with the possibility of choosing Fashion Management as my minor studies.

References

B Lab 2018. B Impact Assessment. URL:

https://bimpactassessment.net/?_ga=2.52098144.817158901.1545899363-1432612640.1541608959. Accessed 27 December 2018.

Better Work 2016. Progress and Potential: How Better Work is improving garment workers' lives and boosting factory competitiveness. A summary of an independent assessment of the Better Work programme. URL: https://betterwork.org/.../BW-Progress-and-Potential_Web-final.pdf. Accessed: 10 January 2019.

Black, S. 2012. The Sustainable Fashion Handbook. Thames & Hudson. New York.

The Business of Fashion & McKinsey & Company 2017. The State of Fashion 2018. URL: https://cdn.businessoffashion.com/reports/The_State_of_Fashion_2018_v2.pdf. Accessed: 27 December 2018.

Caniato, F., Caridi, M., Crippa, L. & Moretto, A. 2012. Environmental sustainability in fashion supply chains: An exploratory case based research. International Journal of Production Economics, 135, 2, p. 659–670. URL: <https://www-sciencedirect-com.ezproxy.haaga-helia.fi/science/article/pii/S0925527311002659>. Accessed: 9 January 2019.

Clean Clothes Campaign 2005. Looking for a quick fix: How weak social auditing is keeping workers in sweatshops. URL: [Clean Clothes Campaign 2005. Looking for a quick fix: How weak social auditing is keeping workers in sweatshops](https://cleanclothes.org/looking-for-a-quick-fix-how-weak-social-auditing-is-keeping-workers-in-sweatshops). Accessed: 12 February 2019.

Clean Clothes Campaign 2012. Gender: Women workers mistreated. URL: <https://cleanclothes.org/issues/gender>. Accessed: 12 February 2019.

Common Objective 2018. Made-By Environmental Benchmark for Fibres. URL: <https://www.commonobjective.co/article/made-by-environmental-benchmark-for-fibres>. Accessed: 24 January 2019.

ECHA 2013. European Chemicals Agency. Newsletter. Chemicals and clothing. URL: https://newsletter.echa.europa.eu/home/-/newsletter/entry/1_13_textile. Accessed: 12 February 2019.

ECHA 2019. European Chemicals Agency. Understanding REACH. URL: <https://echa.europa.eu/regulations/reach/understanding-reach>. Accessed: 12 February 2019.

Elementy 2019. URL: <https://elementywear.com/en/>. Accessed: 3 May 2019.

Ellen MacArthur Foundation 2017. A new textiles economy: Redesigning fashion's future. URL: https://www.ellenmacarthurfoundation.org/assets/downloads/A-New-Textiles-Economy_Full-Report_Updated_1-12-17.pdf. Accessed: 17 December 2018.

Ethical Trading Initiative 2018. The ETI base code. URL: https://www.ethicaltrade.org/sites/default/files/shared_resources/ETI%20Base%20Code%20%28English%29.pdf. Accessed: 10 January 2019.

Fair Wear Foundation 2012. Fair Wear Foundation Audit Manual. URL: <https://www.fairwear.org/wp-content/uploads/2016/06/FWFauditmanual-march2012.pdf>. Accessed 9 January 2019.

Fair Wear Foundation 2018. URL: <https://www.fairwear.org>. Accessed: 27 December 2018.

Fairtrade International 2019. Fairtrade Textile Standard. URL: <https://www.fairtrade.net/standards/our-standards/textile-standard.html>. Accessed: 5 February 2019.

Fashion Revolution 2015. It's Time for a Fashion Revolution. White Paper. URL: https://www.fashionrevolution.org/wp-content/uploads/2015/11/FashRev_Whitepaper_Dec2015_screen.pdf. Accessed: 12 March 2019.

Federal Office for the Environment 2017. Recycled Textile Fibres and Textile Recycling. An overview of the Market and its possibilities for Public Procurers in Switzerland. URL: <https://www.bafu.admin.ch/dam/bafu/fr/dokumente/wirtschaft-konsum/externe-studien-berichte/Recycled-Textile-Fibres-and-Textile-Recycling.pdf.download.pdf/study-on-recycled-textiles-and-textile-recyclability-ch.pdf>. Accessed: 24 January 2019.

Finnwatch 2016. Kaalimaanvartijat. Näkökulmia työelämän oikeuksia tarkastelevien sertifiointi- ja auditointijärjestelmien laatuun. URL: http://finnwatch.org/images/pdf/KaalimaanVartijat_web.pdf. Accessed: 21 January 2019.

Fletcher, K. 2014. Sustainable Fashion and Textiles. Design Journeys. Routledge. New York.

Global Fashion Agenda & The Boston Consulting Group 2017. Pulse of the Fashion Industry 2017. URL: https://www.globalfashionagenda.com/wp-content/uploads/2017/05/Pulse-of-the-Fashion-Industry_2017.pdf. Accessed: 18 December 2018.

Global Fashion Agenda & The Boston Consulting Group 2018. Pulse of the Fashion Industry 2018. URL: <https://www.globalfashionagenda.com/initiatives/pulse/#>. Accessed: 28 December 2018.

Global Organic Textile Standard 2016. URL: <https://www.global-standard.org>. Accessed: 27 December 2018.

Green Strategy 2018. What is Sustainable Fashion? URL: <http://www.greenstrategy.se/sustainable-fashion/what-is-sustainable-fashion>. Accessed: 27 December 2018.

Greenpeace 2017. Fashion at the Crossroads. URL: <https://www.greenpeace.org/archive-international/Global/international/publications/detox/2017/Fashion-at-the-Crossroads.pdf>. Accessed: 9 January 2019.

Greenpeace 2018. Destination Zero: Seven years of Detoxing the clothing industry. URL: https://storage.googleapis.com/planet4-international-stateless/2018/07/Toxic_v14.pdf. Accessed: 9 January 2019.

Gwilt, A. & Rissanen, T. 2011. Shaping sustainable fashion. Changing the way we make and use clothes. Earthscan. New York.

Hirsjärvi, S. & Hurme, H. 2015. Tutkimushaastattelu: Teemahaastattelun teoria ja käytäntö. Gaudeamus. Helsinki.

Hirsjärvi, S., Remes P. & Sajavaara, P. 2010. Tutki ja kirjoita. Tammi. Hämeenlinna.

Human Rights Watch 2017. Follow the Thread. The Need for Supply Chain Transparency in the Garment and Footwear Industry. URL: https://www.hrw.org/sites/default/files/report_pdf/wrdtransparency0417_brochure_web_spreads_3.pdf. Accessed: 6 March 2019.

International Labour Organization 2019. Textiles, clothing, leather and footwear sector. URL: <http://www.ilo.org/global/industries-and-sectors/textiles-clothing-leather-footwear/lang--en/index.htm>. Accessed: 10 January 2019.

International Organization for Standardization 2019a. URL: <https://www.iso.org/certification.html>. Accessed: 12 February 2019.

International Organization for Standardization 2019b. ISO 14001:2015. URL: <https://www.iso.org/standard/60857.html>. Accessed: 12 February 2019.

Krüger, H., Himmelstrup Dahl, E., Hjort, T. & Planthinn, D-K. 2012. Guidelines II: A Handbook on Sustainability in Fashion. Sustainable Solution Design Association SSDA. Copenhagen.

Köhrer, E. & Schaffrin, M. 2016. Fashion Made Fair: Modern, Innovative, Sustainable. Prestel. Munich.

Lanius 2019. URL: <https://www.lanius.com/>. Accessed: 3 May 2019.

Niinimäki, K. 2013a. Tenents of Sustainable Fashion. In Niinimäki, K. Sustainable Fashion: New Approaches, p.12–29. Unigrafia. Helsinki.

Niinimäki, K. 2013b. Ethical Design. In Niinimäki, K. Sustainable Fashion: New Approaches, p.44–55. Unigrafia. Helsinki.

Niinimäki, K. 2015. Ethical foundations in sustainable fashion. Textiles and Clothing Sustainability. URL: <https://link.springer.com/content/pdf/10.1186%2Fs40689-015-0002-1.pdf>. Accessed: 24 January 2019.

Näz 2019. URL: <https://naz.pt/>. Accessed: 3 May 2019.

OEKO-TEX 2018. Standard 100 by OEKO-TEX. URL: https://www.oeko-tex.com/en/business/certifications_and_services/ots_100/ots_100_start.xhtml. Accessed: 27 December 2018.

Quantis 2018. Measuring Fashion. Environmental Impact of the Global Apparel and Footwear Industries Study. URL: https://quantis-intl.com/wp-content/uploads/2018/03/measuringfashion_globalimpactstudy_full-report_quantis_cwf_2018a.pdf. Accessed: 11 January 2019.

Rhumaa 2019. URL: <https://www.rhumaa.com/>. Accessed: 3 May 2019.

Rissanen, T. 2013. Zero-Waste Fashion Design: a study at the intersection of cloth, fashion design and pattern cutting. URL: <https://opus.lib.uts.edu.au/bitstream/10453/23384/6/02whole.pdf>. Accessed: 21 March 2019.

Saaranen-Kauppinen, A. & Puusniekka, A. 2006. KvaliMOTV. Menetelmäopetuksen tietovaranto. Tampere: Yhteiskuntatieteellinen tietoarkisto. URL: <http://www.fsd.uta.fi/menetelmaopetus/>. Accessed: 18 March 2019.

Social Accountability International 2019. SA8000 Standard. URL: <http://www.sa-intl.org/index.cfm?fuseaction=Page.ViewPage&pageId=1689>. Accessed: 22 March 2019.

Store of Hope 2019. URL: <https://storeofhope.com/>. Accessed: 3 May 2019.

Stoxt, L. & Kane, G. 2015. Global Garment Industry Factsheet. URL: <https://cleanclothes.org/resources/publications/factsheets/general-factsheet-garment-industry-february-2015.pdf>. Accessed: 9 February 2019.

Sustainable Apparel Coalition 2018. The Higg Index. URL: <https://apparelcoalition.org/the-higg-index>. Accessed: 27 December 2018.

Sustainable Development Goals 2019. Responsible consumption and production: Why it matters. URL: <https://www.un.org/sustainabledevelopment/wp-content/uploads/2018/09/Goal-12.pdf>. Accessed: 11 January 2019.

Terwindt C. & Saage-Maass, M. 2016. Liability of Social Auditors in the Textile Industry. URL:

https://www.ecchr.eu/fileadmin/Publikationen/Policy_Paper_Liability_of_Social_Auditors_in_the_Textile_Industry_FES_ECCHR_2016.pdf. Accessed: 10 January 2019.

Textile Exchange 2016a. About Organic Cotton. URL: <http://aboutorganiccotton.org>. Accessed: 22 January 2019.

Textile Exchange 2016b. Recycled Polyester. URL: https://textileexchange.org/wp-content/uploads/2017/05/TE-PFM-Recycled_Polyester.pdf. Accessed: 24 January 2019.

Textile Guide 2019a. Chemsec. Alternative chemicals you can use. URL: <http://textileguide.chemsec.org/act/alternative-chemicals-you-can-use/>. Accessed: 11 February 2019.

Textile Guide 2019b. Chemsec. Why care about hazardous chemicals? URL: <http://textileguide.chemsec.org/why-care-about-hazardous-chemicals/>. Accessed: 11 February 2019.

The Textile Institute 2015. Textiles and Fashion. Materials, Design and Technology. Woodhead Publishing Limited.

Transparent 2018. Sustainable Fashion in the Digital Era. URL: https://corporate.zalando.com/sites/default/files/media-download/TRANSPARENT_mag_2018.pdf. Accessed: 27 December 2018.

Tuomi, J. & Sarajärvi, A. 2018. Laadullinen tutkimus ja sisällön analyysi. Kustannusosakeyhtiö Tammi. Helsinki.

United Nations Environment Programme 2009. Guidelines for Social Life Cycle Assessment of Products. URL: http://www.unep.fr/shared/publications/pdf/DTIx1164xPA-guidelines_sLCA.pdf. Accessed: 11 January 2019.

Villa Todeschini, B., Nogueira Cortimiglia, M., Callegaro-de-Menezes, D. & Ghezzi A. 2017. Innovative and sustainable business models in the fashion industry: Entrepreneurial drivers, opportunities, and challenges. *Business Horizons*, 60, 6, p. 759–770. URL: <https://www.sciencedirect-com.ezproxy.haaga-helia.fi/science/article/pii/S0007681317301015>. Accessed: 7 February 2019.

World commission on environment and development 1987. Our common future. URL: <http://www.un-documents.net/our-common-future.pdf>. Accessed: 27 December 2018.

World Fair Trade Organization 2018. URL: <https://wfto.com/about-us>. Accessed: 7 February 2019.

Appendices

Appendix 1. Interview questions

1. What is the background of your company (origin, founder, time of establishment, story)?
2. How would you describe your product selection?
3. How big is your market area and volume?

Theme 1: Sustainability approaches of your company

4. What does sustainability mean to your company?
5. How do you implement sustainability in your design and production?
6. Where are your products manufactured and why?
7. What materials do you use in your products and how have you chosen them?
8. How do you manage the use of chemicals in your production?

Theme 2: Ensuring sustainability in production

9. How far are you able to trace your production chain?
10. How do you ensure fair working conditions in your production chain?
11. How do you ensure environmentally sustainable practices in your production chain?
12. What kind of challenges do you face in ensuring sustainability in your production?

Theme 3: Evaluating impacts of production

13. How do you evaluate the social and environmental impacts of your production?
14. Are there any Key Performance Indicators (KPIs) that you track regularly?
15. What kind of challenges do you face in evaluating the impacts?