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Lahti University of Applied Sciences

Sustainable Fashion Business Strategies

Opportunities for circular economy in the
textile industry

LAHTI UNIVERSITY OF APPLIED
SCIENCES
Faculty of Business
Degree Programme in Business
Administration
Bachelor's Thesis
Spring 2016
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Degree Programme in Business Studies

KEMPPAINEN, JENNI: Sustainable Fashion Business
Strategies
Opportunities for circular economy in
the textile industry

Bachelor's Thesis in Business Administration, 60 pages, 4 pages of
appendices

Spring 2016

ABSTRACT

The theme of the thesis arose from an interest in recycling and increasing circular economy pilot projects especially in the textile industry. Besides traditional flea markets and auctions, business operations with bigger volume that further circular economy have started to grow now.

The aim of the thesis was to study the opportunities for circular economy in the textile industry. The new waste management act which comes into force in 2016 forces waste management to burn most of the textile waste. This thesis aims to find alternative methods for consumers and companies to recycle their textile waste and find new business model opportunities for existing and recycled textile materials.

The theoretical framework of the thesis has been divided into two chapters. The first chapter deals with sustainability and environment while the second chapter examines sustainable business strategies.

The study was conducted as a qualitative research. The method used in collecting data was individual interviews. Seven people were selected for the interviews. The interviewees work as entrepreneurs in recycling-based companies or are specialists working in circular economy development projects. The data analysis method was theory based content analysis.

The study gives an idea about the challenges and opportunities related to implementing circular economy strategies in the textile industry. The results of the study can be exploited by beginning entrepreneurs or companies developing their entrepreneurship in the field of textile recycling.

Key Words: Circular economy, textile recycling, textile pilot project, environment, regenerated fibre, waste management act, sustainable development

Lahden ammattikorkeakoulu
Liiketalouden koulutusohjelma

KEMPPAINEN, JENNI:

Muotialan kestävä kehityksen
liiketoimintastrategiat
Kiertotalouden mahdollisuudet
tekstiilialalla

Liiketalouden koulutusohjelma, aikuiset, 60 sivua, 4 liitesivua

Kevät 2016

TIIVISTELMÄ

Opinnäytetyön aihe syntyi kiinnostuksesta kierrätykseen ja yhä moninaisempiin kiertotalouden pilottiprojekteihin erityisesti tekstiilialalla. Perinteisten kirpputorien ja huutokauppojen rinnalle on alkanut kehittyä suuremmalla volyymilla toimivaa, kiertotaloutta edistävää liiketoimintaa.

Opinnäytetyön tavoitteena oli tutkia kiertotalouden mahdollisuuksia tekstiilialalla. Uusi jätelaki, joka astuu voimaan vuonna 2016, pakottaa jätehuollon polttamaan suuren osan tekstiilijätteestä. Tämän opinnäytetyön tavoitteena on löytää vaihtoehtoisia keinoja kuluttajille ja yrityksille heidän tekstiilijätteensä kierrättämiseen sekä löytää uusia liiketoimintamahdollisuuksia jo olemassa olevalle ja kierrätetylle tekstiilimateriaalille.

Opinnäytetyön teoreettinen viitekehys on jaettu kahteen osioon. Ensimmäinen osio käsittelee kestävä kehitystä ja ympäristöä ja toinen kappale kestävä kehityksen liiketoimintastrategioita.

Tutkimus toteutettiin laadullisena eli kvalitatiivisena tutkimuksena. Aineistonkeruumenetelmänä käytettiin yksilöhaastattelua. Haastatteluihin valittiin seitsemän henkilöä, jotka työskentelevät yrittäjinä kierrätykseen perustuvissa yrityksissä tai asiantuntijoina kiertotalouden edistämiseen liittyvissä projekteissa. Aineiston analyysimenetelmänä käytettiin teorialähtöistä sisällönanalyysia.

Työstä ilmenee, millaisia haasteita ja mahdollisuuksia vaatetusala on kiertotalouden liiketoimintamallien toteuttamisessa. Työn tuloksia voivat hyödyntää alkavat yrittäjät ja yritystoimintaa kehittävät yritykset tekstiilikierrätysalalla.

Asiasanat: Kiertotalous, tekstiilikierrätys, tekstiilipilottiprojekti, ympäristö, uusiokuitu, jätelaki, kestävä kehitys

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1 INTRODUCTION

This chapter is going to present the background, thesis objectives, research questions, research methods and the structure of the thesis.

1.1 Background

The process of making new fabric requires a lot of water and damages the environment. Approximately 70,000 tons of clothing and hometextiles are purchased in Finland every year. Fashion is changing quickly and the used textile is either donated to charity, used for another purpose or thrown into waste. (Dahlbo et.al 2015, 8.)

Jurkko (2015) states that the waste management act in 2016, in Finland, will force waste management to invent new elimination methods for textile waste. Textile waste cannot be brought to a landfill site and most of the textile waste will be burned. The amount of textile waste is increasing every year and puts pressure on waste management. That is why prevention of textile waste should be important. Also, information should be given to consumers, through different sources, of how to maintain the materials of the clothing and how to recycle the worn out textiles.

Several small enterprises and handicraft workers have taken advantage of recycled materials and lengthened the lifecycle of damaged textiles. Now many bigger companies have taken the challenge in helping to improve renewable technologies and simultaneously there are several pilot projects with different operators to produce new fabric out of regenerated fibres.

Both sustainability and ecological sustainability have long been an important theme in many industries and a part of companies' strategy. In order to fulfill this promise companies must take more responsibility from environmental issues than focus only on growth. New regulations, availability of raw materials and customers' increasing awareness push companies to change their business plans to be more suitable for circular economy.

The idea for the study was born from the author's own interest towards recycling through work environment and the increasing pilot projects in the industry of recycling and regenerated fibres. The author is interested in recycling in general as well as the opportunities for utilizing textile waste and what are the business opportunities in the industry.

1.2 Thesis objectives and research questions

The thesis aims to see the potential and necessity in renewed materials in the clothing industry from the circular economy perspective. Consumption and the production of textiles are increasing which means that even more textile waste is produced. New methods for utilizing the existing textile material can create new business models.

The research questions are as follows:

- Why is it important that companies include circular economy into their business strategies?
 - o What can companies do to accommodate the ideas of the circular economy into their business strategies?
 - o How should companies be visible to consumers with their circular economy strategy?
 - o How can circular economy be made more attractive to consumers?

The theme of the thesis is topical at the moment in the textile industry in Finland especially because there is a world-wide competition in producing regenerated fibre. Circular economy strategies are being formed in the European Commission which takes also the textile industry into consideration.

Johnsson & Selin (2015) have studied circular economy in the clothing industry at the Chalmers University of Technology. The study is focused on identifying and evaluating MQ Retail's opportunities in adapting to the circular economy. Heiskanen & Piiparinen (2015) have studied the

possibilities of circular economy in Finland and their thesis focuses on the private sector's example cases and public sector's circular economy strategies. This thesis focuses on finding the opportunities in sustainable fashion business strategies in Finland.

1.3 Research method

The thesis is made as a qualitative research because the research studies a phenomenon that is not well-known and the researcher wanted it to be implemented comprehensively (Järvenpää 2006). The background theory is structured from literature and internet sources in the field of sustainability, environment and sustainable business strategies. The theme interviews are used to collect data for the study because the perspective of the studied entrepreneurs or companies are essential and interviews are suitable for their adaptable nature when presenting clarifying questions for interviewees (Järvenpää 2006). Questions used in the interviews are formed with the help of the background theory. Seven experts from the field are interviewed for the thesis. These are individual interviews with specialists and companies working in the pilot projects of renewed fabrics and entrepreneurs operating in the eco-design field. The aim was to get different views on the possibilities of managing textile waste and how companies could implement circular economy strategies into their business strategies. A background form (Appendix 3) and an interview framework (Appendix 4) were used in the interviews.

1.4 Thesis structure

The thesis starts with theory providing the literature overview. In the second chapter sustainability and environment will be presented through recycling, lifecycle of textile, waste management act, environmental responsibility and attitudes towards recycling. In the third chapter sustainable business strategies are viewed through the recycled textile material utilizing companies, regenerated fibre, textile waste pilot projects, sharing economy and circular economy. In the fourth chapter opportunities

for circular economy in textile industry are presented through the interviewed companies, research methods and phases and results. In the fifth chapter findings are presented. In the sixth chapter the summary of the thesis is presented. The following figure describes the structure of the thesis.

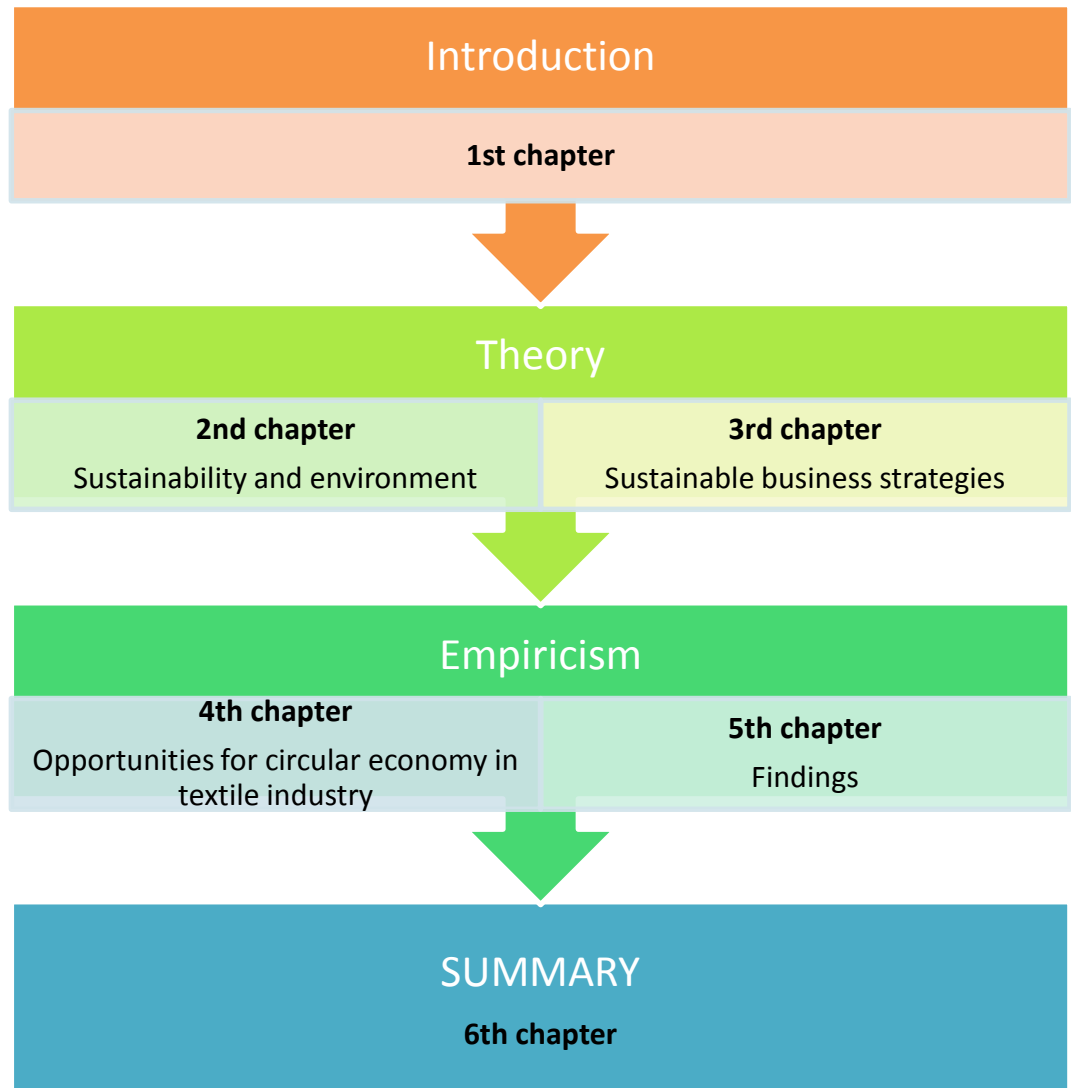


Figure 1. Thesis structure.

2 SUSTAINABILITY AND ENVIRONMENT

This chapter presents the themes such as recycling, lifecycle of clothing, waste management act, environmental responsibility and consumers' attitudes towards recycled products.

2.1 Recycling

There are two types of textiles to be recycled: textiles in good condition and worn out textiles. Usable, unbroken and clean clothing and textiles can be taken to clothing collection points. They can be offered to second hand stores, recycling centres or flea markets. Usable textiles can also be sold via internet's market places or be given to friends. (HSY 2016.)

There are various ways to handle worn out textiles. Old clothing and textiles can be transferred as cleaning cloths or weft rags. They can be repaired or the usable parts can be utilized. At the Helsinki Metropolitan Area Reuse Centre's handicraft service Näprä they accept pieces of cloths and ready cut weft rags. Sheets, towels, blankets, pillows and quilted clothing can be given to the Helsinki Humane Society Hesy; they use the textiles as beds for animals. Also the Martha Organization, in the capital area, organize occasionally collections of worn out clothing. Worn out clothing and shoes can be taken to KappAhl stores. In the capital area of Finland, worn out clothing can be thrown in energy or mixed waste. Mixed waste is transported to Vantaa Energy's waste incinerator. Mixed waste is utilized into production of district heating and electricity and it is not taken to the waste dump. (HSY 2016.)

Harju-Autti and Neuvonen (2011) suggest that it depends a lot on consumers how the change from consuming culture to responsible consuming is going to happen. New openings for recycling operations are needed such as information on possibilities and advantages. Recycling should be made easy and there could be more incentives to increase the reuse. Social entrepreneurship is a business where, in addition to the traditional targets of stability and growth, also environmental or social

advantages are aimed at. Social entrepreneurship is at its best innovative, new creating, inspiring and motivating.

2.2 Lifecycle of textile

Talvenmaa (1998) states that the journey of a ready-made clothing starts from fibers which come from nature or are produced industrially. Fibers are purred as yarns of which fabric or knitted fabric are made of. Lots of energy and labor are needed in the process of making textiles. Also, in the process harmful substances end up in the environment. A major part of the stage of production in making textiles has been relocated from western countries to countries where the salaries of employees are weaker and environment standards are more lose. Textiles manufactured from natural fibers are not necessarily more environment friendly than synthetic fibres; both ways of manufacturing fibers causes environmental hazards. Natural fibers can be made out of animals and plants. For example wool, linen, cotton and silk are natural fibers. The raw material for synthetic fiber is made from either growing in nature or from the by-products born in refining crude oil. For example, acrylic and polyester are synthetic fibers, and are produced industrially. (Punomo 2013b.)

Cotton is one of the most widely used fibers and it has been cultivated for at least 5,000 years. Pesticides are used to produce as much cotton for as little cost as possible. One kilogram of cotton fibre requires between 7,000 and 29,000 liters of water and the same amount is needed to make a single pair of jeans. The residues of pesticides might get in contact with skin in the ready-made clothing. Harmful chemicals have not been used when growing organic cotton although it requires a lot of work. Cotton is collected either by machine or by hand. The machinework and cleaning require a lot of energy. The hand collected cotton is clean and even but the collectors are exposed to harmful pesticides. (Gordon & Hill 2015; Punomo 2013b.)

Also wool has a long history of cultivation. It can be traced to over 6,000 years back. Wool is a natural insulator, it can keep the body warm or cool as necessary. Wool is fully biodegradable. Pesticides can be used in the wool production, too. Sheep can be dipped in pesticide baths or they can be injected with pesticides to deter parasites. Pesticides can be hazardous for farmers and they are polluting water supplies. (Gordon & Hill 2015.)

Synthetic fibers and silk yarns are produced into continuous filament yarn or yarns can be unwound from certain length synthetic fibers and natural fibers. While unwinding more twist to the yarn can be made or it can be curled so that the elasticity and heat insulation improve. Yarns can be merged together so they are made stronger and durable. Oils, which are used to help unwinding, decompose weakly in nature. Organic oils have been used more and more but they cause the yarn to mold easily so it needs mold protection substance. (Punomo 2013b.)

Knittings and fabrics differ with their texture and the way they are produced. There are more different phases in producing fabric than producing knitting. Before weaving a warp is created. The warp yarns are often processed so that they can bear the stress of weaving better. Woven fabrics can be covered with a coating like plastic or rubber. Producing knittings and fabrics does not itself cause remarkable hazards to the environment. The pretreatment, dyeing and finishing treatments are straining the environment to some extent, but on the other hand they are also lengthening the lifecycle of the textile and decreasing the washing need. Energy, chemicals and as much as 500 liters of water per fiber kilogramme are used in the dyeing and finishing treatments. Synthetic fibers do not need as much chemical treatments as natural fibers and regenerated fibers. Different treatments amongst other things improve the smoothness of fabrics and different colours make them more enjoyable. The finished fabric keeps its shape, does not get shabby easily and feels good. Unfinished clothing might soon look bad and eventually the average life of it would be short. The harmful agents in textiles might excessively cause humans allergic symptoms. Ending into water harmful chemicals

are ending into fish and other animals and eventually into humans causing health risks. (Punomo 2013b.)

In the production chain a designer has a remarkable role in developing a clothing's environmental impact. Clothing is produced in various conditions. The working conditions, acknowledging environmental matters and transporting clothing from all over the world into clothing stores are important questions in the clothing lifecycle. With one's choices the designer can influence a clothing's environment friendliness. For example, choosing a material, whether it is made out of cotton, silk or polyester, is decided by the designer. The fabrics are ordered for the designed products from the fabric factories. The fabrics are produced only if there is a demand for them. When ordering a fabric from a factory the designer gives a message that the fabric is a desired product. In the future the factory will probably still produce fabrics based on demand. For this reason the fabrics with less environmental impact should be favoured. This model helps to decrease the discharges of fabrics. In designing it is also good to take into account the efficiency in using materials. Today as much as one fifth of a fabric goes to waste when the pieces of a clothing are cut out from the fabric. A new way to design clothes has been developed against wasting materials. Zero waste –designing aims to use all the material when producing clothing. Thus, zero-waste designing produces little waste in comparison to ordinary production. (Punomo 2013a.)

The rag trade has notably been declining in Finland in the last decades. The working conditions in Finland are usually good, employees get enough salary and they also have other rights. Although the rag trade has decreased in Finland, it has often been transferred to cheap production countries where employees' rights are not as good. In such countries occupational safety is also often weak. When clothes are produced partly or completely abroad the products need to be transported long distances. Additional packing of clothes and transportation increase the costs and the load on the environment. (Punomo 2013a.)

2.2.1 Consumer's decision to buy

For a consumer it can be difficult to be aware of the real concept of the conditions under which a textile was produced. There has long been a recognized demand for greater transparency in garment production. Sustainable textile is textile that is not produced at the cost of the suffering and mistreatment of those who make it. (Gordon & Hill 2015, 122, 126.)

It is essential to consider the selection of a clothing because it affects remarkably into the average age of the clothing. With well justified selection one can ensure the clothing is used longer than the clothing chosen with poor justification. The way of using as well as washing the clothing correctly is affecting the length of the age of a clothing. When the clothing is useless itself it can often be used in a new way before it goes to waste. If the lifecycle of a clothing is lengthened as the energy consumption is halved, then the raw material and produced waste of producing the clothing is halved. Lengthening the clothing's lifecycle is more environmental than reusing it as energy or recycled fibre. (Punomo 2013e, d.)

2.2.2 The final journey of a product

In the ideal lifecycle of a textile it would be used until the end and then used in another purpose, for example, as industry cloths and finally thrown into the garbage. Due to the quickly changing fastfashion and cheap materials the lifecycle does not always have the opportunities to last that long. There are several charity shops which take donations from customers. The products should be washed and in good condition in order to sell them again in second hand stores. Another option is to sell the products in flea markets. Small designer shops accept good materials even if they would be a little bit broken because they can use the material itself in other products or even make a tailor made product for the customer itself from a loved clothing with memories. (Punomo 2013c.)

Handcrafters and eco-design entrepreneurs have long remade products out of old materials. And, blogs and bookstores are full of advice and guidebooks on how to reuse the old products. New technologies have found a way to unwind the textiles and make it into yarns. That way new and more lasting fabrics are made and the old textile gets continuation. The last option is to throw the textile into waste where it is going to be eventually burned.

In the following figure it is demonstrated what is the life cycle assessment for a pair of jeans. First the production for raw material is made. Then the fabric is made for the product. Product is then produced and transported and distributed forward. The consumer buys the product and then decides if it is going to be recycled or if the product is thrown away. (Netzwerk faire mode knowledge 2010.)



Figure 2. Life cycles of clothes (Netzwerk faire mode knowledge 2010.)

2.3 Waste management act

Restrictions for organic and biodegradable waste are coming into force on 1st January 2016. Placement of biodegradable and other organic waste into landfills is mainly abandoned and waste is going to be utilized increasingly as material and energy production. (Ympäristöministeriö 2015.)

Jurkko (2015) argues that the obstacles for the development to reuse textile waste are high expenses and that is why most of the textile waste will be burned. Waste management is responsible of managing textile waste. The new waste management law has been confusing for customers as it has not been clear how to sort textiles in the future. Consumers do not have to change the sorting habits since textiles can still be taken into mixed waste. Although textile waste is taken into mixed waste it is advisable to recycle the waste if possible.

In reference to waste management law (646/2011) it is advisable to follow the principal order: it is primary to decrease the waste amount and its harmfulness. If waste is still going to be created, the wastes' holder is primarily responsible to prepare the waste for reuse or recycle. If recycling is not possible, the holder of the waste has to utilize it in other ways, for example as energy. If utilizing is not possible the waste has to be finished. (Dahlbo et.al 2015, 7.)

2.4 Environmental responsibility

The natural resources of our planet are often perceived as free and taken for granted. Processes are optimized to use as little human labor as possible although it often means increased use of energy and raw materials. The result is mainstreaming as single-use culture, unprofitableness of repair service and planned aging principles put into practice in product development. When trying to achieve short term profits it is not profitable to produce a product as good as possible. The next decades are the most essential for humankind history. The survival of

humankind depends on whether we succeed in decreasing our footprints on our planet's capacity that the throwaway-centered lifestyle has harmed. Then the use of natural resources and production discharges would decrease by almost one and a half planet-size resources at present. (Kukkapuro-Enbom, Enbom & Salonen 2015, 97 – 99.)

For the first time in humankind history individual persons' and separate countries' futures merges into one whole humankind future. Our daily choices are part of the big systemic totality. Mutual dependency turns up for example when 47% of Finns water footprint is formed abroad. Every choice links us to the chain of impacts which can either make the problems worse or decrease them. For the sake of experienced welfare it is totally a different thing to notice being part of a solution than notice that the track from one's own choice is breaking up the future's hope for us all. All the materials are from nature. They are not going to be finished if we are able to get them to circulate. For example metals can be used over and over again. By example to nature's circular economy the products gone off use will be used in new materials' raw material. Moving into circular economy is linked to remarkable business opportunities. (Kukkapuro-Enbom et.al 2015, 102 – 105.)

Jussila (2010) states that environment responsibility observes comprehensively the company's actions into environment. Apart from one's own actions, examining partners in cooperation, lifecycle of company's products, use of the products and the influence of customer's use of products into environmental impacts are taken into account in the whole picture. Environmental issues have long been a general subject of interest. Various interest groups follow and examine environmental issues and this produces continuously more accurate and better methods and indicators to follow and develop environmental issues.

2.5 Attitudes towards recycling

An electronic survey for consumers was made concerning recycling in 2013 and the results were gathered in a report of Suomen ympäristö (2015). It asked about the reasons of giving away clothing and textiles and the methods to take them out of circulation. (Dahlbo et.al 2015, 28.)

In the results it was clear that the main reason to give away a textile or clothing was that the product was broken. With childrens' clothing the reason was that the clothing did not fit anymore. Unsuitable size of womens' or mens' clothing was the second common reason. The third common reason was the clothing's worn out look. Getting bored with the clothing, the style or unfashionability of the product were not so remarkable reasons to give away the textile. Under half of the responsees gave away the clothing because it would need repairing. Most of the responsees tend to repair or get the textiles repaired. (Dahlbo et.al 2015, 29.)

Over 25% of the responsees are putting useless textiles mainly into mixed waste and those that have a chance would put the textile waste into energy waste. In the survey it was not asked how much consumers had taken textiles away from use because it is hard to evaluate. In the survey it was also asked where the usable textiles were taken after household's own use. Common answers were that the textiles were donated to charity. The second common answer was that childrens' and womens' clothing were given to relatives or friends or textiles were taken to flea markets. (Dahlbo et.al 2015, 29 – 30.)

In the open comments it was seen that consumers were very open towards utilization of textiles and most of the responsees hoped more recycling opportunities for useless textiles. Most of the responsees considered recycling to be important in general. (Dahlbo et.al 2015, 33.)

3 SUSTAINABLE BUSINESS STRATEGIES

The third chapter presents the existing recycle based business strategies in the textile industry. In the chapter themes such recycled textile material utilizing companies, regenerated fibres, textile waste pilot projects, sharing economy and circular economy are being presented.

3.1 Recycled textile material utilizing companies

In this chapter the types of recycled textile material utilizing companies are presented. Most of the traditional textile collectors have been charity organizations with physical stores but now there are more new actors also operating only in webstores.

3.1.1 Ecodesign companies

In the field of ecodesign various types of actors are operating their businesses. They can be microentrepreneurships which are profiled as handicraft workers, collectives, retailers of sustainable products or companies working with bigger volumes. In all these types it is common is that the operators in the field utilize recycled materials in their productions or collections.

3.1.2 Recycling centres

Recycling centres operate locally in different parts of Finland. They are organizations providing waste information and are organizing the local waste treatment. Recycle centres are mostly owned by towns and cities.

For example, Helsinki Metropolitan Area Reuse Centre, is working for the benefit of the communities and preventing the increase of waste.

Recycling centres are accepting donations of usable products like textiles and they can either be taken to the stores or they can be picked up from customers. The Reuse Centre wants to increase the environmental

awareness among people, companies and organizations in the Helsinki metropolitan area. (Helsinki Metropolitan Area Reuse Centre 2016c.)

Reuse Centre has a line called Plan B which are locally handmade products made from recycled materials. Reuse Centre is providing craft materials such as buttons, pieces of cloths and ribbons through handicraft Service Näprä. Also workshops are held where customers can make presents, jewelleryes or packages. (Helsinki Metropolitan Area Reuse Centre 2016a, b.)

3.1.3 Charity organizations

After taken out of use and before being textile waste and on the responsibility of town's waste management, various charity organizations such as the SPR, Salvation Army, UFF and Fida are organizing textile collections. Collecting places are often situated at towns' waste management stations' ecopoints and are arranged together. In these collecting points it is hoped that only textiles suitable for reuse are donated. (Dahlbo et.al 2015, 11.)

A big part of the collected textiles are taken abroad by charity organizations. Eighty-one percent from textiles collected by UFF are sold via wholesale for example to Baltic countries. Sorted and useful textiles are taken to Africa. (Dahlbo et.al 2015, 11.)

A challenge for charity organizations are the enormous amounts of textile waste. The poorer quality in material in donations and expensive transportation form an obstacle for utilizing all the textile waste in the best way. The waste charges can be worth tens of thousands of euros. SPR estimates that a third of the donated textiles are going to energy waste. (Kuivas 2015, 18.)

3.1.4 Second hand stores and flea markets

Second hand stores and flea markets are often viewed as places people can sell their old products and receive profits of selling them either personally or renting a table or a market place for the purpose. In recent years a lot of website based second hand stores have come to the markets especially with children's wear.

3.2 Regenerated fibre

In this chapter the regenerated fibres Ioncell-F and Tencel are presented. New technologies are coming to re-produce fabrics and it seems that there is a growing need for sustainable fibres.

3.2.1 Ioncell-F

Ioncell-F is a regenerated fibre developed by Technical Research Centre of Finland VTT and Aalto University. The fibre is possible to use in every kind of textile production from clothing to home textiles. Ioncell-F textile is the same kind as cotton and viscose textiles but it has only better mechanical features and better interaction than cotton. Ioncell-F is produced from cellulose with ionic liquid and the recyclability of Ioncell-F is aimed to be 99.8%. The measurements of general effects in environment friendliness are still researched but they seem encouraging. In the long run it seems that cellulose fibers' production is going to be cheaper than producing cotton. Marimekko has made a dress from the Ioncell-F fabric and it was presented on the occasion of the fashion show in Helsinki Central Railway Station's ticket hall in 2014. (Suomen metsäkeskus 2015; Sixta 2016.)

3.2.2 Tencel

Tencel is a branded lyocell fibre and comes from botanic origin. Tencel textiles are more absorbent than cotton, softer than silk and cooler than linen. The production of the fiber is ecofriendly and consuming 10 – 20

times less water than producing cotton. The production process use a solvent spinning process. Tencel fibre is extracted from the pulp of trees which are grown on sustainably run farms certified by the Forest Stewardship Council. In the making process none of harmful chemicals are used in and more than 99% of the solvent is recovered and reused. Tencel is possible to place other regenerated fibres like viscose rayon. Tencel lyocell gives high strength properties to the fabric. (Lenzing 2016; Patagonia 2016.)

3.3 Textile waste pilot projects

In this chapter the pilot projects of textile waste going on in Finland are going to be presented. At the moment there are at least three bigger pilots operating at the same time for textile waste which implies the growing trend and the need of working textile waste recycling systems.

3.3.1 Relooping Fashion Initiative

Relooping Fashion Initiative is an experiment which was started in 2015 and is still continuing until 2017. The idea is to turn old and worn out cotton textiles into new fibres by using a cellulose dissolution technique. The quality of the re-produced fibre is better than virgin cotton and in the process no harmful chemicals or new material is used. The experiment is a part of Circular Economy of Textiles –project. (Relooping Fashion Initiative 2016.)

The pilot project aims to create a closed-loop business ecosystem in line with the principles of the circular economy and produce business opportunities and shared value for all parties within the value chain. Main themes in the project are service, production, design and business. The first clothing lines made with regenerated fibre will be in stores by the end of 2016. (Relooping Fashion Initiative 2016.)

The pilot project is implemented in a pop-up factory in a man-made cellulose fibre mill in Valkeakoski. VTT, Technical Research Centre of

Finland Ltd, Seppälä, Suez, The Helsinki Metropolitan Area Reuse Centre, Pure Waste, RePack, Ethica and Tekes are the organizations taking part in the project. The Relooping Fashion Initiative has thus far been noticed internationally in Awards Program's public sector category in The Circulars 2016 with highly commented status. (Relooping Fashion Initiative 2016.)

In the following figure the process of Relooping Fashion Initiative is presented.

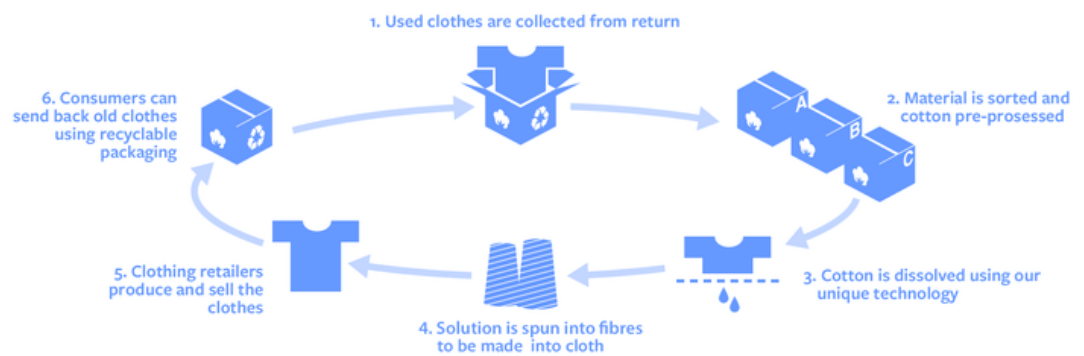


Figure 3. Relooping Fashion Initiative 2016.

3.3.2 New life for clothing

The pilot project New life for clothing was implemented in Sello shopping centre in Espoo from November 2015 until March 2016. Consumers were directed to take their unused clothing and home textiles to a recycling station in the shopping centre. Three opportunities for sorting textile waste were available (Lassila & Tikanoja 2016).

Designer clothing and accessories were put into one collection bin where they were sent forward to be sold and the customer would get a certain amount of money from the sold textiles to their bank account. Other usable and maintained clothing and shoes could be put into one collection bin where the products were donated for families with limited means. The worn out and washed textiles could be put into one collection bin and the material was taken into regenerated fibre. The further development of the

pilot started in March 2016 and by the end of February the textiles collected amounted to 20,000 kilograms (Lassila & Tikanoja 2016).

The cooperatives in the pilot project were Sello, Lassila & Tikanoja, Emmy's webstore, charity organization Hope ry and Dafecor. Dafecor is a Finnish company which produces new products from the surplus of the textile industry. From different textile fibres products are refined which are used in industrial maintaining to prevent or fix environmental hazards, with building and in gardens to intensify production (Dafecor 2016).

3.3.3 Tekstiili 2.0

Tekstiili 2.0 (2016) operates in southwest Finland's waste management area. The pilot started in the beginning of 2016. The aim is to open doors for recycling textile waste. Through the project the quality, amounts and ways to collect unused raw materials are being solved. The purpose is to find cost and resource effective methods to get textile waste used along with principal order and to create common operation modes and create a platform for new business operations which would utilize the textile waste.

The collected textiles are sorted in the halls situated in Turku and Kaarina with the strength of Turun Seudun TST ry and Recycling Center of Kaarina. The pilot is run by Lounais-Suomen Jätehuolto Oy and Turku University of Applied Sciences in collaboration with city of Turku, SITRA, Finnish Solid Waste Association JLY and Ekokem. (Tekstiili 2.0 2016.)

3.4 Sharing economy

Sharing economy is a fresh phenomenon and movement. In sharing economy it is possible to combine old collective and traditional actions and modern technology's communication forms. The phenomenon has been formed along with web technology's development and it enables to share and trade different possessions, resources and skills on a scale which has not been possible before. (Lahti & Selosmaa 2013, 13.)

In Finland, joint use services have been developing slowly. Compared to other Europeans Finns on average are strongly emphasizing the importance of ownership. There still are multiple sharing economy based companies and collectives in Finland. The companies and initiatives are very different from each other. Only part of the companies are trying to gain profits. Companies vary from cars' and work space's joint use to borrowing sports equipments, crowdfunding, small services, time bank activity and food cooperatives. (Lahti & Selosmaa 2013, 31.)

There are five dynamics behind the birth of sharing economy. Cultural change is a social psychological dynamic. Technological development and better strategic design have made communication and matters' coordinating easier and cheaper related to sharing. Through ecological crisis people have seen the benefits of sharing economy. Economical crisis make the sharing economy a necessity. Furthermore, the possibilities of business models have been noticed. (Lahti & Selosmaa 2013, 58.)

New generations of entrepreneurship have noticed the business opportunities for sharing economy. Whole sharing economy market size is predicted to raise over 110 billion dollars. In United States investors have seen the bounce of sharing economy. It has become an interesting object of investment. Also in France sharing economy companies have gained the attention of investors. Referring to Shareable –magazine the capital investments into new sharing economy companies in 2012 combined were over 431 billion dollars. (Lahti & Selosmaa 2013, 69.)

3.5 Circular economy

Pantsar-Kallio (Krabbe 2016) describes circular economy as a model which aims to keep products, components and materials in circulation as long as possible and retaining their value in the circulation. In circular economy the products have been primarily designed to circle.

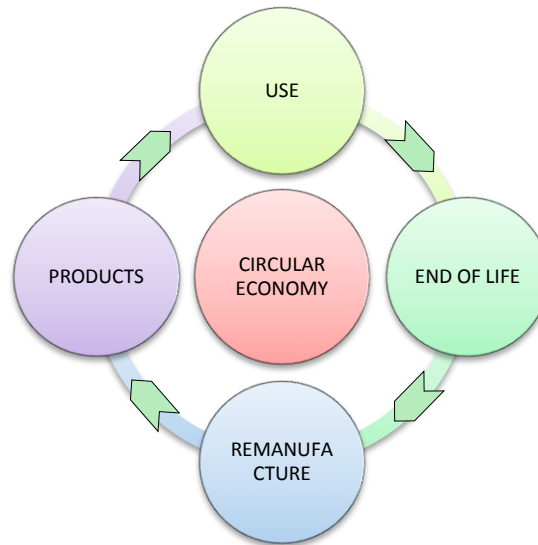


Figure 4. Circular economy. (Imitating: The Recycler 2016.)

Climate change and decreasing of natural resources are one of the biggest global problems. We can limit our wastage by moving towards circular economy where wasting materials and birth of waste is minimized. In circular economy, using resources and materials are accelerated so that both raw materials and their value remain in the circle. In practice this means that the product is designed so the materials are separable and recyclable. (Sitra 2016.)

Preventing climate change and saving natural resources has generated one of the world's fastest growing areas of business. According to Sitra's report (2015) circular economy is a possibility of appreciation worth 1.5 – 2.5 billion euros for Finland. Finland has the possibilities to fare in international competition with high education, strong know-how in technology and good reputation in the cleantech field.

The biggest value potential is not in the material flow or waste. More valuable ways of invocation are maintenance of machines, reusing or reproducing. The starting point should be as efficient circle of value as possible and the prevention of waste birth, not the biggest quantitative invocation of waste as raw materil or energy. (Sitra 2016.)

Finland is already advanced in circular economy in many sectors of economy such as energy efficiency in paper industry, bottle recycling and second hand stores. Fifty-four percent of waste is still unrecycled or not used in any other ways and in Finland there has not been any innovative service concepts created relating to maintaining machines or reusing or reproducing. There are many good world-known brands to follow related to circular economy examples like leasing. (Sitra 2016.)

European Commission is developing a new circular economy package which observes whole life cycle. The package concentrates in municipal waste but trying to achieve also more sustainable production than before.

Circular economy is going to get a fund worth 5.5 billion euros from EU's cohesive fund and also 650 million euros from Horizon2020 –programme. The commission wants to guide the society from linear consumption model into a wise and sustainable use of materials and resources. In the Ecodesign –directive, the commission wants to add criterias of resistance, repairability and recyclability. The responsibility of the manufacturer will be extended to cover the last part of a product's lifecycle. The aim to recycle municipal waste is going to be tightened by 60% in year 2025 and 65% in year 2030. The placement of waste into dumps is aimed to be reduced to 10% by 2030. This means that Finland has to double its recycling in less than ten years. The commission is going to define also the methods on how recycling is going to be made and counted in different countries.

Percentages of recycling would be counted from the amount of waste gone into the actual recycling process by weight. Also the recycled metal out of the ash of burning waste could be counted with recycling percentage. (Saarinen 2016.)

Referring to Katainen (Saarinen 2015, 8) China has already advanced in circular economy and it is an advantage for Europe to be ahead in this cycle. Europe cannot compete with lower wages so it needs to compete with resource efficiency. Bigger companies have already made efforts for circular economy because it is economically worthwhile. It is essential that private sector businesses adopt business models that are based on

circular economy. There has to be better opportunities for consumers to support circular economy. With regulation there are ways to create inducements. As to waste management Katainen (Saarinen 2015, 9) notes that a dump ban for recycling valid products is difficult because it has led to an excessive increase in waste burn in some countries. At the moment there is not enough information from the streams of waste.

International Solid Waste Association (Saarinen 2015, 10) sees that the actors in waste management field have a crucial role in it if the world is able to transfer itself into a real circular economy or if we are continuing to waste our raw materials. There are six obstacles which prevent circular economy to be fulfilled: 1) Waste management act should be replaced with material maintenance act which would be international and which could raise secondary raw material as real and economically profitable choices beside virgin raw materials because waste management does not see the value in secondary raw materials. 2) The fluctuations of market prices to secondary raw materials do not advance investments which are needed in handling and refining waste materials into a form they would be in use in an industry. That is why better financing methods of technological investments and more close collaborations between secondary raw materials' providers and users are needed. 3) There is no extensive forum for trading secondary raw materials. Similar trusted and see-through markets for the trade are needed as with virgin raw materials. 4) Especially the internationally comparable waste statistics are not good. The amounts and streams have to be available in real time and trustedly and it has to cover all the countries globally. 5) The level of waste management is fluctuating greatly between country and area. The actors of waste management have to share information of best customs and success stories. 6) Circular economy demands a global grip. Without international collaboration, common goals and regulation, circular economy does not happen.

4 OPPORTUNITIES FOR CIRCULAR ECONOMY IN THE TEXTILE INDUSTRY

In this chapter the interviewed companies, research methods and phases and results are going to be presented.

4.1 The interviewed companies

In the thesis seven authorities were interviewed from recycling based companies or the companies working with pilot projects concerning regenerated fibres.

Business Development Manager, Lassila & Tikanoja

L&T is a service company that is transforming the consumer society into an efficient recycling society. With operations in Finland, Sweden and Russia, L&T employs 8,000 persons. Net sales in 2015 amounted to EUR 646.3 million. L&T is listed on Nasdaq Helsinki. (Lassila & Tikanoja 2013.)

Partner, Pure Waste Textiles

Pure Waste textiles makes ecologically sustainable and premium quality 100% recycled yarns, fabrics and ready made garments. The products are entirely made out of recycled textile waste and offer the consumer the same quality and comfort as those made out of virgin materials. (Pure Waste 2016.)

Entrepreneur, Re-Do

Re-Do products are created from used clothing, home textiles and leftover pieces. The raw materials of products are second hand store findings, donations or leftovers from industry. The basic idea of Re-Do is to continue the life cycle of the textile. (Re-Do 2016.)

Partner, Remake EkoDesign Oy

Remake EkoDesign is a fashion and textile company which offers eco dressmaker's shop services and design, made out of recycled materials, for individual and corporate customers. Remake EkoDesign has a dressmaker's shop atelier and a store in Helsinki. Remake –collective is a work community and network for designers whose approaches meet Remake's values and methods – sustainable development, recycling, reproduction. Remake EkoDesign also consults companies and communities about textile recycling and reproduction. (Facebook 2016.)

Purchasing Development Manager, Seppälä Oy

Seppälä is a Finnish fashion chain with over 100 stores in Finland and Estonia. Seppälä is a family-owned company and employs over 500 people in Finland and approximately 100 people in Estonia. Seppälä has been a part of Finnish peoples' lives from the year 1930. (Seppälä Oy 2016.)

Development Manager, The Helsinki Metropolitan Area Reuse Center

The Helsinki Metropolitan Area Reuse Centre is a non-profit organization working for the benefit of the community. Their mission is to improve the state of the environment by reducing the amount of waste and by increasing environmental awareness. They have seven stores in the metropolitan area. The Reuse Centre accepts donations of usable items and sells or donates them on to others. (The Helsinki Metropolitan Area Reuse Centre 2016c.)

One of the interviewees wanted to remain anonymous.

4.2 Research methods and phases

The thesis is implemented as a qualitative research based on research questions. Because the research studies a theme that is not well-known and the researcher wanted the study to be implemented comprehensively, the research method was suitable for the thesis (Järvenpää 2006).

Qualitative research method gives the possibility to be flexible with the research questions and understand the phenomenon deeper. Quantitative research method would be useful in the case consumers' attitudes towards regenerated fibre.

Data acquisition in the thesis are theme interviews. Theme interview questions were formed with the themes in the background theory. Theme interviews do not follow certain specific and strict questions but the themes are planned in advance. Theme interview is slightly more structured than an open interview. (Saaranen-Kauppinen & Puusniekka 2006.)

The perspective of the studied entrepreneurs or companies are essential on behalf of the study and interviews are suitable for their adaptable nature when presenting clarifying questions for interviewees (Järvenpää 2006). The aim was to get different and wide-ranging views from the possibilities for managing textile waste and on how companies could implement circular economy strategies into their business strategies.

Interviews were implemented in February and March 2016. Five of the interviews were implemented face-to-face and two of the interviews were executed via phone. All the interviews lasted together approximately 8.5 hours and were recorded and then transcribed as results. Results were analysed and compared with the theory part. Interview background form (Appendix 3) and questions (Appendix 4) are in the appendices of the study.

4.3 Results

In this chapter the results are performed through the themes in interview structure; lifecycle of textile, waste management act, environment and sustainable development, attitudes, circular economy, regenerated fibre and recycling companies and future. Under each theme interviewees' quotations have been used.

4.3.1 Lifecycle of textile

In this theme the biggest problems in textile's lifecycle and the responsibility of consumers' and companies' to improve the lifecycle process are studied. The results differed slightly, although certain main points arose in all of the answers.

A common concern was that growing raw materials such as cotton requires a lot of water, fertilizers, energy, area of cultivation and labor. Oil-based fibre can be easier to process and its production is not as harmful for the environment as growing cotton, but it is non-renewable material. People are increasing on the planet continuously so fields of cultivation are needed and at the same time fields are needed to cultivate cotton so the two start to compete together where the natural resources should be used.

In order to produce and sell textile with cheap prices the production has been removed into third countries where working conditions are not always good. Lots of pesticides are used in the clothing. When the textile industry is moved to a third country it has been noticed that, in China, for example, many big rivers have become polluted. Still the biggest consumer groups are in rich countries. When an industry is taken away from rich western countries it then means that problems are not seen in these western countries.

There is no thought, if the rivers, forests or employees are not ours; but if they would be ours, maybe then matters would be more important for us.

With few interviews it was pointed out that textile waste is created in every step of producing textiles and the created textile waste before it ends to the consumer is called pre-consumer waste. The waste created after the consumer has used the textile is called post-consumer waste. Pre-consumer waste includes: spinning waste, cutting waste, batches with flaws and second-class products. Second-class products could be used as material for product design and all that would be needed is permission from the brand that the material is used in such a way that labels are taken off. In that way high-quality material and design could be used so that the original brand's image does not suffer at any stage. Big brands are not utilizing the potential behind this type of design yet and they see it mostly as a risk. Retailers' textile waste is formed in two ways: overstock and reclamations from customers. Pre-consumer waste was seen to include significantly more volume than post-consumer waste at the moment. The recycling articles from internet or newspapers talk much about post-consumer waste and the new technologies are based on post-consumer waste. It was a concern if the ideas are only implemented concerning post-consumer waste and concentrated what is possible to get from customers for the purpose it would distract the innovations in the pre-consumer side.

Mutual view was that the lifecycle of clothing is short and clothing is only made to last the short fashion cycle. Quality of clothing has become poorer in general and reprocessing poor materials is not useful. Consuming habits do not always support the model of circular economy. A consumer buys clothing from a store with couple euros and throws it away after using it for a couple of times because it has gone out of fashion or it is useless due to quality's sake. Because of the consuming habit the prices have made to come down which means weakened quality in products. Also in poor materials the textile has gone through a big process and has already strained the environment.

The role of media was talked about in the interviews. Media encourages to consume more, stores are following the example and offering more and more collections. Consumers adopt the model of accelerating consuming from media and our society has been built on single-use culture. It needs media, companies and consumers together to change the mindset. Today we might have six or more seasons in a year. Twenty years ago clothing was better quality and lasted longer. Recognition of good and poor material is difficult for consumers this day and they are more interested in brands.

New technologies making fibres were seen positive in all the interviews although there are challenges in the process. Through material circle it is possible to take the textile into new fibre and make a new product out of it. Often materials in Finland go to the waste burning plant at this phase when abroad the material would be reused some how. In various interviews mixed materials were seen problematic when talking about sorting the textiles for the process of regenerated fibres. Clothing which were for example before 100% cotton, might now be mixed with elastine to add more elasticity. Clothings with mixed fibers are more difficult to process chemically into regenerated fibres. There are clothing where different pieces are made from different materials and the materials have to be separated in order to get pure material in use. When material is one and only fibre, it is easier to melt or dissolve into regenerated fibre. When recycling mechanically, material can be ripped open and then mixed fibres are not such a big problem. There are different processes to work on materials and the processes working on synthetic fibres are not so developed yet. Recycling and developing processes for cotton and natural fibres are more advanced. Products are unique and processing needs human labor and time.

Fabric, the material itself, was not seen as the main problem in the interviews. Also buttons, zippers, threads, embroideries, labels, studs and all kinds of components take time and bind resources to be sorted off the textiles. Especially in post-consumer waste every clothing is different.

Textile waste cannot be sorted by robots and it needs to be done by humans. Usually the employees in sorting tasks are long-term unemployed and are not educated to recognize the materials. It has to be taken into consideration what kind of textile waste is profitable to refine, how much work is possible to invest in in the sorting and recognizing materials correctly. If something wrong is going into the process, it can make the process more expensive by disturbing it although the process would succeed.

Textile is a complex product, which includes several different components. In order to get them separated, it requires mostly manual work which means human work which is expensive work force.

Recognizing, preparation, logistics, sorting off different components from products and right recycling methods for certain products and fibre types are challenging. It is essential to think if the recycling is possible to make locally, when it is profitable to transport, where the sorting is implemented and how sorting is organized. Who will be the operator to make a business from sorting the waste the way it is profitable. Sorting materials to make regenerated fibre is not the duty of charity organizations which also collect materials. If we do not develop any end use for textile waste, post-consumer waste will be a problem in the bigger picture.

In various interviews it was pointed out that textile waste should always be handled locally. What is not suitable for Finnish people, cannot be taken for burden of other countries and it does not kill the local textile industry if it is not taken into third countries for example. In textile production countries there are no organized recycling methods although they use almost everything until the end better than people in western countries. Waste is ending up on the side of the roads and they do not have the landfill systems that we have. Many lakes and ponds are paludificated because all the waste is dumped there.

In some researches it had been noticed that the biggest environmental hazards happen after textile products have been bought. This depends on the clothing and the quality but in some clothing even 70% of the environmental impact is born after the clothing is bought. The hazards are born when clothing are for example washed too often and the way they are recycled. At the moment a major part of the clothing which goes out of use goes to a waste burning plant. New technologies could give an answer to how to reuse textile waste if there is not any other use for it.

Many of the interviewees mentioned that material collecting organizations use lots of resources to sort the donations and material. It is possible to create a commercial process for donated clothing where someone takes the clothing and sells it forward to the next operator. Big amounts of the donated clothing is not that valuable so it would not be worthwhile to make a commercial loop for them. Consumers buy a lot of poor materials. From the second hand clothes collection it is seen how poorly textiles are sorted and the poor quality of bought clothing. Unfortunately the poor products are donated more than good quality products. Donated textiles which are not suitable for further processing can include vomit, they can smell bad, there are big amounts of pets' hair or they are so broken that material is not possible to reuse as a new material. If there are good materials which are slightly damaged, it is not a problem because they can be reused.

Textiles produced before the millennium should end up into recycling although they would have flaws like holes or stains in them because they are materialistically and qualitatively at totally different levels. The material collecting organization makes the choice to use or not to use the product. In textiles produced in the 21st century it needs to be considered how much there is useful life left. The quality in donated products have been decreasing in the last years and all the materials are not possible to get into use in material collecting organizations because of the massive material flow. Finnish people buy around 12-13 kilograms of textiles in a year and from this amount ten kilograms are thrown into waste and one kilogram is recycled or donated to charity. Two thirds from the kilogram are

poor quality which cannot be sold forward. Flea markets and second hand stores are a straight cross-section for the products that consumers buy from the stores.

It was discussed in various interviews that consumers should be more aware about what they want and what they get. Consumers should recognize better their own needs and the material's quality. Products' lifecycle's lengthening and slowing down consuming and fashion cycle would be important. When the price is higher, clothing is treated better and thought how it is washed and how it is used.

When donating clothing for organizations that collect second hand clothing, consumers should maintain clothing before the donation because material collecting organizations do not automatically maintain the textiles. It was suggested that in case of charity organizations we would preferably talk about material collecting organizations because they are not recycling- and clothing repair organizations. Charity organizations collect and sort textiles but they should market themselves with the similar kind of points: how much textiles they have collected, sorted, handled and put into circulation plus what was the percentage of charity they made with the money they earned from Finns from these recycled clothing and into what kind of charity projects the money has been invested. Usually the efforts made with collecting, sorting and handling are only a quiet subordinate clause. Charity organizations accept Finnish consumers' products which are handled locally so it is very ecological logistically.

Some consumers are worried about charity organizations not washing the products. If one washing machine uses 145 litres water for one wash and the capacity of a machine is 5 kilograms of clothing and if the company is receiving 1.5 million kilograms of products every year, what would the water rates be not to mention the use of time. That is why consumers have to maintain these products at home and that is why the company accepts only products with good quality, there is no long clothes line where to put the textiles to dry.

In the interviews it was seen that consumers should put their waste into circulation correctly and use the recycle opportunities which companies have made possible. Consumers can sell the textile or donate it to charity. The problem is that charity organizations get a lot of poor material and they have to pay a waste management fee for it. It would be idealistic if consumers could sort material before its recycling into material collection but it is challenging to implement. Everyone is not as conscious about materials and not everyone is keen to take the textile somewhere to get it recycled. It was seen in most of the interviews that consumers need an easy way to sort the waste. Although the opportunity of sorting textiles would be available for consumers, probably the sorted textile waste would need someone to check it.

People should stop complaining that companies don't produce more recycled products if they buy their clothing from discount stores. There is a huge contradiction. If consumers really want companies to make something better, they have to vote with their wallets.

Most of the interviewees saw that consumers should not consume in the products which are done poorly because companies would never stop producing poor products if their consumers buy them. Consumers have had the power to stop the production of fur and angora textiles which is a good example what power and how quickly consumers have the chance to influence brands' actions if they want to.

It was also commonly suggested that consumers would repair their clothing more although it cannot be taken as granted that everyone could sew or would own a sewing machine. It is not common to some consumers to think that old clothes can be altered or made into new ones. These are things which can be taken for granted for more enlightened consumers or actors working in the recycling field but sometimes it needs to be merchandised for consumers when they realize the opportunities.

Through the interviews it was noticed that sometimes even the experts in the industry of recycling cannot tell the difference in different types of waste. They mix the terms and use them vaguely.

Environmental impacts are different when talking with different terms, if we are talking about these just as one recycling material lump, it does not tell anything.

Big companies have the resources to do things better and a consumer can affect its own purchase decisions on what s/he does for the waste born in own use. Globally, clothings are produced nine times as much as we really need them. The worst thing is that most of the waste is born in the Far East. Where the waste is born it should also be handled there. That is why retail- and post-consumer waste must be handled in Finland because it is logistically wise.

In the interviews it was seen that in volume business it would be a step forward if it would be solved on how to get retailers' overstocks into use and it could be possible to create the kind of robots that could cut buttons, zippers etc. out of the textile waste. Thus far, humans can sort textiles faster and manual work is required a lot in the textile sorting process. Germany is developing a material recognizing robot which would recognize the materials with a burning test. It could define from the material if it is going to be made a recycled fiber or burned in a waste burning plant. Still the mass which is taken into regenerated fiber requires humans in between. Companies which use leftover cuttings and spinning waste in their production are the best suppliers at the moment for the textile industry, because their methods are completely waterless. They can handle the material into a new fabric without using water whereupon they can sell the same material with same technique for everyone.

In the interviews it was pointed out that EU legislation does not require much from clothing companies which also means that the companies do not do anything extra. It was hoped that companies would do more than the legislation forces them to do. It would need the companies'

management to make the change. The management should be interested in the subject in the sense that in addition to marketing advantage they would get profitable business operation. They should think about the availability of materials and the profitability of the whole business operation in the organization. A business in the clothing industry will not be the same in the future to what it is today. It is going to be profitable when the system really comes into operation in the next decade.

It was also seen in the interviewees' answers that companies should look after their production chain in a way that there would not be created waste and if waste is born, it would be recycled correctly. In the production countries the waste should not end up on the side of the roads and it must end up in circulation and reused, what is possible to make in case of most of the materials.

It was commonly suggested that companies would take back clothing and in this way take care of the material's life cycle and sorting. Then the material with value would be sorted and it would be sold again by another operator. It would be important for companies to handle the collecting and sorting because all consumers are not interested and eager to do it. Today this kind of material collection would be expensive for retail shops because it needs for example logistics and storage space. Generally in the interviews the quality of clothing materials arose. Clothing companies should improve the quality of clothing and look ahead in the long run. Products should have the quality, reputation and professional pride.

In the answers it was also pointed out that a company's mission is to turn profit for the owners and it is written in the law. Companies which want to go forward and develop, are trying circular economy based models and consumers decide if they want to use the models. If consumers do not want to buy more durable products and they do not want to use trading models outlined in circular economy, it is not profitable for companies to do anything. If there is demand and only durable and high-quality clothing is wanted to be bought, there will be suppliers when they see the potential of growth. Companies invest in desired raw materials when it is possible to

get better profits with new models. In that way business operations steers itself to be part of the functions where it is rational to keep investing in. With circular economy experiments companies can test if the models have demand and if there is, it is planned how operations can be expanded and made economically sensible.

4.3.2 Waste management act

This theme examines the affect the waste management act, coming into effect in 2016, would have on the clothing industry and customs. It was clear that the waste management act itself does not affect either companies' or consumers' way to sort their waste but many ideas for improving sorting were proposed.

Of course the best use for textile is when it is used until the end first. When it is used until the end, it can be bought to recycling because then it has served and filled its task.

The prohibition of organic waste in landfills results in that landfills are replaced with other solutions. Textiles are biodegradable material and it cannot be taken to the landfills. This is one of the material flows which is forced to be directed elsewhere so textile waste goes to a waste burning plant. At the moment waste management law does not affect the actions of consumers and companies.

One option which was proposed in many interviews, in order to get everything into circulation, would be the responsibility of the manufacturer for clothing companies. For example, the paper recycling system, the responsibility of the manufacturer requires the producers of paper to pay someone to collect the paper on behalf of consumers. In some countries there already are systems for responsibility of the manufacturer, where producers of textiles or importers are forced to pay for the collection of textiles. The responsibility of manufacturers can be taken into different levels. Electricity- and electronic products can be taken in any electronics

store to be recycled when the store accepts the product and pays the recycling fee.

It was seen that without having responsibility of manufacturing textiles, clothing companies can destroy their unsold overstock and take them into mixed waste and from there the material is taken to waste burning plants. For the sake of protecting the brand, unused clothing is destroyed and clothing cannot be donated to charity. Overstock material would still be suitable for another round and clothing brands do not yet have the interest to make new collections out of the previous seasons' products. If a retailer does not have the obligation to return the products to the importer, enormous amounts of materials are going to be burned. Although the textile is transformed to energy, all the resources used in producing clothing are going down the drain before the clothing has even been used. At the moment circular economy is missing the kind of systematic operator which would be able to manage also retailers' overstock in a way that the brand would not get harmed but the mass would be reused.

The pressure for implementing voluntary responsibility of manufacturer seems to be increasing. The clothing industry resists it because then every clothing store would have to accept textile waste. There are still many questions regarding responsibility of the manufacturer. For example, in shopping centres it needs storage space, handling space, logistic payment and energy waste payment. Another question which arose is that before having the responsibility of the manufacturer, every recycling bin needs to be invited to tender. Textile waste being household waste is owned by local waste disposal plants. It needs to be thought is there any possibilities to other actors use the waste in between before it is directed to waste disposal plants. If there would be some national operator who would be interested in establishing, for example, a sorting centre or recycling centre for textiles, it would need to invite to tender the bins with every local waste disposal and this would have to be done every three years.

There are matters in result of not having or having the responsibility of manufacturer which are cramping the development.

The waste management act demands the sorting of waste but only from the waste company perspective. The consumer has the right to throw waste into mixed waste and does everything right by the laws. This can be formed as a problem for material collecting organizations when it is said that consumers can throw textile into mixed waste and this is burned to energy. The consumer does not bother to sort the waste the way they did before.

Although the new act of waste management law does not affect the sorting for consumers, it would have been important to report that way the consumer would have felt that s/he has some kind of responsibility. The whole thing was not publicly informed to consumers and there was wrong impressions and rumours going on on how to act. Consumers have been out of countenance if it is not possible to put textiles into mixed waste. It was felt in the answers of interviewees that an opportunity of marketing and informing was left unused from different directions and there could have been more options offered about what the consumer could do.

Increasing customers' awareness arose many times during the interviews. Consumers should be informed better related to sorting and consumers should understand that although energy is made out of burned material, it is the last option for textile recycling. It was suggested that it would be good if there would be better instructions available to sorting textile waste and sorting should still be made easy. People who do not know about fabrics and materials cannot necessarily tell the difference between natural or synthetic fibre. Sorting could be implemented by the type of clothing, for example jeans etc., which people are able to recognize. Table cloths and curtains and other big textiles could be in a different bin. This kind of sorting would still be for the consumers interested in the theme.

In most of the interviews the textile sorting was seen problematic because it is expensive and the clothing collected from the consumers have to be sorted with human labor. Only humans can sort, for example, clothing going to be resold and it is not automatized yet. With the principal order of waste law, textile worthy as it is should be sold and only then material is utilized in other ways. At the moment it is not clear how much textiles are going into mixed waste. In material collecting organizations the weighing of the share of textile waste in mixed waste would be extra work and textiles are received enormous amounts. Especially in the capital area there are many opportunities to recycle textile waste. Some stores accept every kind of textile but it is taken in some cases to Germany and Netherlands which is not logistically sensible.

A thing which was seen to be changing is that little by little consumers do not buy as poor quality products as before. Quality has been compulsory for companies to improve, even in the cheapest clothing stores.

4.3.3 Environment and sustainable development

In the theme it was studied how recycling and reuse could be increased in Finland and if the companies working in the textile industry should inform their customers more about ecological choices. It was a common view that increasing the awareness of consumers and improving clothing companies' informing would be important.

Interviewees saw that people are very different and they have different needs. Other people are more eager to recycle and are more ready to make more effort and others are not as interested in recycling or sorting their waste. If circular economy, recycling and sorting are made easy, more people will take part in it. The methods have to be experimented human-orientedly and build the choices for people's different every day life.

It was suggested that different materials and products should be utilized better. It would be possible to raise the refining level for many recyclable

material. Materials are used as insulators and products related to cleaning industry. When thinking about mass and how much there is textile waste, it is sufficient for that kind of product with current material flow and at the same time it would be possible to raise the refining level and make a lot of new products and utilize much bigger amounts of waste.

In various interviews it was presented that more and more companies are coming in to the industry of recycling and they see that the consuming behaviour and values are starting to change. Consumers might be ready to try something new if the possibility is offered to them. The new operator could handle the sorting in a way that it would know what kind of waste there is and there would be different kinds of sections what could be utilized with different ways. To some extent this is done already.

It was seen that in order to improve reuse and recycling in Finland, political decisions are needed. For example, repair services could be legitimated to reduction sewing services in housekeeping. For now only when renewing homes such as renewing a house's roof, is legitimizing to reductions. Consumers could use dressmakers more and repair their clothing. A product's lifecycle should be slowed down and textile's appreciation is decreasing when prices are down, although the high price does not assure that the quality is lasting.

It was generally noticed in the interviews that many clothing companies have taken eco-cotton and regenerated fibre materials into part of their collection. Now there can be one collection which has been made with the terms of sustainable development and then most of the products can still be cheap articles. Usually companies inform customers from their ecological materials if they have been able to get it into their collections. The problem is that there would be a demand but not suppliers for regenerated fibres. Part of the consumers are more enlightened or in principle hope that materials would be more environment friendly. It is not only a companies' responsibility to inform people about ecological matters but it is also the media's responsibility.

It was noticed that when consumers are more aware, also companies' informing has to improve. At the moment most of companies' informing was seen as greenwash because anything concrete is told about the actions but companies are still marketing themselves as ecological operators. Companies are making only what consumers insist on having and if the action is not enough for consumers, companies have to make things better. In general people appreciate that they are being informed transparently about matters and they are supported to act correctly. In this sense people would be more responsive to take recycling forward.

It was also pointed out in the interviews that companies' aim is to make profit and not to be environment advisors. Companies' responsibility should include informing consumers on how to maintain textiles and what is the quality of a textile.

In ideal world consumer can go to fabric store and buy a fabric where it is a guarantee and information about how it is going to last. Then consumer would go to dressmaker who would sew a well-fitting and for the consumer's purposes suitable clothing. The clothing would be maintained and altered according to situation. Or, consumer can go to the shop where it is told what the durability is in a certain product and that it has been tested by independent research institute. Consumer would always have clothings in the cupboard what is wanted to be used. The clothing company's responsibility is to produce products with good quality that consumer can be happy when using it. The chain has to still be durable.

4.3.4 Attitudes

In the theme consumers' images about recycled products were studied. It was also asked if consumers are ready to pay more from recycled, remodeled or regenerated fibre clothing and how consumers can be drawn to cherish lasting and high-quality products. Generally it was noticed that

consumers are not ready to pay more for the products but there are consumers that are seeking the kind of clothing that is sustainable. It would also be important for the companies working in the field of recycling to pay attention to their branding and to avoid the traditional clichés concerning recycling. In general it was noticed in the interviews that attitudes are changing all the time and people are respecting more recycled products when they are more aware. Consumers might say that they appreciate recycled products but they are not ready to pay the price for what it is.

Ecological values should not be the absolute value in products. If the brand is based in the idea of being very ecological it will harm the whole business. If the products are not so good they would manage beside other products, then more product development is needed. The clothing should be so good that it is sold like that on behalf of its design and a customer can dress it without knowing it is an ecoproduct. A consumer does not have to buy anything, s/he needs to be seduced to buy the product. Ecological matters should only be additional values.

Some companies can try to sell the product by advertising the recycled products with the fact it is recycled and therefore it is more expensive. I don't think this is going to work. After all, we think about our own money and choices.

In the interviews it was brought forward that the word of recycling is quite old fashioned and that it is still facing some traditional associations. Recycling is a word that consumers understand the way that old is used again. The material's collecting and making it into new products or fibres have required a lot of opening the theory and explaining. In the last years the theme has been talked and written about more and the attitudes are changing little by little. A lot of traditional associations are still existing in recycling to be just recycling. Reusing industry's waste is a new thing for many.

Consumers are not ready to pay more for the regenerated fibre or recycled products. On the contrary, the products should be cheaper. Consumers can say that they appreciate recycled and more ecological options but they are not ready to pay more for it. There can be impressions that regenerated fibre is worse quality thus it should be cheaper.

It was also seen through the interviews that at the same time when it is known that regenerated fibre is made as if a new fibre it is perceived cleaner or as a new product unlike a second hand clothing. Consumers who are not interested in second hand clothing could accept more likely the kind of material which is made from old clothing but is basically a new product. There are more prejudices towards second hand clothing than towards new clothing. Some people wear only second hand clothing.

Aware consumers are ready to pay more and are even looking for recycled or regenerated fibre products. At the moment companies who get first in the markets of regenerated fibre have the possibilities to find even the smallest markets and get enough turnover. Virgin materials like cotton and synthetic fibres are relatively cheap to produce and raw materials are still available. If there is not coming a legislative which would punish from using virgin materials or would give benefits for maintaining circular economy type of system, the kind of consumer needs to be found who is ready to pay for regenerated fibre products.

In pilot projects it was seen that the problem is that the volume of processing is not so big and it means it is not so profitable. Structure of expenses is totally different than in normal mass production. Making regenerated fibre clothing is not a cheap production method at the moment. Products still need to be as fascinating and the price at the same level as in the ones made from new fibres.

Textile is getting worse in use time after time. First it is a shirt, then a rug and then maybe an underwall and then maybe energy. With regenerated fibre methods the material is again better than before. Part of the consumers are concerned about the hygiene when the product has been

worn by someone else and this same thing is not thought about the new products and about the process they have gone through before it ends up to the stores. There are different kind of processes made for clothing and they have to be tested, also in the case of regenerated fibres. It is a risk that there is going to be more specific criteria for regenerated fibre products than normally processed materials. For example poisonously dyed jeans can be sold in every store but recycled clothing has to be very clean.

It was commonly noticed in the interviews that increasing awareness is the best tool for consumers to be interested in products with higher quality and which would be more lasting. It is advisable to think what to buy, what the material is, what kind of washing instructions there is and is there a need for the product. Products which last a long time, are multi-purposed and can be used all year long, are ecological. It was mentioned often in the interviews that we should all act jointly and collectively. Companies should manage their operations well and produce their products well. With media they should inform matters truthfully. That way consumers get the necessary information and when consumers get enough information, they choose probably the green, more ecologic and durable choice.

Companies start to increase their level of quality and eliminate all the cheapest from the selections. Companies also have to think what the customers are ready to pay for. No one is going to buy just Finnish innovation or recycling if the product is not good enough. The production supporting education and impositions of trends should be politically supported. Consumers should not be instructed but informed about solutions. The exhaustion of natural resources are pushing companies to offer alternative products.

4.3.5 Circular economy, regenerated fibre and recycling

In the theme it was studied how circular economy is shown internationally in the textile industry and what are the possibilities for Finland in the

industry. It also asked how the companies working with regenerated fibres and recycling based companies are visible for the customers and how circular economy is made attractive for customers. Finland's opportunities were seen positively and it was hoped that Finland would get to the international markets of regenerated fibre.

Germany, Netherlands and Nordic countries are leaders in the recycling field. And other European countries, Japan, United States and South Korea are starting to work in the field. When Eastern countries are interested in recycling also the producing countries start to get interested in the field. The gap is shortened quite a lot world wide and waste is a big business abroad. Recycling and recycled materials are now a megatrend. Directions are maybe refined but it is going to be a big thing for a long time. There are many actors world wide competing on who makes the best innovations in the industry of textile waste. There are great business opportunities and everyone knows that it is the future. There has been continuous development in sport textiles but it has only looked for a cheap price in the field of natural fibres textiles.

The price of raw materials are increasing because of the demand and the standards of living are increasing also in Asia. There is going to be shortage of raw materials and that is the reason why regenerated fibre is developed only by now. If the regenerated fibre technologies are able to be made to work technically it could solve the problem with retailers' overstock. That way the old stock would not be burnt but it could be channeled as regenerated fibre. Basically this should also be a provision of law. It needs to be found out who pays for the waste and to whom, and where the business opportunities are in circular economy.

Regenerated fibre could be a very big export article for Finland if the process is made to work in a way that it can produce solutions which is possible to make anything from plastic to fabric. Finnish regenerated fibre technologies have already been noticed internationally and the method of chemical solution is starting to have a competitive position.

The strength in Finland is that we have knowledge, field of research and technology. The technology has opportunities to be pioneering and exported internationally. Recycling value would really be an added value in regenerated fibre clothing. Consumers would have the chance to be more ecologic without straining the environment with consumption if they want to follow the fashion. European Union is trying to promote circular economy a lot and it is a big thing at the EU level. There is much talk about services and leasing. It is going to be our future in the clothing industry as well. Maybe people will lease their clothing in the future when they are going for example skiing. Products with less use could be rented.

Defribating, collecting and logistics are the business opportunities in Finland with textile waste industry. Expenses and profitability are counted from the pilot projects. When thinking about the line of circular economy, the fabric made from pulp is interesting because it is done from our own resources, trees. The bags made from pulp are also a unique method although in Finland plastic bags are not such a problem as they may be abroad. Plastic bags are linked strongly to fashion industry since it is compulsory to pack the customers purchases.

At some point in the world it is necessary to move into circular economy. There are countries where these things are already done and we can follow their example. In Finland we have possibilites if we realize where to concentrate on and when sufficient signals are received from consumers. The business world is used to funds so there might have to be some kind of tax reliefs. The problem is when acting in Finland, we are a country populated sparsely. How widely it is profitable to collect textile when the volumes have to be commercially sensible. It is not profitable to transport textile from us to Europe into bigger facilities because cost of transportation is bigger than the amount paid for textile waste. It is then more profitable to sell it to energy than transport the waste.

Facebook, Instagram, blogs, participating in events and companies' websites were the main marketing tools in the companies or projects. With small companies social media is the best tool for visibility since it does not

need marketing budgets. It is also the most efficient and best tool to tell what companies are doing. When concrete things and actions are talked about and customers are activated, the message is going through and it can be seen in the amounts of visitors on the websites when having press releases. Informing should be as customer-friendly as possible. Visibility was seen to be an important tool for companies since competition is becoming tougher.

In order to get consumers interested in circular economy the level of the quality needs to be high enough in the products. Increasing consumers' awareness helps to give a better idea on circular economy. The word recycling is not valid anymore because before it has meant old, worn out and used. With the technologies such as making fabric from pulp or regenerated fibre the word gets a new meaning. Recycling is so diverse that it is not usable for everything that is done under it nowadays.

In most of the interviews it was seen that with new experiments, possibilities and transparency circular economy can be seen more attractive. Many consumers are more interested where to take the textile eventually than if the clothing is somehow ecological. An individual consumer is hard to have an influence on where and how a product is made. It is easy for the aware consumer to find out where to take the textile waste. It is easier to influence when the sorting places are given to consumers. People appreciate when it is told what is going to happen to the donated textiles and where it is going to. With circular economy we can also create more work which is a crucial factor. If we can create success stories behind circular economy it can have an influence.

Consumers are interested in values but in everyday life they are more interested in the easiest option available. In circular economy the thought is more in collecting materials and business model. We should talk about more modesty and necessity. It is not enough that we consume the same way and recycle everything in factories. It consumes logistics, energy, resources and attention from important matters. Circular economy is all right but sharing economy is interesting and sensible. Circular economy is

interesting but more important would be to concentrate on the consuming habits and quality.

Hopefully it happens that the next generations can drink fresh water and live in a world where they do not have to iron clothing made by other children in poor working conditions. Why this is needed to happen is that the world would be more fair and equal place to live in.

It was seen that implementing circular economy in the business strategies would be important for the sake of environment and that the planet would not be strained by the waste and pollutants. Circular economy thinking should be used down the line in every kind of production and not only in textiles. In many of the answers the joint responsibility was arosed. As representatives of our communities we are responsible to act certain ways and it is one's choice how wide the responsibility is.

Natural resources and the conditions in third countries were considered to be a big problem. If consumers in western countries buy products which are produced in the Far East or Africa and is that way using arrogantly third countries' natural resources, it is in conflict for example with the view of not accepting regufees coming to in Finland. Wars are being fought for the sake of natural resource shortage which leads people to leave their countries. If consumers do not for example want refugees in Finland then it is needed to stop buying poor quality products. Consumers can buy and consume products from the companies who manage their operations well.

Circular economy was seen to be one of the most important actions taken on how to get sustainable development in some kind of stage. Climate change agreements were seen to be unfair towards third countries since the production has moved from western countries to third countries and in that way also third countries always exceed their limits of discharges. The problems of western countries are only seen to be moved in third countries and the targets are not shared. The whole planet should be handled as one. Textile industry is the second biggest industry polluting fresh waters.

Thousands of liters of water have been used in one textile and chemicals are poured into the rivers where people are taking their drinking water from and water to irrigate their fields. Cheap production is moving from China to Africa. In Ethiopia there are much clothing factories at the moment and that is a country where they do not have water.

It was a common thought that companies are forced to figure out circular economy based models. Price of cotton is going to increase and companies have to think economically more sensible ways to produce their products ahead. Then they are not forced to raise the prices of products. Natural resources are already running out but they are going to be increasingly the kind of goods which are not easy to find.

Only waste is a material which is profitable in the next 10 – 20 years. The only thing which is not running out from the planet is waste and it is the only thing we are continuously producing. If the business is already based for using waste as main material or at least a big part of material is waste, then there is such a business plan which is working in the future.

The starting point is that everyone act by the principles of circular economy. It has to be that easy and simple that everyone can act by the model. It should be an automatic method so it would be even weird that a company would not act with by the model. If our thinking is not changing towards circular economy, we are not going to get any permanent change on the planet. Circular economy is the tool which is making this amount of people possible to live with this type or increasing type of standards.

We use the double as much resources what planet has to offer. We cannot use more than we have, nature is going to be destroyed. People and consumers are thinking more and more circular economy. If this is the case it brings more competitiveness for textile waste.

4.3.6 Future

In this theme the interviewees were asked if producing regenerated fibre and ecofashion have come stay and how they see the future in textile industry. Interviewees were interested to see the future of the Finnish innovations in the regenerated fibres and thought that ecofashion should be a fashion among everyday clothing.

I believe so, this is future. When have seen the terrible boom of consuming, it is hard to imagine we would go back to that.

Interviewees considered that circular economy is going to be a matter which is coming to be shown more in every area of life. Not only ecofashion but ecological values. Recycle thinking should be adopted in everyday lives and not only in certain events when the clothing does not need to be washable or durable. Recycling is harder to get into everydaylife clothing when product would have the features of being durable and it would be cost-effective to choose a product made with regenerated technology.

Ecofashion was seen as it needs to be taken nearer ordinary people. Recycling is facing much of a belief of being a hippie ideology, so the new technologies should be marketed more luxury-wise and the reception of consumers is also a matter of branding. It was seen that in the future people are not going to speak about ecofashion but it is one type of an action among others. Fabric and clothing made from regenerated fibre will probably be profiled as ecofashion for several years from now on but it is starting to be a material among others. In some materials regenerated fibre is already stabilized itself and it has gone through first in the side of synthetic fibres. Consumers' attitudes and values are changing and more experiences than products are gathered. Regenerated fibre has come to stay but the products made out from regenerated fibres still have to be durable and wearable. Trashion and art were seen as a category of their own.

In a bigger picture and seeing that the planet's population is increasing and citizens are continuously passing into consuming middle class, it is seen that we are facing the shortage of raw materials at some point. It is going to be the same development in every kind of waste's material flow and waste starts to seem interesting when materials are decreasing. Economical development is directing us that way we have to use material more effectively. Circular economy requires certain innovations which Finland is now trying to get to the top of the world with.

Interviewees saw the future to be good with the developing technologies and in the industry of textiles although there would be changes and turbulence in the coming years. It was seen that companies which make things ecologically and quality-wise well, are in a good situation in the future. The rise of the sustainable development trend was seen very strong and the change in consumers buying behaviors and that way also companies operations were thought to change.

It was hoped that there are going to be more opportunities in Finland with the spirit of circular economy and people would adopt the possibilities to build circular economy, workplaces and welfare. It was seen that at some point the amount of products is going to decrease for material collecting companies in the future and the quality is going to weaken so it is needed to think about adding the value to products in another way. Along with sharing economy more collective and stronger operations for sustainable lifestyle is made possible.

5 FINDINGS

When comparing theory and empiricism the similarities were found from the recycling needs, environmental hazards concerning producing cotton and the non-renewability of oil-based fibres. Through the theme interviews it was found out that greenwash, responsibility of manufacturer and sorting processes are challenging matters. In the end the matters are improvable.

European Union and government are funding projects in the field of circular economy so it is useful for sustainable clothing companies and research organizations to participate or develop processes through the experimental pilot projects. It is going to be interesting to follow the results of the pilot projects such as Relooping Fashion Initiative, New life for clothing and Tekstiili 2.0. With the models we can create sustainable models in Finland and possibly take the regenerated fibre technology abroad.

Through production responsibility and an actor who would use the textile waste as a raw material it would be possible to get a closed loop for the circulation of textiles. This needs new regulations for clothing companies and joint responsibility. Whereas companies would be responsible to take back damaged clothing, consumers need to be aware on what to take and where. In the end consumers decide what kind of products they have in the market. It needs awareness and consumers to take the trouble to create a working process for recycling textiles.

An interesting point was to be seen from the report of Suomen Ympäristö (2015) whereby from at least some of the charity organizations most of the donated textiles are taken outside of Finland. And through the interviews it was noticed that some of the operators working with certain retailers take textile waste outside of Finland also even though it would be more ecological to handle the textile waste locally.

Further studies based on the thesis can be implemented e.g. about the auditions and working conditions in third countries, how the manufacture

responsibility is going to work, how the retailers' overstock is handled, how the material flow in charity organizations are handled and what were the results of regenerated fibre projects.

As mentioned by futurist Linturi MTV3 news (2016), if we want our economical situation to improve in Finland and if we want to invest in export, should we adopt the new technologies and develop new layers on them. If we do not adopt new technologies and do not use them, we are trying to make export in museum. The same method goes for textile industry not only in Finland but globally.

5.1 Reliability and validity

Sustainable development and circular economy are hot topics at the moment. The gathered data is fresh and there are more and more studies about circular economy models in the textile industry. References used in this study are from reliable sources such as Sitra, Ympäristöministeriö, Lassila & Tikanoja and HSY. In this study the interviewed persons were all professionals working in the field of recycling or projects related to recycling so the information for empirical research was also from reliable sources. Critical opinions about circular economy could not be found too many which could be seen as questionable relative to reliability.

All the questions were not valid in all of the interviews since the interviewees could all work in different fields of recycling. They still could relate to the topic since everyone has been working in areas related to textile waste. There is not too much literature about circular economy yet, but there are many articles and reports about the subject. Sustainable development in the industry of textiles is not studied much either, but there are various pilot projects and future predictions available with the theme.

Results of the pilot projects in process are not published yet, so there are possibilities to make research about the process in the future when analyzing the possibilities of business models in the field of recycled textiles.

6 SUMMARY

The aim of the thesis was to find the possibilities for circular economy in the textile industry.

In conclusion, there is urgent need for regenerated fibre and development of recycling since natural sources are running out. There are many sectors which need to be considered when organizing new methods for utilizing textile waste. Few main points which could improve the situation for environment are: responsibility of manufacturer, sharing economy and business operations which could utilize the textile waste.

Before anyone can make a functioning business from recycling textile waste, it needs a transformation in the waste management act to let a third party to use the waste which has already been taken into waste management. Before responsibility of the manufacturer can be taken into action there needs to be a clear system on how to take back the textile from stores. There is a risk that all the useless material ends up for the shops who are not responsible for all the material.

With sharing economy methods there could be a possibility for example to lease clothes. There could be growing markets for this kind of business with clothing and textiles which we do not need everyday such as: formal wear, sport textiles and decorations for different occasions.

The theme will be studied more in the coming years and more extensive results will be gathered through the companies using circular economy models. In all companies it is possible to adopt some of the circular economy strategies but it is easier for the ones which have thriven on sustainable strategies from the beginning. With the results of regenerated fibre pilot projects it is possible to analyze better the need and the business opportunities of circular economy in the textile industry in the future.

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APPENDICES

1 Background form

2 Interview questions

3 Taustatietolomake

4 Haastattelukysymykset

Appendix 1

BACKGROUND FORM

Interview is recorded for transcribing. Record will not be used in other purposes. Background information and interview will be used in a thesis of university of applied sciences. All the given information will be dealt confidentially. At your will the discussed matters can also used anonymously.

There have been made two copies of this argeement, one for each contracting party. Both parties are bound to follow the agreement above. Interviewee can have the ready thesis to read via email at a will.

Name of the interviewee and company

Assignment

There is no need to handle the interview anonymously

I want the interview to be handled anonymously

Signature of interviewee

Place and date

Signature and clarification of signature of the interviewer

Appendix 2

Interview questions

Introduction

The purpose of the interview is to find perspectives why companies in textile industry should utilize the ideas of circular economy in their business strategies. How this should be done, how the consumers should be informed and how circular economy is presented as an attractive ideology for consumers.

The interviewee has at will a right for anonymous answers.

Permission to record the interview will be asked and the background form will be filled and signed.

Lifecycle of textile

1. What are the biggest challenges or problems in textile's lifecycle?
2. What consumers and companies can do for the matters?

Waste management act

3. Is the new waste management act going to affect to companies operations?

Environment and sustainable development

4. What are your company's tools to support environment and sustainability?
5. How recycling and reusing could be increased in Finland?
6. Should the companies working in the textile industry inform their customers more about ecological choices?

Attitudes

7. What are the images of consumers about recycled products? Are consumers ready to pay more from recycled, remodelled or regenerated fibre clothing?
8. How consumers can be drawn to cherish lasting and high-quality products?

Circular economy, regenerated fibre and recycling companies

9. Theme is a hot topic in Finland, how this is shown internationally? What are the possibilities for Finland in the industry?
10. What are the ways companies working with regenerated fibres and recycling companies are visible for customers, what are the tools for visibility? How circular economy is made attractive for customers?
11. Why it would be important for companies working in textile industry to use ideas of circular economy in their business strategies?

Future

12. Have producing of regenerated fibre and ecofashion come to stay? How do you see the future in the industry?

Appendix 3

TAUSTATIETOLOMAKE

Haastattelu nauhoitetaan aukikirjoittamista varten. Tallennetta ei käytetä muuhun tarkoitukseen. Taustatietoja ja haastattelua tullaan käyttämään ammattikorkeakoulututkinnon lopputyössä. Kaikki annetut tiedot käsitellään luottamuksellisina. Halutessanne voidaan haastattelussa käsitellyjä asioita käsitellä lopputyössä myös anonyymisti.

Tätä sopimusta on tehty kaksi kappaletta, molemmille sopijapuolille. Molemmat osapuolet sitoutuvat noudattamaan yllämainittua sopimusta. Haastateltava saa halutessaan valmiin opinnäytetyön luettavakseen sähköpostin välityksellä.

Haastateltavan nimi ja yritys

Työtehtävä

Haastattelua ei ole tarpeen käsitellä anonyymisti

Haluan, että haastattelu käsitellään anonyymisti

Haastateltavan allekirjoitus

Paikka ja päiväys

Haastattelijan allekirjoitus ja nimenselvennys

Appendix 4

Haastattelukysymykset

Esittely

Haastattelun tarkoituksena löytää näkökulmia siihen, miksi tekstiilialan yritysten tulisi hyödyntää kiertotalousajattelua liiketoimintastrategioissaan. Miten tämä tulisi tehdä, miten kuluttajia tulisi informoida ja miten kiertotalous saadaan näyttämään houkuttelevana ideologiana kuluttajalle.

Haastateltavalla on halutessaan oikeus anonyymeihin vastauksiin.

Pyydetään lupa haastattelun nauhoitukseen, täytetään ja allekirjoitetaan taustatietolomake.

Vaatteen kiertokulku

1. Mitkä ovat tekstiilin elinkaaren suurimmat haasteet tai ongelmakohdat?
2. Mitä kuluttajat ja yritykset voisivat tehdä asioille?

Jätelaki

3. Tuleeko uusi jätelaki vaikuttamaan yritysten toimintaan?

Ympäristö ja kestävä kehitys

4. Miten pyritte yrityksessänne tukemaan ympäristöä ja kestäväää kehitystä?
5. Miten kierrätystä ja uusiokäyttöä voitaisiin lisätä Suomessa?
6. Tulisiko tekstiilialan yritysten informoida asiakkaitaan enemmän ekologisemmista vaihtoehdoista?

Asenteet

7. Millaiset mielikuvat kuluttajilla on kierrätystuotteista? Ovatko kuluttajat valmiita maksamaan enemmän kierrätetyistä ja uudelleen muokatuista vaatteista tai uusiokuituvaatteista?
8. Kuinka kuluttajat saadaan vaalimaan kestäviä ja laadukkaita tuotteita?

Kiertotalous ja uusiokuitu- ja kierrätysyritykset

9. Aihe on pinnalla Suomessa, miten tämä näkyy kansainvälisesti? Mitkä mahdollisuudet Suomessa on alalla?
10. Millä tavoin uusiokuituprojektien kanssa työskentelevät yritykset ja kierrätysyritykset tuovat itsensä tietoisiksi kuluttajien silmissä, mitkä ovat näkyvyyden keinot? Miten kiertotaloudesta tehdään kuluttajien silmissä laadukasta ja viehättävää?
11. Miksi olisi tärkeää että tekstiilialan yritykset yleensä käyttäisivät kiertotalousajattelua liiketoiminnassaan?

Tulevaisuus

12. Onko uusiokuidun valmistaminen ja ekomuoti tullut jäädäkseen? Millaisena näet tulevaisuuden alalla?