To what extent can principles of the circular economy be integrated in European fashion businesses?
I would first like to thank my graduation project coaches Joop Smit and Jan de Vries of the Amsterdam Fashion Institute. The door to their office was always open whenever I ran into a trouble spot or had a question about my research or writing. They consistently allowed this paper to be my own work, but steered me in the right direction whenever they thought I needed it.

I would also like to thank the experts who were involved in the interviews for this research project: Iris van Wanrooij, Bert van Son, Linsmore Nefdt, Gwen Cunningham, Elin Mohlander and Michal Kubicki. Without their passionate participation and input, the interviews could not have been successfully conducted.

Finally, I must express my very profound gratitude to my family, friends and to my boyfriend for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this graduation project. This accomplishment would not have been possible without them. Thank you.

Loïs Rutten
To be able to implement circular principles and thereby create a circular fashion industry, seven key elements are defined and provide guidance along this transition, from small incremental changes to completely new business models. A new era of circular fashion is starting now, rethinking the relationship between markets, consumers, and natural resources. It will take time and effort to transform a business but there has never been a better time to start this journey towards a circular future.

After decades of polluting, depleting and wasting our resources and the environment, a shift appears from linear to circular economic models stimulated by powerful disruptive trends (Ellen McArthur Foundation, 2013). Nature should be treasured and resources have to be used in an effective and efficient way. Companies, governments and consumers start to realize what the change towards a circular economy can bring and how important a regenerative and restorative economy is. As researched by the Ellen McArthur Foundation (2013), the circular economy can be divided into three principles that stimulate this transition. The most important aspect of this new business model is that waste materials are converted into valuable inputs, so there will be no end of life disposals.

An important role in this transition is fulfilled by the European Union; they contribute by investigating possible benefits, set new regulations and fund projects supporting the circular economy. Besides an action plan focusing on climate change, nature and biodiversity, environment and health, and natural resources and waste, there are different projects specifically for the clothing and textile industry. This sector represents a large proportion of the total European manufacturing industry, providing work for 1.7 million people and generating 166 billion euros of turnover, so it therefore deserves attention. Examples of projects (partly) funded by the European Union are Fibersort, EcoProFabrics and ECAP (European Clothing Action Plan). The European Union can act as a strong and powerful backbone for circular businesses but companies should take initiatives and propose new plans to the European Commission and vice versa to contribute to a better industry and make successful changes.

Why action for change in the sustainability of the fashion industry is necessary also comes from the changes the industry has gone through the last decades, from a production of only a few collections a year to new items every week. This change is visible in the number of items being produced annually showing a massive increase of 100 billion items entering the market from 2000 to 2014. Alongside the production increases the environmental effects have become significant and alarming. In response to this, circular fashion has been introduced.

"Circular fashion" can be defined as clothes, shoes or accessories that are designed, sourced, produced and provided with the intention to be used and circulate responsibly and effectively in society for as long as possible in their most valuable form, and thereafter return safely to the biosphere when no longer of human use."
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Described as ‘the second biggest world polluter’ accountable for 10% of the global carbon emission and producing approximately 80 billion items of clothing worldwide every year proves that the fashion industry should change and improve when it comes to sustainability matters. At the moment most companies follow the ‘take-make-dispose’ economic model, which aims to keep products, components and materials at their highest usability and value, all the time (Webster, 2017).

Principles of the circular economy are of great relevance for fashion businesses, especially to work in a sustainable manner. By now companies like Philips, Unilever, Nike and H&M are exploring the possibilities of changing their business model towards a circular model. However, we are only at the beginning of a transition towards an economy where different industries are adding value to it, instead of destroying it. This research focuses on the possibilities of integrating a circular business model in European fashion businesses because the European Commission works on different programmes, such as The Circular Economy Package (European Commission, 2017c), to stimulate Europe in changing towards a circular economy.

The most important aspects of this research are to define what principles of the circular economy can be applied to fashion businesses, how this would work and what the possible results can be. Transforming the fashion industry towards circularity can help to improve the environmental issues, make the industry more sustainable and less polluting. This research is constrained specifically to European fashion businesses because the European Commission works on different programmes, such as The Circular Economy Package (European Commission, 2017c), to stimulate Europe in changing towards a circular economy. As well as this package, the EU Single Market is of high importance when it comes to size, quality and design. The EU represents more than 30% of the world’s exports and the textile and clothing industry is one of the top 10 exports in world markets. This means that Europe is a solid ground to do research on circular business models for the fashion industry and will provide results that are applicable to the entire European Union.

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An alternative to this detrimental model is a circular business model or ‘circular economy’ where natural resource limits are acknowledged but still allows for economic development and innovation. This economic model stimulates efficient and effective usage of natural resources and will certainly get out of hand when continuing with the current economic model.

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The transcribed interviews can be found in the Process book belonging to this research.

To make sure each sub question will be answered in a correct manner different research methods will be used, preferably multiple methods and at least three sources of data per question to increase validity and reliability.

The first two sub questions require mostly descriptive research, this in order to gain an accurate profile of what a circular economy is and what the role is of the European Union. This is done by using secondary sources, such as (refereed) academic journals, and the books ‘A wealth of flows’ by Ken Webster and ‘Waste to Wealth’ by Peter Lacy & Jakob Rutsulys to give well-grounded explanations and definitions. Additionally, reports and conference proceedings are used, for instance grey literature, developed by the government and (consultancy) businesses. These results combined represent the theoretical framework of the report.

Additionally, case studies, reports and conference proceedings have been used to objectify the findings.

Additionally, to be able to answer the main research question the following sub questions need to be answered:

1. What are the principles of a circular economy and how does it differ from a linear economy?

The aim of this sub question is to define and compare different ideas about a circular economy and explain the most important aspects of it in relation to a linear economy.

2. How is the European Union involved in developments of a circular economy?

The aim of this sub question is to explore a number of steps the European Union could undertake to establish a circular economy. It is important to find out what the possibilities are for fashion businesses within the European Union to change towards a circular business model, what different regulations there are concerning a circular economy and how the European Union could provide help with reform.

3. How did the concept circular fashion developed over time?

The aim of this sub question is to outline the way in which circular fashion came to life and expanded over time, it provides an explanation on what the term circular fashion means.

4. What elements are necessary for a European fashion business to be able to implement a circular business model?

The aim of the fourth, and last, sub question is to research different aspects of the circular economy that are important to be able to make a transition towards circular fashion. In addition, the opportunities and challenges of implementing a circular business model are analysed and listed. This is relevant information for professionals who are considering a transition towards such a business model.

In order to accomplish the research aim the following research question has been developed:

“To what extent can principles of the circular economy be integrated in European fashion businesses?”

Additionally, to be able to answer the main research question the following sub questions need to be answered:

1. What are the principles of a circular economy and how does it differ from a linear economy?

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STRUCTURE

This graduation project will be structured as follows: an executive summary followed by the first chapter that gives a detailed introduction including the rationale, research aim, research question(s) and methodology. This chapter is followed by the theoretical framework where all the necessary theory is researched and explained. It provides answers on the first two sub questions (chapters ‘linear vs circular’ and ‘European Union’) with a conclusion in the end of each chapter. The following chapters (chapters ‘circular fashion industry’ and ‘implementation’) answer sub questions three and four, also including a small conclusion in the end of each chapter. Chapter 6 is the concluding chapter and provides an answer on the main research question as well as usage of the final product.

LIMITATIONS

Even though this research was carefully prepared there are some limitations and shortcomings. Four out of six experts interviewed are working in Dutch companies or industry; this limited the research when it comes to foreign experience. For future research it would be helpful to interview experts from different countries and sectors. Having a subject that is in continuous development means that when publishing this report new technologies, ideas and companies working on a circular economy are already ahead of this report and can provide new insights which are not covered in this research. Lastly, because companies are only implementing circular principles since a few decades the long-term results and effects are not yet visible and therefore not known or covered in this research.
LINEAR VS CIRCULAR

LINEAR ECONOMY

Before being able to define what a circular economy is it is important to know its predecessor, namely a linear economy. This economic business model is described as a ‘make-take-dispose step plan’ by the Ellen MacArthur Foundation (2016) and has been used since the Industrial Revolution. The process of creating a product starts with extracting resources, followed by producing the product. Examples of possible products are electronic devices, food, furniture or textiles. Once the products are in use they will last until the consumer decides to get rid of it and dispose it as waste.

Because most business models are focused on generating revenue by increasing sales, and therefore selling as many products as possible, the products are designed in such a way that companies can keep on selling new products (Achterberg, Bocken, & Hinfelaar, 2016). This means that the lifespan of the products are kept relatively short and old products are incinerated or end up in landfills. A linear model is therefore focused on ‘supplying customers an ever-increasing throughput of goods’, according to Lacy & Rutqvist (2015), and is a result of the historically cheap and abundant resources.

During this linear process the environmental impact is almost entirely disregarded and no attention is paid to waste reduction or possibilities to return discarded materials into a production process. Research during the last few decades has revealed the extreme overconsumption and how it damages our surroundings. Especially the apparel industry has changed dramatically in the early 21th century. Costs started to fall down, operations became more streamlined and consumer spending increased, resulting in a doubling of clothing production from 2000 to 2014. Besides this, the average consumer bought 60% more garments each year (McKinsey & Company, 2016). During this period the fast fashion segment increased and created growth for the clothing companies. The consumers were now able to update and expand their wardrobes much quicker, the low-priced items became disposable and treated as waste after being worn only seven or eight times (McKinsey & Company, 2016).

The downside of this industry change is that production and design innovations were not keeping up with the demand for products, resulting in environmental problems and unsafe working conditions in the expanding factories, to name one example. As mentioned during the ‘Ode to ethical fashion’ conference the fast fashion industry produces 2 million tons of waste, 2.1 million tons of CO2 and uses 70 million tons of water each year. This is a consequence of linear business models, disregarding the waste that companies are producing. When products end up as waste all the value that has been added during a production process will be destroyed after usage, so lifecycles remain short and limited.

The economy was “locked into a system where everything from production economics and contracts to regulation and mindsets favours the linear model of production and consumption” (Ellen MacArthur Foundation, 2013). However, several disruptive trends weaken this lock-in. The same report points out that first “resource scarcity and tighter environmental standards are here to stay. Their effect will be to reward circular businesses over ‘take-make-dispose’ businesses”. Another trend is the rise of information technologies, making it possible to track and trace products and materials throughout the supply chain and usage phase. Third and last the trend is the change in consumer behaviour. A new generation of consumers are preferring access over ownership, already visible in the increase of shared cars, machinery, and even articles of daily use. These trends are examples of a change towards circularity.

The Ellen MacArthur Foundation (2015) outlined their ideas about the circular economy in a graph as displayed below in figure 1 including three separated principles:

1. Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows.
2. Optimize resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles.
3. Foster system effectiveness by revealing and designing out negative externalities.

CIRCULAR ECONOMY

During the last two decades more companies have started to realize how big the impact and wastefulness of a linear business model is and what the benefits are if they change towards a more circular business model. Most important of this new model is that waste materials are converted into valuable inputs, so there will be no end of life disposals. Having such an economic system means that products and services are exchanged in ‘cycles’ or closed loops. This is explained as follows (Kraaijenhagen, Van Oppen & Bocken, 2016, Ellen MacArthur Foundation, 2016):

“A circular economy is characterized as an economy which is regenerative by design, with the aim to retain as much value as possible of products, parts and materials”

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3. Foster system effectiveness by revealing and designing out negative externalities.
In summary these principles explain that if we hold on to our resources it is possible to have long term profit from them. Followed by making sure we make maximum use of the resources and in the end focus on eliminating undesired externalities, thereby there is no value loss from the used resources. Within this diagram we see two cycles, the green cycle is the biological cycle and the blue cycle is the technical cycle. As visible both cycles are able to maintain themselves, end products become “food” at the beginning of the chain. Because all cycles use their own resources the pressure on each resource decreases, this extends their lifetime. The three principles are combined with the following five pressure on each resource decreases, this extents their lifetime.

1. Waste is “designed out”. Biological resources can be returned to the soil because they are compostable and environmentally friendly, in this way life can grow again. Technological resources can be used an unlimited number of times while the quality remains the same. For both cycles it means that almost all the ‘waste’ being produced becomes food for another product.

2. Diversity builds strength. Being diverse results in creating power besides systems becoming more versatile and resilient. During a crisis diversity provides possibilities to adapt to changes, it makes sure the system can thrive in the long run.

3. Renewable energy sources power the economy. Resources from the biological cycle can be consumed, in comparison to the technical cycle where resources can only be used. So the energy that is necessary to fuel the circular economy is solely biological and renewable. This in turn results in decreasing the resource dependency and lessens energy necessity.

4. Think in systems. An economic system consists of many connections between different partners, so every decision can affect other parties. Within a circular economy this is taken into account at all times.

5. Prices or other feedback mechanisms should reflect real costs. In case the full cost of a product is not communicated it could prevent the circular economy from developing. Therefore, it is important to reveal the full cost of negative externalities and remove perverse subsidies in order to make the circular economy effective and successful.

To make sure our resources are used in a way that maximum value is retained for as long as possible or even forever “four clear-cut sources of value creation” (Ellen MacArthur Foundation, 2015) are developed. These four clear-cut sources of value creation, visible in figure 2, are driven by the previously mentioned principles and characteristics. In summary they explain that resources are used as long as possible by so many partners and divisions as possible. In case the resource is not usable anymore it can be recycled and returned into the economy.

- The power of the inner circle
- The power of cascaded use
- The power of pure inputs

Besides the environmental benefits a circular economy also increases revenue and economic welfare. According to the European Commission (2015) companies that follow circular economy principles are the fastest growing companies of this era. For individual businesses a circular business model could also mean that input costs decrease and can even create completely new profit streams for some cases (Ellen MacArthur Foundation, 2015).

Another advantage is that volatility can be reduced and security of supply can be increased, explained as following: “The shift to a more circular economy implies using less virgin material and more recycled inputs with a higher share of labour costs, reducing a company’s exposure to ever more volatile raw materials prices, increasing resilience. The threat of supply chains being disrupted by natural disasters or geopolitical imbalances is lessened, too, because decentralized operators provide alternative materials sources” (Ellen MacArthur Foundation, 2015).

Two possible additional advantages, mentioned in the previously named report, are new demands for business services and improved customer interactions and loyalty. Basically meaning that a new business model requires new technologies and experts. It also provides an opportunity to engage new customers and establish new long-term relationships with “improved products, better service, and greater customer satisfaction”.

Gradually a shift is visible from linear to circular economic models. The environment has increased in importance and more companies, governments and consumers have started to realize the impact they have and that nature should be treasured. Working together is the new aim and nature has become a friend instead of an enemy. This means that we do not pollute, deplete and waste our resources but use them in an effective and efficient way. This results in a shift from a linear towards a circular economy, as visible below in figure 3, where waste becomes food again. The benefits of a circular economy propose a hopeful vision for economies, the environment, businesses, and citizens to develop a regenerative and restorative economy in the future.
“In 2050, we live well, within the planet’s ecological limits. Our prosperity and healthy environment stem from an innovative, circular economy where nothing is wasted and where natural resources are managed sustainably, and biodiversity is protected, valued and restored in ways that enhance our society’s resilience. Our low-carbon growth has long been decoupled from resource use, setting the pace for a safe and sustainable global society”

Because the clothing and textile industry represents a large proportion of the total European manufacturing industry, providing work for 1.7 million people and generating 166 billion euros of turnover⁸, legislation is necessary to make sure the consumers are protected and correct information is available for stakeholders. Besides this, the European Commission engages in dialogues with non-governmental organizations to establish policies and regulations that have to do with the global clothing and textile industry. Since 2011 there are new regulations on fibre names, labelling and marked fibre composition on all EU textile products following the Textile Regulation (EU) No. 1007/2011. This programme replaces the former Textile Directives dating back to 1971. But not only product regulations are important because this industry involves all four previously mentioned priority areas and plays an important part in the circular economy.

Even though improvements have been made there are still many obstacles to overcome, such as halting biodiversity loss and improving soil and water quality. After finalizing this programme a network of protected areas to cover over 18% of the EU’s land area, the introduction of a comprehensive chemicals policy, and robust policies for climate change were developed. The programme was divided in four priority areas:

1. Climate change
2. Nature and biodiversity
3. Environment and health
4. Natural resources and waste

ACTION PLANS

Before the European Union was created activities were developed and executed by the European Community, existing of three international organizations: The European Coal and Steel Community (ECSC), the European Atomic Energy Community (Euratom) and the European Economic Community (EEC). The European Coal and Steel Community (ECSC), the European Atomic Energy Community (Euratom) and the European Economic Community (EEC). At the beginning of this collaboration the importance of the environment, clean water and air was already highlighted, problems that could be tackled by working together. In 1972 the European Commission developed the first Environmental Action Programme. A joint approach to improve the environmental conditions was developed and still is necessary because most problems are facing multiple countries. Besides, it increases honest and fair competition among EU Member States.

From 2002 till 2012 the “6th Community Environment Action Programme (EAP)” has been executed. As mentioned by the European Commission, this programme “helped ensure that environment legislation is in place to tackle most environmental challenges in the EU”. It also included extending “the Nature 2000 network of protected areas to cover over 18% of the EU’s land area, the introduction of a comprehensive chemicals policy, and robust policies for climate change”. The programme was divided into the following four priority areas:

1. Climate change
2. Nature and biodiversity
3. Environment and health
4. Natural resources and waste

CURRENT SITUATION

The year 2017 will also contain programmes to come closer to fulfilling the long-term vision, which has been stated, by the EU institutions and the Member States. One of the actions developed by the European Commission (2017) is a Plastic Strategy. The aim of this strategy is to “improve the economics, quality and uptake of plastic recycling and reuse, to reduce plastic leakage in the environment and to decouple plastics production from fossil fuels”. Next to this, a detailed analysis will be made on chemical, product and waste legislation because of the legal, technical or practical problems that have become known. These problems could prevent recycled materials being brought back into the economy and thereby hinder the shift towards a circular economy. What the commission will do is improving the information about products and waste substances of concern. Managing these substances of concern, which are found in recycled materials, will be facilitated. Non-toxic material cycles will also be promoted and the usage of secondary raw materials enhanced.

Another action that takes place in the year 2017 will be a legislative proposal on minimum quality requirements to promote the safe reuse of treated waste water, while ensuring the health and environmental safety of water reuse practices and free trade of food products in the EU (European Commission, 2017).

These aims and actions involve many industries, the fashion industry being one of them. However, there are also more specific plans being developed such as the project Fibersort. The goal of this project is “to optimise (reuse of material and natural resources in North-West Europe)”⁹, it is initiated by circle Economy and funded by the EU. Together with partners such as Smart Fibersorting B.V. and Valvan Baling Systems they will run this project from 2016-2019. As explained by circle Economy⁹ Fibersort is “a sort of project that takes the fibre composition out of post-consumer recyclable textile materials (through optical detection technology) and uses this to sort clothes based on the material it is made of (e.g. cotton, polyester, wool³). This is a very important step before materials can be recycled because higher quality can be guaranteed when the composition is known. Having such an innovative technology enables companies to transform low value waste into new high quality textiles and thereby contribute to a circular supply chain.

The European Commission also stimulates and helps smaller initiatives such as EcoProFabrics. This project was partly run by the company Dutch Advawees, a company focusing on circular workwear located in Nijmegen. As mentioned by team member Iris van Wanejooij this project could not have existed without funding of the European Commission. Because of this funding the company was able to research and develop a 100% recyclable polyester fibre.

One more project that is running from 2015 until March 2019 is funded by the European Union is called ECAP (European Clothing Action Plan) and is part of EU LIFE. This project aims to reduce the increasing quantities of clothing waste across Europe. It is a joint initiative led by organisations from the United Kingdom, the Netherlands and Denmark. Companies who will make this project a success include WRAP, MADE-BY, Rijkwaterstaart (part of the Dutch ministry of Infrastructure and the Environment), Danish Fashion Institute (DAFI) and London Waste and Recycling Board (LWB)¹⁰.

Besides the long-term environmental benefits for the EU the financial benefits will also increase and become significant when circular economy principles are integrated and the proposed strategies are followed. As identified by The Ellen MacArthur Foundation, SUN and McKinsey (2015) a net benefit of €1.8 trillion (or €0.9 trillion more than in the current linear development path) could be accomplished by the year 2030. See figure 4.

They also stated that when new technologies and business models are integrated Europe could achieve ‘growth within’; getting much more value from the existing stock of products and materials. This can be achieved when natural capital is preserved and enhanced, yields from resources in use are optimized and negative externalities are removed to increase the effectiveness of the system. These changes will result in less structural waste and impressive economic benefits, but is only successful when a change of mind set is accomplished.

Another effect of the circular economy is that welfare will improve, as well as GDP and employment receiving a boost. The disposible income of European households and Europe’s GDP could improve by 11 and 7 percent once the system is changed (McKinsey & Company, 2016). Employment will be boosted because lower prices will fuel extra spending as well as recycling activities requiring extra labour and new remanufacturing process needing highly skilled employees.

Definitely worth mentioning are the environmental effects. These will mainly be caused by emission reduction due to electric shared and autonomous vehicles, a reduction in wasteage of food, generative and healthy food chains, passive houses, urban planning, and renewable energy. This will potentially result in a 48 percent drop of carbon-dioxide emissions in 2030 compared to the levels in 2012 and would even further decrease by 2050 to 83 percent (Ellen MacArthur, 2015).

FUTURE

In addition, the consumption of primary materials (measured by car and construction inputs, the use of synthetic fertilizers, pesticides, water and land use for agriculture, fuels and nonrenewable electricity and land for real estate) will decrease to 32 percent by 2030 and around 53 percent by 2050 (McKinsey & Company, 2016).

To make this all happen the European Commission developed the previously mentioned 7th Environment Action Programme (EAP), including nine priority objectives which they want to achieve by the year 2020. This programme received a €650 million funding and will “contribute to closing the loop of product lifecycles through greater recycling and re-use, and bring benefits for both the environment and the economy” (European Commission, 2015).

The European Union should take part of the responsibilities, to stimulate companies to transform their business models, for their account. This is also confirmed by Mishal Kubicki, Policy Officer for Sustainable Development at European Commission, stating the following:

“From the EU it is therefore essential to commit and give a strong policy line regarding the direction, giving the businesses assurance about the necessity to adapt their business models”

This can be done by setting up pilots for new material information systems and communicate the (positive) results. It would also be helpful if they organize cross-sectoral meetings to stimulate sharing of knowledge. Thereby they can start promoting new business models. The European Union should take part of the responsibilities, to stimulate companies to transform their business models, for their account. This is also confirmed by Mishal Kubicki, Policy Officer for Sustainable Development at European Commission, stating the following:

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CONCLUSION

The European Union is trying to tackle many sustainability issues; this is done by setting up different action plans for both the short and long term. Therefore, the EU contributes to make the transition towards a circular economy by investigating the possible benefits and creating new regulations. They stress the importance of collaborations between countries, the public and private sectors to make sure every country meets the targets for 2020 and achieve the long-term vision for 2050. Not only are the environmental benefits of a circular economy significant, the financial savings are also tremendous and should be taken into account. The European Union can act as a strong and powerful backbone for circular business but companies should take initiatives and propose new plans to the European Commission and vice versa to contribute to a better industry and make successful changes.

Figure 4: Moving to a circular economy could dramatically lower Europe’s mobility, food, and built-environment costs by 2030.

In addition, the consumption of primary materials (measured by car and construction inputs, the use of synthetic fertilizers, pesticides, water and land use for agriculture, fuels and nonrenewable electricity and land for real estate) will decrease to 32 percent by 2030 and around 53 percent by 2050 (McKinsey & Company, 2016).

To make this all happen the European Commission developed the previously mentioned 7th Environment Action Programme (EAP), including nine priority objectives which they want to achieve by the year 2020. This programme received a €650 million funding and will “contribute to closing the loop of product lifecycles through greater recycling and re-use, and bring benefits for both the environment and the economy” (European Commission, 2015).

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Over the last decades the fashion industry has changed significantly. Going back to the 1980’s when factories were facing design restrictions, this resulted in “low cost mass production of standardized styles that did not change frequently” (Bhardwaj & Fairhurst, 2009). Later on an increase of women’s apparel took place, classic and basic styles had to make place for more fashion-conscious garments. Since the 1980’s there were four stages that can explain the fashion life cycle, as explained by Bhardwaj and Fairhurst (2009), these stages included: “Introduction and adoption by fashion leaders, growth and increase in public acceptance, mass conformity (maturation) and finally the decline and obsolescence of fashion”. Besides, the fashion calendar was very simplified with Spring/Summer and Autumn/Winter collections and followed a timeline from fabric exhibitions to fashion show to trade fairs. Over these years the amount of garments being produced increased significantly. Going back to the 1980’s when factories were facing labor issues in the industry and the amount of waste increases (because of a decrease in prices) and follows the consumption levels of the Western world it will have tremendous impact on the environmental footprint of the fashion industry. Figure 6 below shows the effects of increased spending and what it means if the industry does not improve its environmental outlook. If the purchasing power of consumers in developing countries increases (because of a decrease in prices) and follows the consumption levels of the Western world it will have tremendous impact on the environmental footprint of the fashion industry. Figure 6 below shows the effects of increased spending and what it means if the industry does not improve its environmental outlook. Figure 6 shows the effects of increased spending and what it means if the industry does not improve its environmental outlook.

 Consumers reacted to these low prices by purchasing even more items of clothing. A research report by McKinsey & Company (2016) explained: “the number of garments produced annually has doubled since 2000 and exceeded 1 billion for the first time in 2014: nearly 12 items of clothing for every person on earth”. This fast fashion trend creates alarming pressure on our resources, increases labor issues in the industry and the amount of waste caused by the disposing of unfashionable or worn-out garments. To prevent this from happening fashion businesses have to change the core of their business models and not only the product they deliver. As mentioned by Uninnette Neloff:

"Every phase in making a product should be taken into consideration. Like back in the days when garments were designed to be altered when necessary and repaired till the garments became useless. Also now this should be the way designs are made, only when a garment becomes unusable anymore it can be recycled/reused. It is hard but it should be possible to design products that last a long time and where every phase is taken into consideration".

As consumer spending increases, especially in emerging economies, the clothing industry's environmental impact could expand greatly. Disasters such as the Rana Plaza disaster in 2013 in Bangladesh has been an eye opener for many consumers and fashion brands. To fight these problems several actions were taken and new coalitions arose such as the Zero Discharge of Hazardous Chemicals and The Better Cotton Initiative. Besides these independent organisations are fashion businesses taking own initiatives to tackle their sustainability issues.

In the spring of 2014 the term ‘circular fashion’ arose. One of the first people to mention this new system was Dr. Anna Brismar, head of the firm Sweden's regional environment agency. Dr. Brismar was the first people to mention this new system was Dr. Anna Brismar, head of the firm Sweden's regional environment agency. To lose the negative image of the polluting fashion industry brands started to assign certificates and work together with organisations in order to prove their willingness to become more sustainable. Examples of those certificates and collaborations are MADE-BY, The Ethical Trading Initiative (ETI) and the Sustainable Apparel Coalition. Besides these independent organisations are fashion businesses taking own initiatives to tackle their sustainability issues. Companies like H&M and Levi’s for example have partnered with I:CO to develop reuse and recycle programs, Patagonia offers repair services and collects garments in store and through mail, and C&A aims at only using organic cotton by the year 2020.

SHIFT TOWARDS CIRCULAR FASHION

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Companies like H&M and Levi’s for example have partnered with I:CO to develop reuse and recycle programs, Patagonia offers repair services and collects garments in store and through mail, and C&A aims at only using organic cotton by the year 2020.
In tandem with these sustainability initiatives, the circular economy became part of the political agenda in Europe and especially in countries such as Sweden, Finland and the Netherlands. It seems that it was time for change and to create new opportunities by merging sustainable fashion and the circular economy and develop a new system, namely ‘circular fashion’. Dr. Anna Brismar developed a definition to explain this term, which is based on the principles of the circular economy created by the Ellen MacArthur Foundation.

"Circular fashion" can be defined as clothes, shoes or accessories that are designed, sourced, produced and provided with the intention to be used and circulate responsibly and effectively in society for as long as possible in their most valuable form, and hereafter return safely to the biosphere when no longer of human use" 19

In the last few years the introduction of a company using a circular fashion system has already taken place. The company MUD Jeans was a forerunner and introduced a completely circular business model whereby jeans are sold or leased, then returned and reused or recycled into new denim. As mentioned by Bert van Son, owner of the company, “being a small company makes them able to have complete control over their design, production and supply chain”. But being small shouldn’t be influencing the choice to transform to a circular business. As explained in the next section of this report many more elements are necessary to make companies able to transform their business model.

CONCLUSION

Over the last few decades the fashion industry has changed significantly. From the production of only a few collections per year to new items every week. This change is visible in the number of items being produced annually showing a massive increase of 100 billion items entering the market from 2000 to 2014. Having such an increase in consumption levels is starting to take its toll on the environment. Besides circumstances influencing human wellbeing resources are getting scarcer. In response to these problems circular fashion has come to life. Companies, governments and individuals are introducing this new system to make significant changes and improve the industry.

circularfashion.com/circular-fashion-definition/
But how can the current fashion industry transform and become circular? After the conducted research I hereby present you small steps concluding in seven principles which can be used to stimulate this transition and change the industry. First of all fashion businesses need to aspire to act more responsibly and show interest in developing a sustainable brand and consumer loyalty to make a successful shift towards circular fashion. As a start companies can take small steps concluding in seven principles which can be used to stimulate this transition and change the industry. The seven principles below help admitting to the flaws you are facing, doing this helps to improve everything you do, be open about it, then the trust is be transparent, let your consumers be able to watch "It is just about a matter of having your storytelling right, essential transparency in the supply chain is. It is stressed by all communication. Besides these steps it is important to mention how a circular system: source, design, take-back, collaborations and a simplified version with five important steps or building blocks for student, which are necessary to create a circular industry. These are small steps of importance to start changing the negative impact of the fashion industry. However, changing to a fully circular business will involve much more change and requires a complete turnaround in the core business of the industry. Previous research and interviews with experts, working in this field of circular economy, revealed seven overarching principles that act as a guide to change towards circular fashion. These principles are also confirmed by Gwen Cunningham explaining a simplified version with five important steps or building blocks for a circular system: source, design, take-back, collaborations and communication. Besides these steps it is important to mention how the essential transparency in the supply chain is. It is stressed by all the professionals (including Linenmore Nefit, Elin Mohlander and Iris van Wanrooij) in this research, where Bert van Son mentioned: "It is just about a matter of having your storytelling right, be transparent, let your consumers be able to watch everything you do, be open about it, then the trust is there and the sales will go automatically". Being transparent in everything you do as a company also means admitting to the flaws you are facing, doing this helps to improve and make changes in the industry. The seven principles below help to eliminate the difficulties a fashion company is facing and to transform into a circular business.

**Implications**

**Key Elements**

Prioritise regenerative resources Our resources are scarce and if we don’t want to run out we have to apply smarter technologies to reduce and reuse our resources. As a fashion company you have to rethink the purpose of your products, how long it should last and what materials are needed. As a circular business you review the different ways of shaping their products, and then use renewable or recycling techniques, inform customers about low-environmental impacts such as, 3D printing, laser cutting, sonic cutting, digital printing and digital finishing’s.

Preserve and extend what’s already made Products already existing in our economy have to be maintained, repaired, upgraded and/or continued in a second or more life. This to maximise the lifetime of the used resources. Fashion companies can accomplish this by offering repair services, redesign and remanufacturing inputs into new sellable products, implement take back possibilities and end-of-life strategies. Examples of companies that can do this include: H&M, Second-hand Store & Collect Concept, Stagelabel and Patagonia with a Common Threads Initiative.

**Use Waste as Resource**

Once the fashion items are in the end of their lifetime everything is better than fashioning or landfilling. According to the principles of the circular economy it is best to minimise and recover waste and make sure it can be reused and/or recycled. In this way waste becomes a source of secondary resources. Implementing new technologies that can separate different materials and make it possible to safely return the products to nature or eventually recycle into new products. Companies that help in making this happen are Circle Economy, the market for textile waste and I.CO, a company who provides the infrastructure to make sure old textiles can be used in new ways, and Recover that upcycle textile waste into new fibres and fabrics.

**Collaborate to Create Joint Value**

Many small changes alone will be able to change the entire industry. Collaborating throughout the supply chain, with all the different organisations and together with the public sector is therefore highly essential. By having a united front transparency will increase, best practices are shared and joint value created. Companies that can support fashion brands to achieve these collaborations are Circle Economy, Recover, Worn Again and Mistra Future Fashion. Another initiative, such as the European Clothing Action Plan (ECAP), helps to unite retailers, brands, suppliers, the public sector, re-use and recycling organisations and charities, thereby they create circular value networks.

**Rethink the Business Model**

Most fashion businesses have to consider new ways of shaping their business to become circular and increase value by using closed loop models, implement reuse and recycling strategies and create repair & warranty services. Other ways of rethinking the business model is looking at the possibilities of offering products as a service or start with sharing or leasing models. Companies with interesting business models are MUD Jeans, Lena The Fashion Library, Vigga, Stagelabel and Huit Denim.
As stated before, transparency in all of these principles is of high importance. Gwen Cunningham ratifies this by saying the following: "The nice thing I think about circular economy is that transparency is kind of a must, you can’t have a circular economy without transparency. I always think of it in terms of linear economy and you are all sitting here holding hands you can see the person to your right and you left but I can’t see two people down there or there but if you are in a circle you know, you have no choice but to know”

Besides becoming transparent it is important to understand that creating circular flows in businesses and society is more than closing the loop on different materials through reusing, remaking and recycling. All partners involved in the supply chain have a corporate responsibility to consider all aspects of their businesses, also at strategic and operational level, and make sure to reduce the societal and environmental impact they have. A total turnaround of a company cannot happen overnight, analyse what the possibilities are to become circular and create short term and long-term strategies.

**OPPORTUNITIES AND CHALLENGES**

Companies considering a change towards a sustainable and circular business have to take several opportunities and challenges in consideration. Nevertheless, important to remember is that challenges can be opportunities for other companies and the other way around; it depends on the business model and long and short-term goals.

**Opportunities**

**Economic benefits:** When implementing circular economy principles new or additional revenue streams and better profit margins are created. Research done by Circle Economy & SITRA (2015) shows that recycling costs are estimated on €0,09 compared to €0,16 for incineration and €2,92 for landfill for 1 kg of clothing.

**Reduction of environmental impacts:** According to WRAP UK, a company can reduce carbon, waste and water footprints by 20-30% when the lifecycle of a garment is extended by just 9 months. In figure 7 it is visible what the impact savings are for a ton of material based on 50% recycled cotton and 50% recycled PET.

**Reduced sourcing risks:** Having diverse strategies to source increases resilience against unpredictable markets.

**New business opportunities:** Changing your business model also provides new opportunities in unexplored market segments and increases your market share. This will be possible because having a unique offering of products increases competitive advantage, besides having access to subsidies or policy incentives become easier.

![Figure 07](image)

**Stronger partnerships:** Having a circular business helps to develop new and stronger supplier partnerships where both parties will benefit from.

**Improved competitive advantage:** Besides becoming transparent it is important to understand that creating circular flows in businesses and society is more than closing the loop on different materials through reusing, remaking and recycling. All partners involved in the supply chain have a corporate responsibility to consider all aspects of their businesses, also at strategic and operational level, and make sure to reduce the societal and environmental impact they have. A total turnaround of a company cannot happen overnight, analyse what the possibilities are to become circular and create short term and long-term strategies.

**Challenges**

**Investments:** This is required to make a fundamental shift, together with this fundamental shift lies a change of mind-set from the industry and partners.

**Adjust the brand communication and market engagement:** This to change the consumers’ mind-set, behaviour and brand engagement.

**Regulations:** When it comes to European regulations there might be difficulties concerning ownership, transport and textile waste, on top of this some regulatory incentives are still lacking.

**Technologies:** Because a circular business model requires new (recycling) technologies there might be a challenge with keeping all these technologies up to date and cost effective.

**Quantities:** Especially for recycling higher volumes of material are needed to make it profitable.

**Risk of cannibalization:** There is a possibility that offering second-hand will negatively affect new sales.

**Responsibility for the product beyond point of sale:** Companies should manage new partners or role for itself to handle return, reuse, recycle and repair possibilities.

**CONCLUSION**

To make companies able to implement a circular business model several elements should be taken into consideration. Of course it is important that a company cares about the social and environmental conditions they are operating in. Starting with small steps, such as creating and changing design standards towards products for reuse and recycling, develop new sustainable fibers, inform consumers about care taking of the products, invest in new recycling technologies and increase labour and environmental standards, are the start of the transition to circularity.

Creating a fully circular business requires a much bigger change, which can be accomplished with help of the following seven key elements: prioritise regenerative resources, preserve and extend what’s already made, use waste as resource, design for the future, collaborate to create joint value, rethink the business model and incorporate digital technology.

Such a change in the core business of the industry brings several opportunities and challenges along. Investments are necessary to make a fundamental shift, in turn this will bring new revenue streams and improved profit margins. Other important opportunities are increased competitive advantage, larger market share, greater customer loyalty and engagement, reduction of environmental impacts and broader societal benefits. The downside to this is the lack of knowledge and lack on several regulations in the European Union, this causes barriers on top of the difficulties changing the mind-set of the industry partners and consumers and keeping up to date with the technological developments.
CONCLUSION

Previous research has been conducted in order to explain, define and explore the possibilities to integrate principles of a circular economy in European fashion businesses, following the research question: "To what extent can principles of the circular economy be integrated in European fashion businesses?". Therefore, an analysis on linear and circular principles is done next to detailed research on the role of the European Union, the developments of the fashion industry and how to implement a circular system.

Having a circular business means that everything you, as a company, design, source, produce and provide is intended to circulate in society for as long as possible and thereby retain highest value of products, parts and materials as possible. After usage the products should return safely to the soil whereby we do not pollute, deplete or waste our resources.

To create a circular fashion industry several key elements of the circular economy can be integrated into the core of European fashion businesses, from small incremental changes to completely new business models. For most fashion businesses it is possible and a great opportunity to become circular, especially when they are located in the European Union because of legislations and funding. In summary, this means that in every step of the (fashion) chain circular principles can be integrated, from resources till the products end-of-life. Companies should focus on using renewable, recyclable and/or biodegradable resources, what the purpose of the product is and if the design fits to that, how products can be maintained, repaired or upgraded, what happens to the products after usage, what kind of waste is produced and how to process it, with whom to collaborate and share information, what changes in the business model are required and how to become transparent by using, for example, digital technology.

Considering all these steps helps to create a fully circular fashion business that radically improves resource productivity, enhances differentiation, reduces costs and risks, creates new and robust revenue streams and makes consumers happier in the long run.

In order to complete this research three booklets are made, one for the consumer, one for the fashion student and one for the fashion professional. These booklets provide some insight in circular fashion but are mainly to inspire, empower and direct people to make choices stimulating a circular economy. This is done by listing questions and remarks you should always consider and ask yourself including answers to set people on the right track.

buy less choose better make it last

Vivienne Westwood
The European Clothing Action Plan – is an existing project that will bring environmental and economic benefit to the clothing sector.

Ecological footprint

The area of productive land and water ecosystems required to produce the resources that the population consumes and assimilate the wastes that the population produces, wherever on Earth the land and water is located.

EMAS

Stands for The EU Eco-Management and Audit Scheme and is a premium management instrument developed by the European Commission for companies and other organisations to evaluate, report, and improve their environmental performance.

European Commission

The European Union (EU) is a group of 28 countries that operates as a cohesive economic and political block. Nineteen of the countries use the euro as their official currency. The EU grew out of a desire to form a single European political entity to end the centuries of warfare among European countries that culminated with World War II, which decimated much of the continent. The European Single Market was established by 12 countries in 1993 to ensure the so-called four freedoms: the movement of goods, services, people and money.

Fast fashion

A modern day system of fashion that adopts methodology including speed to market and volume supply within a constant replenishment of merchandise into retail stores. Normally characterised by low priced merchandise but ‘fast fashion’ can also be aligned to other market sectors including premium and luxury categories where the process of supply chain acceleration and constant supply is implemented.

GDP

Gross domestic product is the best way to measure a country’s economy. GDP is the total value of everything produced by all the people and companies in the country.

SME

Small and medium-sized enterprises

The Biological Cycle

Encompasses the flows of renewable materials. Consumption only occurs in the biological cycle. Renewable (biological) nutrients are mostly regenerated in the biological cycle. (Ellen MacArthur Foundation, 2015)

The Technical Cycle

Involves the management of stocks of finite materials. Use replaces consumption. Technical materials are recovered and mostly restored in the technical cycle. (Ellen MacArthur Foundation, 2015)
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APPENDIX I

PRIORITIES 7TH ENVIRONMENT ACTION PROGRAMME

1. To protect, conserve and enhance the Union’s natural capital
2. To turn the Union into a resource-efficient, green, and competitive low-carbon economy
3. To safeguard the Union’s citizens from environment-related pressures and risks to health and wellbeing
4. To maximise the benefits of the Union’s environment legislation by improving implementation
5. To increase knowledge about the environment and widen the evidence base for policy
6. To secure investment for environment and climate policy and account for the environmental costs of any societal activities
7. To better integrate environmental concerns into other policy areas and ensure coherence when creating new policy
8. To make the Union’s cities more sustainable
9. To help the Union address international environmental and climate challenges more effectively.