Research Report

Textile waste in the Twente Region

A consultative research on actions the municipalities in the Twente region could undertake to support high quality recycling in the textile waste market.

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Foreword

This final thesis “Textile waste in the Twente region”, was written as a completion to the major Environmental Sciences on the Saxion University of Applied Sciences in Deventer, the Netherlands. The research started off in January 2015 on behalf of the Knowledge Centre of Living Environment from Saxion.

The research is a sub study of the research on “Marketing and commercialisation of resources”, commissioned by the ‘Steering group zero waste Twente’ of the Twente region. The aim of this overarching research is to explore possibilities on waste marketing and valorisation in the Twente region, in order to speed up the transition to a zero waste region in 2030. This particular research was focussed on the textile waste market in the Twente region. The main goal was to find out what the actual bottlenecks are that prevent more municipal textiles from being recycled and in what way the bottlenecks could be overcome.

This research could not have been done without the help of others. I would like to thank them especially.

In the first place, I would like to thank my project leader and mentor Ahmed Abunada, for his advises and commitment in our weekly meetings. Additionally, I owe thanks to Frans Jorna, supervisor of the overarching research, for making time to provide helpful feedback in the last weeks of my research period.

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1 Vermarkting en verwaarding van grondstoffen
Abstract
This final thesis was commissioned by the Knowledge Centre of Living Environment, in order to research the textile waste market in Twente. The extern client of this research is the ‘steering group zero waste Twente’, a steering group of the Twente region that aims to stimulate circular economy through pursuing a zero waste region in 2030. The region wants to set up shared policies in order to reach this goal.

One of the waste streams that needs attention is municipal textile. The environmental impact of this waste stream is severe and the waste stream is well recyclable. However, only 38% of the textiles are collected separately. The rest is all ending up in incinerators. Furthermore, a big share of the textiles that are collected separately is recycled in a low quality way, also called down cycling. Therefore, this particular research is focused on the main bottlenecks in the textile waste market in Twente that prevents more textiles from being recycled. In order to overcome those bottlenecks, solutions are set up. This approach has led to the following problem description:

“In which way could the municipalities in the Twente region support the textile waste market in Twente to ensure more textiles will be recycled for the highest quality possible?”

With the help of literature research and interviews with experts, a couple of bottlenecks in the textile waste market were identified: 1. a lack of communication to citizens; 2. a lack of scalable innovative recycling methods and 3. a lack of municipal involvement.

In the 14 municipalities in the Twente region, three main textile collection organisations that are collecting through containers are active: the traditional charitable organisations Reshare (Salvation Army) and Sympany, and the Twente textile circle. The Twente textile circle is a new textile collecting collaboration between thrift stores het Goed and de Beurs, commercial waste collector Twente milieu and textile innovation centre Texperium.

In this research, the business models of these three organisations are compared. As a result, it has become clear in what way these organisations are dealing with the main bottlenecks and in which extend they are trying to solve them.

This comparison shows that the Twente textile circle is mainly focusing on the bottlenecks regarding communication and innovation, because their expenses on these themes are much higher. The charitable organisations are giving less money to solving these bottlenecks and are focusing on charity projects.

The identification of the bottlenecks and the comparison between the collecting organisations has led to two conclusions:

**Conclusion 1- Make textile waste a high priority**
Despite the high environmental impacts and the recycling possibilities of textiles, municipalities are seeing the textile waste stream as relatively unimportant. However, it is clear that this should change as there are a lot of opportunities that could be seized. The municipalities in the Twente region could support the textile waste market by taking it seriously and acting accordingly.

**Conclusion 2- Expand the Twente textile circle**
Based on the focus and the main values the Twente textile circle is pursuing - communication and innovation - it is likely that this organisation could help the Twente region with their main goal: a zero waste Twente in 2030. Furthermore, the charitable organisations are considered to be incapable on collecting more textiles at this moment, as this will harm their business model.
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1. Introduction

1.1. Situation report
The last couple of years, sustainability in terms of resource efficiency and Cradle2Cradle are becoming more and more vital themes in our economy and society (Anderson & White, 2009). These themes are drivers for a more “Circular Economy”, an economy in which resources are not distracted but recycled, and were pollution is banned. The reason that these themes are becoming more vital is simply that humanity has no real choice. Many resources we use on a daily basis are exhaustible and already getting scarce (Wright & Boorse). At the same time, extracting resources—such as textiles—often cause serious environmental problems. An essential theme in the transition to a circular economy is the treatment of waste. In a circular economy waste basically does not exist anymore, because all resources are used again (Anderson & White, 2009). In short, the need for high quality recycling is clear.

Both national and transnational governments are striving for a more circular economy and higher recycling rates. In reaction to the directives on waste management, dictated by the European commission, the Dutch government set up a national waste management plan (LAP II). This plan aims to stimulate waste separation and recycling (IPR Normag, 2013). Furthermore, the LAP II states that all municipalities are responsible for the collection of the household waste in their own territory (IPR Normag, 2013).

Waste in the Twente region
The Twente region is following this mission towards a circular economy. The Twente region is a collaboration of 14 municipalities in Twente. The region is an organisation on its own and has 600 employees. The main goal of the region is to develop shared policies on certain issues such as waste management (IPR Normag, 2013). In 2013 the region set up a project for cooperation on waste collection and recycling. The main goal: ‘a zero waste Twente in 2030’ (IPR Normag, 2013). To strengthen each other, shared policies on waste management for all the municipalities in Twente are pursued. The region has no governing power, but provides municipalities with guidelines (Karin Fakkert, personal communication, May 2015).

Textile
A waste stream that is lagging behind in terms of recycling is the municipal textile. Only 38% is collected separately in the Netherlands to be reused or recycled. A staggering 62% is not separated and as a result incinerated (Custers, Hopstaken, & van der Maesen, 2014). This is an important issue as the environmental impact of textile is severe (Challa, n.d.), especially in terms of water and pesticide usage. Municipal textile is a waste stream that is usually rather easily recyclable. Taking those two facts into account, it can be concluded that there are desirable steps to be taken to decrease the environmental impact of the stream.

To achieve this, textile recycling is a good method (van de Vreede & Sevenster, 2010), since the more recycled textile is used in new products, the less new textile has to be produced.

Textile waste collection
At the moment, the organisation of collecting and selling the textiles is mainly done by four big charitable organisations (Custers, Hopstaken, & van der Maesen, 2014). This is also the case in Twente. Most of the waste is collected from households by the charitable organisations Reshare (the Salvation Army) and Sympany, and a new initiative, which is called ‘the Twente Textile circle’.

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2 Following the definition of Twente Milieu, the environmental agency of the region. This is mainly clothing and other household products like towels and curtains.
3 Leger des heils
4 Fusion of KICI (Red Cross) and Humana.
The Twente textile circle is a cooperation between waste collector Twente milieu and local thrift stores ‘het Goed’ and ‘de Beurs’ (Peter Bos, personal communication, March 2015). Those waste collecting organisations have a lot of influence on the recycling market as they decide where they invest their money and what the application of the textile waste will be.

Role region and municipalities
The main influence the region and municipalities have on these developments is to reconsider the waste collecting organisations that are working for them. They could even force those companies to do certain things because there is a lot of competition from other collecting companies (Theo Matton, personal communication, March 2015). Therefore, municipalities have a lot of power in the market.

The research
The main problem that the municipalities are facing at this moment is the shape of shared policies on this theme of textile collection and valorisation. Municipalities are especially not agreeing on the way to handle the actual problems in the market. Almelo for instance, is a staunch supporter of the charitable organisations and their charity goals (Karin Fakkert, personal communication, March 2015). The municipality of Enschede chooses for the Twente textile circle, the new initiative, because they think this will lead to more collection and recycling (Mirian Kock, personal communication, March 2015).

In order to create more clarity for the municipalities in Twente, this research will clearly describe what the main bottlenecks in the textile recycling market are that are currently preventing more textiles from being recycled in a high quality way. Subsequently, it is described what the textile collecting companies in Twente are actually doing to solve these bottlenecks, and in what way their business models differ. In this way, the differences between the organisations - and the choices they make - are becoming clearer.

In this research, contribution to higher collection rates and high quality recycling will be the main themes. This is because the ultimate aim - looking at waste management - is a zero waste Twente. Finally, a list of recommendations will be set up in which a future perspective will be unfolded where the main bottleneck in the market should be solved, in order to recycle more textiles in the highest quality possible.

Organisation
This particular research will be input for the much broader research, conducted by the ‘knowledge centre of the living environment’ (lectorate governance) of the Saxion University of Applied Sciences on ‘Marketing and commercialisation of resources’. This is commissioned by the ‘steering group zero waste Twente’ of the Twente Region. A couple of researchers and students are contributing to the research, under the direction of lector governance Frans Jorna. The research determines which waste streams are valuable and what the region and municipalities could do to increase the recycling rates of those streams. In the final report of this overarching research, the role of the region will be described and other aspects and waste streams will be taken into account as well. This particular textile recycling research will be a deepening examination on the textile stream. This is desirable because the organisational structure of the market is very different from other waste streams and therefore needs in depth research.

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5 De Twentse textielcirkel
6 At this moment, most recyclable textiles are recycled in a low quality way: it is pressed together for insulation materials and that kind of products. This is often called ‘down cycling’ (Harrie van Bommel, personal communication, January 2015). There are also some examples of new clothing that are made out of recycled fibres. That is called high quality recycling, as the quality of the recycled product is high.

7 Vermarkting en verwaarding van grondstoffen
1.2. Objective
Latest the 15th of June, providing an advisory report for the Twente region on policies that could be carried out to achieve shared policies on textile collection and marketing. These policies should support the textile waste market in Twente to ensure more textiles will be recycled at the highest quality possible.

1.3. Problem description
In which way could the municipalities in the Twente region support the textile waste market in Twente to ensure more textiles will be recycled for the highest quality possible?

1.4. Key terms
Recycling: In this report, recycling is used as a collective word for all different recycling options, except for reusing. Upcycling and down cycling is also indicated as recycling. Down cycling means that the product that is reused has a lower value than the original product. Recycling means that maintains the same value and upcycling means that the value has increased after using the resource again (Harry van Bommel, personal communication, January 2015). It is clearly indicated when the word ‘recycling’ is not meant as a collective word.

Textile: In this report the focus will lay on municipal textile waste, following the definition of Twente Milieu, the environmental agency of the region. This mainly means clothing and other household products without filling like towels and curtains (Twente milieu, n.d.).

Textile waste market: This research will be focussed on the collection and marketing of the textiles and the companies who are behind them: the textile collection organisations. In this research, the focus will be on the container collecting organisations, as basically all big textile collecting companies are focusing on this way of collecting as it is much more efficient (Fred Spronk, personal communication, May 2015). However, the textile waste market includes basically every step from consumer (waste producer) to the end user (recycling or thrift store). These will also be considered in the research, but in a more general way.

Highest quality possible: The quality issue is about the way of recycling: down cycling, recycling or upcycling. To establish a circular economy, there should be no waste. Therefore it is needed to recycle the waste in such a way that the quality and value at least stays the same, because then there is no production of new materials needed. The higher the quality of recycling, the less new raw materials you will need (Custers et. al., 2014).

Textile marketing
Textile marketing refers to the process of finding an application for the waste. This could be selling it in a thrift store or selling it to recycling companies. It does not necessarily provide money.
1.5. Research questions

1. Which national and international trends and developments could be determined in the textile waste market?

2. What are the main bottlenecks that prevent more textiles to be recycled?

3. What is the current situation in the textile waste market in Twente?

4. In what way are the textile collecting organisations attempting to solve the main bottlenecks in the market in order to come to more textile collection and recycling?

1.6. Reading guide

In order to make clear the actual need for the transition to a circular economy and a zero waste society, in chapter 2, the background environmental problems and the accompanying solutions are described. Furthermore an explanation on relevance of the research subject - textiles - is explained with a clear description of the environmental impacts.

In chapter 3 the research approach is described. In this chapter an elaboration on the used research techniques is given.

Chapter 4 provides all the results and the sequential answers on the research questions. The chapter starts off with the trends and developments in paragraph 4.1., subsequently; the bottlenecks in the market are defined in 4.2. In paragraph 4.3., the current policies on textile waste in the municipalities of Twente are elaborated. Paragraph 4.4. consists of a comparison between the business models of the main textile collecting companies in the Twente region on a number of themes. Thereafter, in paragraph 4.5., a short analysis is given on this comparison and it becomes clear in which extend the textile collecting organisations are actually investing in solutions for the main bottlenecks.

In chapter 5, the results are translated in two main conclusions. Immediately after a brief discussion in chapter 6, some clear and applicable recommendations are given in chapter 7.

Appendices

Some important appendices are included in the report in order to support and clarify the results in chapter 4.

Appendix 1 includes a table with detailed information of the situation on waste collection in the 14 municipalities in Twente. In appendix 2, the contact details of the approached municipalities are given.

Thereafter, in appendix 3 the key figures and formulas are shown which are used to calculate the results in paragraph 4.4.

Finally, the interview reports that provided a lot of essential knowledge can be found in appendix 4.
2. Literature review
In this chapter, the context and the actual need for a transition to a circular economy are described in paragraph 2.1. and 2.2. Subsequently, the relevance of this theme for textiles is evidenced in paragraph 2.3.

2.1. Environmental problems
We live in a world facing a large amount of environmental problems, such as the increasing scarcity of resources and global warming (Urgenda, n.d.). This is threatening prosperity and equality in the world (United Nations, n.d.). In this paragraph, the most important environmental problems that are relevant for this particular research are described briefly.

Global warming
According to the IPCC (2013) and a widespread scientific consensus (95% certainty), current climate change is mainly caused by human Greenhouse Gas Emissions (GHG) (United Nations, n.d.). It is required to make sure the world will not warm up more than 2 degrees Celsius (IPPC, 2013) to prevent that the climate change becomes ‘substantial’. To make sure the line will not be crossed, a significant worldwide limitation of GHG emissions is necessary.

Resources
Another worldwide environmental challenge is the increasing scarcity of resources. This is becoming a more and more vital theme in society (United Nations, n.d.). When issuing resources, not only real touchable resources such as metals and minerals are relevant, but also the more abstract and less touchable resources such as fertile land and clean drinking water are getting scarce in some parts of the world (de Correspondent, 2015). Water shortage could be a real problem as a result of intensive non-sustainable agriculture.

Population growth
Basically, our entire society including all the products we use is built on the principles of the linear economy (Anderson & White, 2009). The United Nations expect the world population to grow with another 2 billion people in 2050. In combination with the increasing purchasing power of people in upcoming countries like China and India, this could cause higher and instable raw material prices. Of course, it also has strong negative impacts on other environmental themes (de Vries, 2012).

Ecological footprint
According to the World Wildlife Fund (WWF) (2015), every person needs 1.7 hectares ground for an equal distribution of resources. This is called the ecological footprint. For example, Dutch people have an average footprint of 6.3 hectares. So if all people would have the same lifestyle, we would need three earths.

Based on scientific consensus, it is evident that it is actually impossible to provide all mankind with proper food, clean drinking water and a manageable climate for the next decades if we maintain this ‘lifestyle’. Nowadays, more and more leading businesses, governments and other parties are recognizing this problem (Anderson & White, 2009) and are convinced that our economy should change to make sure that next generations can also enjoy a liveable world.

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8 The simplest way to define ecological footprint would be to call it the impact of human activities measured in terms of the area of biologically productive land and water required to produce the goods consumed and to assimilate the wastes generated (WWF, n.d.).
2.2. Transition from linear to circular
A really important change is the transition from the “take waste make” circle where we distract resources, use them, and throw them away to put on landfill or distract energy from through incinerators. To produce new products, we mine and produce new materials. To minimize the environmental impact on our world, the economy has to change radically (Anderson, 2009). Humanity has to make serious steps towards a circular economy. A complete circular economy means that all materials are completely recycled or upcycled and waste basically does not exist anymore. This will result in less environmental impact because fewer resources will have to be extracted (de Vries, 2012).

![Linear and circular economies](http://www.brad.ac.uk/ten-plus-one/)

As described by McDonough and Braungart (Cradle to Cradle, Re-making the way we make things), the circular economy basically consists of two nutrient circles: biological nutrients, designed to re-enter the biosphere safely and build natural capital, and technical nutrients, which are designed to circulate at high quality without entering the biosphere (Ellen MacArthur Foundation, n.d.). If all materials are considered as either a biological or a technical nutrient, the loops could be completely closed. In figure 1, the difference between the linear and circular economy is visualized.

**Urban mining**
The last couple of years, both businesses and governments are slowly moving towards a society where ‘waste’ is more often seen as a new resource (MVO Nederland, 2015). To support this claim, around 51% of the municipal waste in the Netherlands is recycled these days (ANP, 2013). With these figures, the Netherlands had the fifth highest recycling rate in Europe in 2010 (EEA, 2013). Another concept that is based on this principle is ‘urban mining’. Urban mining means that cities are seen as new mining areas (Brunner, 2011). Through waste processing activities in cities, new resources are showing up. A lot of materials that were originally considered as waste are now considered as valuable new materials. This could be the case for all different types of materials, such as metals like gold and aluminium, but also textiles and plastics. The last few years, new techniques are being developed to distract new resources out of landfills.
Policies

To follow up the recycling targets of the European commission, Dutch national government set up the second national waste management plan (LAP II). This plan is aimed to stimulate waste separation and recycling (IPR Normag, 2013). The LAP II states that all municipalities are responsible for the collection of the household waste on their own territory (Regio Twente, n.d.). Municipalities also have to make sure that the waste is processed in the best way. This should happen following the principles of de ‘ladder van Lansink’ or the ‘waste hierarchy’ (Bergsma, Vroonhof, Blom & Odegard, 2014), reprinted in figure 2. The waste hierarchy states that landfilling is the worst option looking at the environment, and waste prevention is the best option. In between (from good to bad), reuse, recycling, energy recovery and incineration are options. According to the review of LAP 1 and LAP 2 by Bergsma et al. (2014), it is recommended to give the circular economy a more prominent role in LAP 3, which will come out in 2015.

Figure 2. Reprinted from CE Delft. (n.d.). retrieved from http://www.ce.nl/publicatie/evaluatie_landelijk_afvalbeheerplan_(lap)_1_en_2/1482

From waste to resource

Dutch government is trying to speed up the transition into a circular economy by the program ‘from waste to resource’ (VANG). This program is connected to LAP2 and is a stepping stone for LAP 3 (Mansveld, 2014).

One of the main aims is to stimulate resource recycling in the Netherlands. This stimulates recycling innovation and contributes to closing the loops. The VANG includes eight operational targets such as improving waste separation and stimulating high quality recycling.
2.3. Municipal textiles

Now that the current environmental problems and their conceptual solutions have been described, it is time to zoom in on the research subject: municipal textiles. In this paragraph, relevant issues regarding the environmental impacts and the current national situation of municipal textile waste treatment are discussed.

Environmental impact of textiles production

One of the everyday products that causes big environmental and social problems is textile. The most common textiles in work wear and household textiles is cotton (van de Vreede & Sevenster, 2010). Cotton has a huge impact on the environment in countries where it is produced. 20% of the world wide usage of pesticides is used for cotton production (Goedewaar.nl, n.d.). This has led to many health issues in producing countries. Cotton production also has a lot of impact on the shortage of water, because cotton is a crop that needs a lot of it. The cotton that is used to make one t-shirt needs 2700 litre of water to grow. An average jeans cost 8000 litre of water (Water footprint network, n.d.). The water use of cotton has often great local impacts. In Central Asia, for instance, excessive use of water from the Amur Darya and Syr Darya rivers for cotton irrigation have led to the near-disappearance of the Aral Sea.

In 2010, researchers van de Vreeede & Sevenster (CE Delft), set up an analysis based on Life Cycle Assessment (LCA) to measure the environmental impact of textile streams in the Netherlands. In this research, the researchers looked at the total environmental impact of different types of textiles (the most common textiles in work wear and household textiles except for technical textile and carpets). As shown in figure 3, the largest environmental impact in the life cycle of textiles comes from the production phase of the textile types cotton and wool (52% in total). It is noteworthy that wool is only 5% of the total textile stream, but has the biggest share in environmental impact (33%).

Figure 3. The relative share in environmental impact. Adapted from “milieuanalyses textiel” by CE Delft, 2007, p. 5. Retrieved from http://www.rwsleefomgeving.nl/onderwerpen/duurzaam_produceren/ketenaanpak/downloads/milieuanalyses/

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9 Life Cycle Assessment (LCA) is a way to measure the environmental impacts of products on the environment in all phases of its life cycle: from production, transport, consumption and waste (Bras-Klapwijk et. al., 2003).
Furthermore, van de Vreede & Sevenster concluded that a 30% reduction of the total environmental impact is possible. This can be achieved with a combination of actions such as energy reduction in production, a shift to other fibres and a higher recycling rate.

**Relative environmental impact textiles**
The environmental impact of the life cycle of textiles is relatively high, compared to other waste streams. Figure 4 makes clear that the total volume of textiles compared to the other municipal waste streams is relatively small. However, looking at CO₂ emissions, textile is the second largest stream.

![Relative environmental impact textiles](image)

**Figure 4.** The relative share of CO₂ emission, compared to other waste streams. Reprinted from ‘Dutch Research Institute for Transitions’ (DRIFT), 2014, p. 59. Retrieved from hdl.handle.net/1765/51022

Also looking at the shadow prices, the environmental impact of textiles is much bigger than the impacts of other waste streams. The shadow costs of textile in comparison to others could be defined as follows (Agentschap NL, NL Milieu en Leefomgeving & Uringa, 2012):

- **Textiles:** 37.02 euro’s per kg
- **Paper and carton:** 0.49 euro’s per kg
- **Food waste:** 11.83 euro’s per kg
- **Large domestic waste:** 4.71 euro’s per kg
- **Flat/sheet glass:** 0.07 euro’s per kg

**VANG**
Due to its high environmental impacts, national government treats textile as a priority waste stream in the policy program “from waste to resource” (VANG).

**Textile separation in the Netherlands**
In 2012, Eureco researched the recycling potential of the total municipal textile waste stream. They concluded that at least 64% of the current textile waste stream is reusable or recyclable. However, only around 38% of the textile waste is collected separately (Custers et. al., 2014). The rest is all incinerated because it is not collected separately. It can be concluded that a big share of valuable textiles disappears in the incinerator.

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10 Shadow price is a monetary value of environmental impact, based on Life Cycle Analysis (LCA) scores. It indicates what is the most expensive measure to prevent a certain impact (Infomil n.d.).
In figure 5 is shown how many percent of other waste streams are separated in comparison to textiles.

![Diagram showing waste stream separation percentages](image)

Figure 5. Percentages of waste streams that is collected separately. Reprinted from ‘Dutch Research Institute for Transitions’ (DRIFT), 2014, p. 2. Retrieved from hdl.handle.net/1765/51022

Despite the high environmental impact of textiles, the separation rate is not one of the highest compared to other household waste streams. According to the brochure of Agentschap NL, NL Leefomgeving & Uringa “Textielinzameling op de kaart” (textile collection on the agenda) (2012), improving the collection rates of textiles did not make significant progress since the late 90s. However, the amount of textiles that is disappearing as residual waste is increasing every year (Schalwijk & Mulder, 2012).

**Application separated textiles**

Although 62% of the municipal textile waste is not separated yet, as it is ending up as residual waste, around 38% is actually separated. Researchers from FFact (Custers et al., 2014) set up a material flow analysis on the destination of separated municipal textile waste in the Netherlands. Some of it is reused (56%) and some of it is recycled (37%). The rest is incinerated as the quality is not good enough (7%). The reusable clothing is mainly sold second hand in thrift stores in Africa. The recyclable textile is mainly recycled in the Netherlands and is mainly made into cleaning rags. Textile that is not useable for cleaning rags is mechanically recycled (fibre recycling) into new products like blankets or carpets. When the materials are not good for this type of recycling, it is used for felt production or insulation materials. This is mainly happening in India. Detailed information is visualised in figure 6.
The textile waste that is visualized in figure 6, is mainly collected by four big charitable organisations (Meijer, 2011).

**Poor work circumstances**

According to Custers et. al., 87 % of the textiles that are used for fibre recycling are actually recycled in India. Research of Lucy Norris (2012, p. 4) - an anthropologist based at University College London - made clear that the fibre recycling of textiles in India is often done under bad circumstances: “Whole factories run on subcontracted labor hired by jobbers working to quotas, and workers do not receive minimum employment benefits, do not have the right to associate and have no job security. They work in poor environmental conditions, use old machinery, often with dangerous working practices such as mending moving parts, and suffer respiratory problems from exposure to fibres, dust and chemicals. On average, a man working in a shoddy spinning mill earns c. Rs 180/day, or $3-3.50 for a 12-hour shift before advances and obligatory deductions etc. Women cutters earn up to Rs70 ($1.40) a day before deductions for an 8-hour shift. There is no obvious evidence of child labour, but babies and young children often accompany their mothers to the cutting floor for the day.”
3. Research approach

In this chapter, the executed research approach is explained. The activities are split up in three basic elements. 1. Identifying trends, developments and bottlenecks; 2. Sketching the current situation; and 3. Comparing textile collecting companies.

This research approach is a typical ‘critical research’ (Baarda, Bakker, Fischer, Julsing, & Peters, 2012). This means that first the actual problem was analysed and unravelled together with stakeholders. Subsequently, solutions for these problems were developed. The reason to choose for this approach is that in the first phase of the research, the actual problems in the market and the underlying reasons were unclear. The only thing that was clear was that not enough textiles were recycled and it was obvious that too little textile collection was a main reason. The reason behind these problems - the actual bottlenecks - and the other existing problems had to be identified.

Planning of the interviews

Although the research approach is divided in three separate elements, the interviews were not strictly planned. Officially, on the 17th of April, element 1 and 2 were finished, as the focus was determined. However, some interviews on these subjects were conducted after the 17th of April. These interviews deepened the knowledge on the considered subjects. Furthermore, some interviewees were recommended by other interviewees. That made it inevitable to not work on different elements in the same period sometimes.

Interview approach

In this research, a lot of interviews were conducted. The interviews were done in a half-structured way. This means that there is done some preparatory work on the knowledge and background of the interviewee. Subsequently, the most important questions were formulated. However, if new questions or subjects came up during the interview, these were discussed as well. The interview reports were all captured on paper and can be found in appendix 4.

3.1. Element 1: Identifying Trends, Developments & Bottlenecks

Element 1 includes the answering of the first two research questions:

1. Which national and international trends and developments could be determined in the textile waste market?
   1.1. Which organisational developments are upcoming?
   1.2. Which technical developments are upcoming?

2. What are the main bottlenecks that prevent more textiles to be recycled?

The reason that those two research questions were conducted as one element is the similarity of the methods. Basically the same literature sources were used, and the same people were interviewed.

Technical and organisational developments

In this phase of the research, the focus was both on technical and organisational application of the textile waste. Organisational developments are referring to ways of organizing the municipal textile waste stream in terms of collecting and marketing of the waste. Technical developments are referring to the actual recycling techniques such as mechanical and chemical recycling.
Literature research
In order to learn more about developments and bottlenecks in textile recycling, a lot of literature research was done. Information was found on the websites of innovation centres in the Netherlands and in other countries which are working on textile recycling, such as the Dutch association of textile recovery (Vereniging Herwinning Textile, VHT). Attention was also paid to news items regarding developments in the textile recycling market. Research on the websites of Dutch newspapers ‘Trouw’ and ‘de Volkskrant’, and English newspaper ‘The Guardian’ was done, because of their strong reputation in terms of sustainability issues. Finally, professional articles were collected through the platform ‘Afval Online’ (Waste Online).

Interviews with experts
Besides the literature research, some interviews with experts in the textile recycling market were done.
- **Harrie van Bommel (Lecturer sustainable international business)**
  Harrie van Bommel did a lot of research on sustainable business and more specifically on textile recycling. A future perspective on waste in general was discussed as well.
- **Texperium and VAR Frankenhuys- Respectively textile innovation centre and textile recycler in Haaksbergen- Contact person, Peter Bos**
  Peter Bos is really experienced on the theme of textile recycling in Twente because of his work for VAR Frankenhuys, the textile recycling company, and Texperium, the textile innovation centre. He is working on the textile recycling theme for years and knows a lot about the situation in Twente. With Texperium he is also initiator of the ‘Textile circle Twente’. Information that was gained in this particular interview is also relevant - and therefore used - in element three. This means that the trends, developments and bottlenecks were discussed as well as the activities of the Twente textile circle.
- **Gerrit Bouwhuis (lector Saxion in Smart functional materials)**
  Gerrit Bouwhuis has - supplementary to the other interviewees - specific knowledge on innovative textile recycling because of his background in textile sciences. At this moment he is working on the Saxcell, a new way of (chemical) textile recycling. It is a perfect example of an innovative way of textile recycling that may have a big impact in the future. Next to his activities regarding Saxcell, he was able to tell something about other organisations that are working on innovative recycling methods.
- **Researcher of FFact - Marijn van der Maesen**
  Marijn van Maesen of research firm FFact was interviewed to ask explanation on her research on the application of textile household waste in the Netherlands. For this research she had a lot of conversations with different stakeholders in the textile waste market and therefore a broad knowledge on this theme.
- **Departments of Public Works (Rijkswaterstaat)- Hanneke op den Brouw (Short phone call)**
  Hanneke op den Brouw is advisor chain efficiency at the Department of public works. She was actively involved in the green deal for collection of textiles in 2012 and told something about problems national government is facing in order to improve the textile waste market.

Obviously, the interviewees that were interviewed for the other two elements also had a broad knowledge on the trends developments and bottlenecks in the market. Therefore these themes were discussed in these interviews as well.
Laying down focus
After conducting the most vital interviews of element 1, on the 17th of April 2015, a meeting with the project leader of KCL Ahmed Abunada took place. In this meeting, it was concluded that the research will be mainly focusing on the collection and marketing of textiles, because that is where some big organisational and political problems are. Also, municipalities have a direct influence on this part of the market. It was decided that there will be zoomed in on the container collection system and the policies and values of the organisations behind, instead of looking into the door-to-door collection system. With this focus, the main and most relevant stakeholders in the textile waste market in Twente could be contacted.

3.2. Element 2: Sketching the current situation in Twente
3. What is the current situation in the textile waste market in Twente?
  3.1. Which companies are collecting textiles?
    3.1.1. Which problems could be determined by these organisations?
  3.2. In what way is the waste sorted?
  3.3. What is the application of the waste?

To get a full understanding of the current situation in Twente, it was desirable to look at the roles of the relevant stakeholders in the textile market in Twente firstly. This includes primarily municipalities and the waste collection organisations. In order to make sure the whole situation is described in the right way, interviews with people who have extensive knowledge on the textile market in Twente were conducted.

The first step was to find out which relevant stakeholders were active in Twente. Furthermore, it was essential to deepen the understanding on what the main bottlenecks in the market mean for Twente and to find out what knowledge on the situation is already available.

Interviews with experts in the textile waste market in Twente:
  - Twente region - contact person: Agnes Koopman, Karin Fakkert & Mirian Kock
    The Twente region is the extern client and is supposed to have a proper overview on the stakeholders and their roles. In the interview with Mrs. Koopman, two waste projects leader of the steering groups of Almelo and Enschede, respectively Karin Fakkert and Mirian Kock, were joining. They gave some information on the way municipalities are making their decisions on textile recycling issues such as contracts with collecting companies.
  - IPR Normag - Consultation firm of the Twente region - contact person, Paul de Bruin
    In their research report, IPR Normag talks about the chain meeting with stakeholders in the textile industry. Information on outcomes is not available. In the interview, attention was paid to this subject, and Mr. de Bruin was asked what his ideas are on the textile recycling theme based on the impression he got in his research in 2012/13.
  - Riding school disabled people east (VPGO) - contact person: Fred Spronk
    Fred Spronk is the director of his own textile collecting company, Spronk G E. He carries out the door-to-door collection for the ‘Riding school for disabled people east’ (VPGO) for over 20 years now. Therefore, he has a thorough knowledge and experience in the market. The VPGO is a charitable organisation that gives disabled people the chance to ride a horse. Fred Spronk was interviewed in order to get a full understanding of the position of the door-to-door collecting organisations and the recent shifts in the market.
  - All municipalities in the Twente region
    In order to gain knowledge on the specific policies of the municipalities in the Twente region, and the textile collection organisations that are active, all municipalities in the Twente region were contacted by email. Agnes Koopman provided the contact information of the right people. In appendix 2, a list of all contact persons can be found.
Result
The main result of element 2 of this research was the knowledge on which organisations are active in Twente, and what policies the municipalities are executing. This made the comparison of element 3 possible.

3.3. Element 3: Comparison Textile Collecting Organisations
Element 3 has provided an answer on research question 4.

4. In what way are the textile collecting organisations attempting to solve the main bottlenecks in the market in order to come to more textile collection and recycling?
   4.1. What are the main differences between the textile collecting organisations in Twente?

As researched in element 2, the main textile waste collectors in Twente are: Reshare, Sympamy and the Twente textile circle. Those three companies are adding their own various values. Reshare and Sympamy are largely having the same business models. However, the Twente textile circle is doing something completely different.

In order to clarify in what way those organisations are dealing with the existing bottlenecks in the textile market in Twente, the business models were compared to each other. It is difficult to determine which organisation is “doing best” or is “adding the most values”. Deciding which values are most important is a political subject and is not researched and advised on. Instead, the main goal of the Twente region is considered a zero waste Twente in 2030. The collecting companies were reviewed on the expected and potential contribution to this goal. The required information to conduct such a comparison was gained through interviews with representatives of the organisations themselves and their annual reports over 2013, as that is the last year all organisations published representative figures. In the preparatory phase, an interview with an independent expert from the Dutch association for textile recovery (VHT) was planned. Unfortunately, this organisation was unattainable.

Preparation on interviews
Before the interviews with the representatives of the collection and marketing companies were conducted, there had been looked at the annual reports of the charitable organisations, including the financial statements and (if available) the future goals. Things that were still unclear after reading the reports were clarified in the interviews. All information from the Twente textile circle was gathered through the interviews.
Interviews with representatives

- The charitable organisations (Reshare & Sympany)- contact persons: Jolande Uringa & Marc Vooges

Obviously, the charitable organisations were asked what their business model is, and what their vision is on innovation and textile marketing. The interview with Marc Vooges was conducted relatively early in the process in order to understand the views of the charitable organisations. Detailed questions on financial aspects of the charitable organisations were not really needed, because the annual reports were clear.

- Twente Milieu (Twente textile circle) -contact person: Bas Assink

Twente Milieu is a waste treating organisation serving seven municipalities in Twente (Twente milieu, n.d.) and has several tasks such as managing containers and collecting the waste of households. Since 2012 Twente milieu is participating in the ‘textile circle Twente’. This is an initiative that strives for more local textile collection, sorting and recycling. In this project, Twente Milieu is responsible for collecting the Textiles. Twente Milieu was asked about their role in the Twente textile circle, and some relevant figures. However, a part of the figures were already delivered by Peter Bos from Texperium.

- Het Goed (Twente textile circle) – Contact persons: Roel Muis & Auke van der Hoek

Het Goed is also connected to the Twente textile circle and is sorting and marketing the textiles. In some municipalities, they are still collecting the textiles as well. Het Goed was asked for some missing figures and their exact role in the Twente textile circle.
4. Results
In order to come up with clear conclusions and recommendations to improve the textile waste market, it is essential to look carefully at the current situation in the market. Therefore, in paragraph 4.1., the trends and developments are described detailed to give an idea of the current state of the textile waste market in the Netherlands. Subsequently, in paragraph 4.2., the main bottlenecks in the market are described that prevent more textiles from being recycled. Following on this, in paragraph 4.3., there is zoomed in on the situation in Twente. Finally, in paragraph 4.4., the textile collecting organisations that are active in Twente are compared on four themes. Finally, the results of paragraph 4.4. are analysed in paragraph 4.5. in order to determine the main and secondary values of the collecting organisations.

4.1. Trends and developments in the textile waste market
In this paragraph, the trends and developments in the textile waste market are explained. First, possible developments in the waste collection market are elaborated briefly. Subsequently, trends and developments in textile waste collection and marketing in municipalities are explained. Finally, developments in the high quality recycling market of textiles are elaborated.

4.1.1. The waste collection market in general
Regarding Wim van Lieshout\textsuperscript{11} and Adriaan Visser\textsuperscript{12} (as cited by Didde, 2015), in the near future - approximately ten years- we will only produce 25\% of the current amount of residual waste. Because of the expected increasing value of waste, it will become more feasible to collect the reusable and recyclable streams such as glass, GFT and textiles at people their homes (Visser, as cited by Diddle, 2015). This will make waste separation much easier for citizens. In the future perspective of Visser and van Lieshout, the small residual waste stream that will remain, should be delivered on a central place.

There are also other possibilities and visions on waste separation. An example is the “waste pays” initiative (Paul de Bruin, personal communication, March 2015). “Waste pays” means that people bring their valuable waste streams to a central point where they get revenue for it. However, these developments are in early stages and should be tested on a bigger scale.

Senior-lecturer and researcher Sustainable International Business at the Saxion University of Applied Sciences Harrie van Bommel also expects that our current waste system will change completely: “It is quite clear that in the future we will probably have three waste streams left: the wet stream (GFT), the dry streams (textiles, cans, paper et cetera) and residual. In this scenario, the necessary waste separation will be done by highly developed separation machines after disposal. In Twente, some changes in waste collection are occurring already. In Hengelo example, a system of ‘reversed waste collection’ will be implemented (Tubantia, 2015). This means that separated waste streams will be collected for free at people their homes, residual waste should be disposed on a central point in the neighbourhood. This should encourage people to separate their waste.

\textsuperscript{11} Director of the HVC-holding. The largest non-commercial waste processor in the Netherlands.
\textsuperscript{12} Former director of the largest commercial waste processor in the Netherlands, SITA.
4.1.2. Textile waste collection and marketing in municipalities

From charity to commercialisation & Competition

The very beginning of textile collection in the Netherlands can be found in 1967 (Meijer, 2011). In this year ‘foundation people in need’ started collecting textiles to send to developing countries for charity. Later on, the character of the activities moved to fundraising: the textile waste was sold, and the revenues were spent on charity. In the same period, the Salvation Army started to do the same thing: until today they are market leader in the Netherlands. Throughout the years, textile waste started to become more valuable (Meijer, 2011). As a result, more charitable parties such as KICI (1975) and Humana (1988) started to undertake similar activities.

As the economic value of the textiles was rising, commercial parties and thrift stores started to collect textiles as well (Marc Vooges, Personal communication, April 2015). In a lot of cases, those commercial parties pretend to be charitable as well, because they are funding charity. However, those organisations want to make profit for their shareholders, so the percentage that is going to charity is lower.

As more organisations started to involve in the market, municipalities also became interested in the benefits of textile collection and marketing (Marc Vooges, personal communication, April 2015). The last 10 to 15 years municipalities started to ask the collecting organisations for remunerations. Some municipalities are even organizing tender processes, in most cases, the highest bidder wins. For the charitable organisations, that are basically obliged to spend money on their charities, it is very hard to compete with the commercial parties. As can be seen in figure 7, since 2006, the collection costs have increased, and the revenues have not. As a result, the amount of money that is going to charities or other useful things has declined.

![Figure 7. Developments gross proceeds and costs per kilogram collected clothing, self-doers are organisations that are collecting textiles themselves. Adapted from ‘Geschiedenis van het professioneel inzamelen van gebruikte kleding door goede doelen instellingen’ by Meijer, 2011, p. 12.](image)

According to Hielke van den Brink from the Dutch association for textile recovery (VHT) (as cited by Hellendoorn, 2013), the remunerations could have negative impact on sustainability issues: “I hear a lot of complaints from members of VHT that municipalities purely think about the financial aspect. With these policies, municipalities are enlarging the chance that organisations, who are taking sustainability not really serious, are enabled to collect the textiles.” Van den Brink states that municipalities should be critical about the activities of the textile collecting organisations.

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13 Stichting Mensen in Nood
14 Money that is paid by collecting organisations to municipalities in order to get permission to collect.
A telling issue is the fact that charitable organisations are not able to meet the requirements of the CBF\(^\text{15}\) certificate anymore (Meijer, 2011).

**From door-to-door collection to container collection**

In the early days of textile collection, most textiles were collected through door-to-door collection. Which means that charitable organizations are sending bags to people their homes. These people can put their old reusable clothing in it and put the bags on the street. The collecting organisations picks up these bags. Container collection means that people have to bring their own bags with old clothing to containers that are based on central point in neighborhoods. Based on CBF data, Anton Meijer (2011) visualized the trend from door-to-door and depot collection towards container collection in figure 8.

![Developments in shares of three collection methods as percentage of the total amount of collected kilograms 1988-2009](image)

**Figure 8.** Developments gross proceeds and costs per kilogram collected clothing. Adapted from ‘Geschiedenis van het professioneel inzamelen van gebruikte kleding door goede doelen instellingen’ by Meijer, 2011, p. 9.

Door-to-door collection has become less feasible over the last few years, as the collection costs are high and the margins are declining (Fred Spronk, personal communication, May 2015). According to Spronk, door-to-door textile collection has no future anymore. Traditional charitable door-to-door collecting organisations -such as VPGO- are also hindered by “bunglers”, organisations that do not have permits or certificates.

Depot collection means that people bring their clothes to depots, which are mainly thrift stores. This way of collection always had a small share in total collection figures. This is not expected to change.

**From reusing to recycling**

According to estimates, it is expected that the demand for reusable clothing will go down in the next couple of years (Peter Bos, personal communication, March 2015) due to the economic progression in developing countries (Wageningen UR, n.d.). If this trend continues, the demand for reusable clothing will go down and the share of textiles that have to be recycled for its fibres will increase. “The share of reused textiles is approximately 45 % at this moment. We expect it will be around 33 % in 2020, this means that more textiles will have to be recycled in the future”, according to Peter Bos from textile innovation centre Texperium (personal communication, March 2015). This is not a big problem, as most damaged textiles are very well recyclable as well.

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\(^\text{15}\) CBF is a certifying institute that certifies fundraising institutions, such as charitable textile collecting organizations. To meet the requirements of the CBF, officially, 40 % of the revenues may be spend on collection costs. As this is not realistic for textile collecting organizations, some exceptions have been approved (Meijer, 2011).
Involvement of retail stores

Recently, retail stores as H&M and WE started to engage in the waste market as well (Harrie van Bommel, personal communication, February 2015). Those clothing stores are asking back their clothes; clients get a refund when they a bag of old clothes. In the case of H&M, they are funding local charities with 0,02 euro’s per kilogram and they are trying to recycle a small part of the returned clothes into their own products. The opinions about this development are divided. Lector sustainable business at Saxion University of applied sciences Harrie van Bommel and waste advocate Rogier Hörchner are seeing it as a positive development. According to Hörchner (as cited by Hellendoorn, 2013), it is the ultimate “producers responsibility”. “However, from a legal point of view, the delivered textiles are seen as waste”, says Hörchner: “This means that the law should be changed to make it really legal to deliver sacks of textile waste to retail stores”.

Harrie van Bommel (personal communication, February 2015), explained that the retail stores are taking positive action on textile recycling: “They are trying to recycle more textiles into their own products, yes they really are. At this moment, we only talk about relatively small percentages of 20 % recycled fibres, against 80 % new fibres”.

Marc Vooges (as cited by Hellendoorn, 2013) from textile collector Sympany, doubts whether the collection activities from the retail industry will be really successful in the future: “Stores as H&M and C&A are collecting textile waste to attract customers, but in the future all stores will start doing the same, and the distinctive character will disappear. Logistically it will be extremely difficult to get high volumes”. H&M itself declares in a national newspaper ‘de Volkskrant’ (Veenstra, 2012) that the collection costs are very low as there is an overcapacity in transport.

To give an indication of quantities: since 2013, H&M collected around 0.5 Kton in 17 months (Custers et al. 2014). From 2013, the total amount of collected textiles has increased slightly.
4.1.3. High quality recycling

Improving recycling techniques

Using textile waste for recycling in products like new clothes felt, filling and threads has a positive impact on the environment, because the raw material does not have to be produced any more (Custers et al., 2014).

The last couple of years, there have been some serious progress in textile recycling techniques. In Twente, innovation centre Texperium is working on it. Texperium claims that it is already possible to make new clothing with approximately 45 to 75% recycled natural fibres such as cotton. It is not possible to make high quality fibres that are 100% recycled with these natural fibres. The reason for this is the wearing and tearing of the materials which results in shorter fibres (Peter Bos, personal communication, March 2015). To get a high quality product, old and new textiles will always have to be blended. Polyester, which is a polymer, can be recycled for 100% already.

However, Harrie van Bommel expects that we will make a shift from mechanical to chemical recycling. Mechanical recycling means that the fibres are fiberized (pulled apart) to be used for new products (ten Cate, n.d.). Chemical recycling means that the textiles are demolished to its basic elements -cellulose- to be build up again for recycling (Harrie van Bommel, personal communication, January 2015). This way, high quality recycling is possible, because you do not have problems with fibres which are getting shorter because of wearing and tearing. Although the technique is promising, it is still in the testing phase (Gerrit Bouwhuis, personal communication, April 2015).

Feasibility of high quality recycling techniques

According to Anton Luiken (as cited by Verhoek, Stam & Zhukina, 2014) from Texperium, the market of recycled yarns is not viable yet. This is partly caused by the extremely low prices of cotton at this moment. As long as these prices will stay this low, market implementation of textile recycling is not likely to become viable soon. As cotton is the most used textile fibre with 65% in the household textile stream in the Netherlands (van de Vreede & Sevenster, 2010), the prices are really important for the feasibility of textile recycling techniques.

Cotton prices

In figure 9, the developments in cotton prices over the last 30 years are visualized. Due to stimulations, farmers in mainly China and the United States of America started producing cotton. Through these financial stimulations, the farmers started to produce more and more cotton. That is one of the main reasons why cotton prices are low at this very moment. The current price of one kilogram of virgin cotton is €0,65 (Nasdaq, n.d.). As can be seen in figure 9, in 2011 the price was much higher. This was caused by bad harvests in big producing companies. That caused a shortage, so the prices rose fast (Josephs, 2011). This could happen in the future as well.
Future perspective
According to the ICAC (as cited by Agrimoney.com, 2015) it is not likely that cotton prices will drop in the next couple of years. A price forecast of the ‘EIU Economic and Commodity Forecast’ underwrites this claim in figure 10.

Although the price is not likely to fall in the next couple of years, on the long term ICAC expects the prices to normalize again (Agrimoney.com, 2015), but this will take several seasons as the market supply needs time to adjust.
Long term future perspective

Predicting cotton or textile prices in general is really difficult, as there are a lot of influencing factors. Among researchers there are different views on this theme. Some of them see a link between oil and cotton prices. According to Mutuc, Pan & Hudson (2010), there is a ‘significant’ link between fluctuations in oil and cotton prices, although the link is weak. Mutuc Pan & Hudson concluded that only 3% of the long-run cotton prices can be explained by fluctuating oil prices.

As the world population will rise dramatically and our average welfare will increase as well—as is explained in paragraph 2.1—our food demand will increase (FAO, 2009) about 70% between 2007 and 2050. A lot of extra farmland is needed to feed all those people. At the same time, the demand for cotton will increase as well. According to the Global Cotton Report of 2012 (as cited by Fibre2Fashion, n.d.), global demand will increase with 45 million bales in 2020 from the 2012 level of 223.79 million bales. This trend is expected to continue.

Based on these facts, Peter Bos (personal communication, March 2015) and Anton Luiken (as cited by Verhoek, Stam & Zhukina, 2014) from innovation centre Texperium, are expecting that on the long term, cotton prices will go up. However, there are no signs of these developments yet. A possible reason that is common amongst experts is the economic crisis of 2008 (Harrie van Bommel, personal communication, May 2015).
4.2. Bottlenecks in the textile recycling market

In this report, three main bottlenecks in the market are identified, that prevent more textiles from being recycled in a high quality way. In this paragraph, these bottlenecks are explained.

4.2.1. Bottleneck 1: A lack of communication to citizens

In 2012, NL Agency (Agentschap NL) and the Ministry of Infrastructure and Environment (I&M)-commissioned research firm TNS Nipo to do research on the attitudes of citizens towards textile collection. This research is called “Kansen voor textielinzameling” (Schalwijk & Mulder, 2012). This research helped them to get a clearer view on ways to stimulate citizens to deliver more textiles. Furthermore, in 2011 the ministry set up chain consulting’s, which are gatherings with the main stakeholders in the textile waste market such as collectors, separators, municipalities and recycling companies. In the brochure “Textielinzameling op de kaart” (Agentschap NL, NL Milieu en Leefomgeving & Uringa, 2012), the main findings and conclusions are presented.

Communication gap

One of the main conclusions presented by Schalwijk & Mulder (2012) is the lack of knowledge among citizens. In 2011, 60% of the people that deliver their textiles separately, did not know that damaged clothing could be delivered in the containers as well as reusable clothing. A reason for this is that the traditional textile collectors are all communicating different messages to the citizens about what to deliver or not. As a result, people get confused.

Motives for citizens to deliver textiles

In the document, the most important motives for people to deliver their textiles are defined. It is clear that “doing good” is an important factor. “Doing good” is a broad term in this case as people are not making a distinction between environmental and social aspects. Both aspects are considered important. As researched by Schalwijk & Mulder (2012), around 75% of Dutch citizens find it important that they are contributing to more recycling and waste reduction. An equal percentage of the people find it important to do something for other people. At the same time, around 50% of the people are rejecting incineration as a good recycling method of textiles. 25% of the people assess it as “not more than reasonable”. According to Schalwijk & Mulder (2012), waste separation is also “an attitude towards life”: people who separate textiles generally also separate other waste streams and vice versa. Another interesting point is that hardly anyone (6%) deliver textiles to save waste costs.

Solutions

It can be concluded that the will to deliver textiles in favour of good causes and a useful application is there. In the brochure “Textielinzameling op de kaart”, some solutions are proposed. It is clear that there have to be invested in clear and effective communication in order to make clear what sort of textile waste can be delivered, and what good causes are supported. To reach this goal it is important to set up clear communication plans. This can be done by municipalities in cooperation with collection organisations. In the communication plans, it is important emphasize the social and environmental benefits of textile separation. It is also advised to select collection organisations on their collection and recycling performances rather than on prices.

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17 Opportunities for textile collection
18 Textile collection on the agenda
The follow up: the Green Deal
In 2012, a follow up on the chain consultation and the report of Schalwijk & Mulder was deployed: The ‘Green Deal for Collection of Textiles’ (Fashion 2, n.d.). The most important stakeholders were connected to the deal, except for the municipalities (op den Brouw, personal communication, May 2015).
The overarching goal of the Green Deal is the ambition to collect 50% more textiles in the future. A couple of important goals were set up such as pursuing a separation rule, and setting up a national communication plan in order to encourage people to deliver more textile waste. The separation rule had been realized. However, the communication plan had stranded.

Chain deficit
One of the reasons that the green deal did not succeed, is because of the fear for a chain deficit (Verheggen, 2014). The chain deficit is caused by a couple of things. In the first place, investments in communication and marketing are needed to collect more textiles. However, it is expected that when more clothes will be collected, the average quality will go down as more damaged clothing will be delivered as well. This means that the economic value of the waste will decrease. Especially the charitable organisations are afraid of this development, because they will not be able to earn enough money with selling the clothes to stay viable (Peter Bos, personal communication, March 2015). Their main goal is charity, and in case of the chain deficit they will not have enough money for that anymore.

Hanneke op den Brouw (personal communication, May 2015) - one of the main responsible people from the Dutch Department of Public Works (Rijkswaterstaat) - admits that the green deal has stranded. “I agree the chain deficit was a problem. However, parties were also not willing to continue, because the Association of Dutch Municipalities (VNG) was not willing to cooperate: they did not find it important enough”. At this moment, the department is working on a new project called ‘from waste to resource’ (VANG), with textile as one of the prior streams.

Solutions for the chain deficit
According to Jolande Uringa of Reshare (personal communication, May 2015), improving and implementing scalable high quality recycling methods is a perfect way to increase the economic value of non-reusable textiles. When textiles can be recycled in such a high quality way that you can make new clothing with it in a feasible and competitive way, the economic value will rise as well. When this happens, collection organisations could overcome the chain deficit. According to Uringa, basically all collecting organisations are looking for these innovations.
4.2.2. Bottleneck 2. A lack of scalable innovative recycling methods

Technically seen, high quality recycling is possible already. Texperium succeeded in making new jeans with 50% recycled fibres (Peter Bos, as cited by Diddle, 2015). However, there are some problems that prevent these techniques from being applied on a larger scale.

Feasibility

As explained in paragraph 4.1., there is no real market for recycled clothing yarns yet. Therefore, all recyclable textiles are mainly used for low quality recycling, called down cycling. When issuing a circular economy, textiles have to be recycled in the highest quality possible in order to diminish the pressure on resources. Unfortunately, due to the low cotton prices, it is not likely that high quality fibre recycling will become viable the next few years (Anton Luiken (as cited by Verhoek, Stam & Zhukina, 2014).

As detailed projections on the future are not available, it is hard to say whether the cotton prices will rise and the "break-even point" for feasible high quality textile recycling will be. However, it is expected that it will happen for sure.

Solutions

Although the cotton prices cannot be increased artificially in order to make recycling techniques more viable, there can be done something to boost high quality recycling.

In the first place, there are quite some technical challenges to be dealt with. An example is removing the colour of old textiles and the wearing and tearing of materials (Gerrit Bouwhuis, Personal communication, April 2015).

These challenges make high quality textile recycling difficult. Moreover, the techniques should be made more efficient in order to improve the marketability. Fundamental research is needed to overcome these things. Furthermore, experiments on a bigger scale are necessary to make innovations scalable. According to Gerrit Bouwhuis (personal communication, April 2015) involvement of businesses is essential, as innovation centres or universities are not able to produce large quantities. However, businesses are often reluctant to step in as the techniques are not proven yet. We can only prove the actual effectiveness of the technique when we test it. This is a vicious circle.

Role of regional governments

Regarding Jolande Uringa (personal communication, May 2015), municipalities could be of help with procuring products and cooperation in innovation projects. At this moment, Reshare is doing such a project with Defence. Governments could function as pilot projects for recycled fibre products. This can improve the scalability of the developments, as it can be tested on a big scale. Clothing businesses could then be attracted to join.
4.2.3. Bottleneck 3. A lack of municipal involvement

Municipalities have quite a lot of power in the textile waste market (Theo Matton, personal communication, March 2015). They could choose their textile collection partners and according to Uringa (personal communication, May 2015) they also could have a role in stimulating innovation.

However, Matton - policy advisor of the municipality of Enschede - explained that a lot of municipalities are seeing textile as a relatively unimportant waste stream, because of the small mass. Streams as paper and GFT are much bigger, looking at kilograms. Municipalities are not really looking at environmental impact. Therefore, it is not likely that most municipalities will develop action plans on supporting the textile market in terms of communication or boosting high quality textile recycling. According to the interview with the project leaders of the Twente region, municipalities are quite convinced that the loops are already pretty much closed and real action is needed (Karin Fakkert, personal communication, March 2015).

This lack of involvement is endorsed by the brochure “Textielinzameling op de kaart” (Agentschap NL, NL Milieu en Leefomgeving & Uringa, 2012). The unwillingness of the Association of Dutch Municipalities (VNG) to cooperate in the green deal for the collection of textiles is also underlining this lack of involvement.

A result of the lack of involvement is that municipalities are organizing their textile collection system in the same way they always did. Peter Bos (personal communication, March 2015) added that municipalities are not seeing the actual possibilities in terms of textile recycling. Recycling textiles is already possible in a high quality way, although it may not be 100 % yet.

Remunerations

The remuneration policies - as explained in paragraph 4.1.2. - could be seen as indicators of this lack of interest as it is limiting the financial resources of collecting organisations. In this way, the collecting organisations are less capable to do investments in communication and innovation on order to solve the first two bottlenecks.
4.3. Current textile waste policies in the region

In this paragraph, there will be zoomed in on the situation in the Twente region itself. The actors and global policies on textile collection in the Twente region are defined. The focus lies on container collection instead of door-to-door and depot collection. This is because the share of kilograms that are collected through door-to-door and depot collection is decreasing for many years now. Moreover, the collection organisations are mainly focusing on container collection nowadays.

Textile collecting organisations

In the Twente region, four textile collecting organisations are active. Some municipalities are outsourcing more than one organisation:

- 6 municipalities are outsourcing Reshare
- 2 municipalities are outsourcing Sympa
- 7 municipalities are outsourcing the Twente textile circle (Twentse textielcirkel)
- 1 municipality is outsourcing the Borne Thrift store (Bornse kringloopwinkel)
- 1 municipality is not having a container collection system yet

A table with all relevant information on the textile waste collecting per municipality can be found in appendix 1.

Motives behind working with the charitable organisations

The reasons for cooperation with the charitable organisations vary. For example, the municipality of Almelo works with Reshare from an idealistic point of view (Karin Fakkert, personal communication, March 2015), because they think charity is important. Therefore, the organisation should be enabled to employ their activities as much as possible. Rijssen-Holten is just choosing for the highest bidder, which is Reshare at this moment.

Motives behind working with the Twente textile circle

Motives behind choosing for the Twente textile circle are not researched in depth. However, in case of Enschede, there is an ambition to collect more textiles (Mirian Kock, personal communication, March 2015) and they are convinced that the textile circle can help them with this aim. The presence of Twente milieu and thrift stores het Goed and de Beurs play a role as well (Auke van der Hoek. Personal communication, May 2015).

Remunerations

Four municipalities in the Twente region are asking for remunerations of the collecting organisations. Hellendoorn and Borne are asking relatively small payments (0,03 euro’s and 0,02 euro’s per kilogram). Rijssen-Holten asks 0,20 euro’s per kilogram. Twenterand also asks remunerations, but they requested not to publish the actual sum. Finally, Wierden is not outsourcing a container collector yet. However, when starting with an organisation, a tendering process for textile collectors is planned.
Motives behind remuneration policies.
In the case of Rijssen-Holten, the remuneration policies are based on the fact that citizens are delivering their textiles to collecting organisations and that the money should return to the citizens. According to Wim Haase (personal communication, June 2015), the municipality wants to invest the money in reducing the waste taxes. If there comes up another collecting organisation that can provide higher remunerations, they will start working with them. Although, Haase highlighted that those organisations should be reliable. The reason of Karin Fakkert from the municipality of Almelo (personal communication, March 2015) not to ask remunerations is that Almelo does not want to decrease the amount of money that is reserved for funding charities.
4.4. Comparison Textile Collecting Organisations.

As defined in paragraph 4.3., looking at container collection, there are basically four organisations active in Twente: the traditional charitable organisations: Reshare and Sympany, Thrift store Borne and the new initiative: the Twente textile circle (Twente milieu, together with het Goed and de Beurs). Thrift store Borne will not be discussed in this chapter, as it is assumed that their activities will be mainly the same as the activities of het Goed and de Beurs. Moreover, it is just relevant for one relatively small municipality.

In this paragraph, the three main textile collecting organisations are compared on three levels. 1. Action plans to come to more collection; 2. Contribution to innovation and 3. Other added values. These points show how the business models of the three main textile collecting companies in Twente are looking like, what their differences are and in what extend the organisations are able to deal with the actual bottlenecks on communication and innovation.

Introducing the concepts of textile collecting companies.

Before the organisations are compared, a short introduction on the concepts of the organisation will be given.

Explanation Reshare

As explained briefly in paragraph 4.1., The Salvation Army was one of the first textile waste collectors in the Netherlands. Since 2006, Reshare is the textile collecting organisation of the Salvation Army (Meijer, 2011). This is an evangelical organisation that is doing all sorts of projects in evangelization and social work (Leger des Heils Reshare, 2013). The business model of Reshare means that the collected textiles are sold to their (regular) consumers in mainly foreign countries in Africa. With the earned money, Reshare funds the Salvation Army (Jolande Uringa, personal communication, May 2015).

Sympany

Sympany is a merged organisation of KICI and Humana (Marc Vooges, personal communication, April 2015). Their business model is mainly the same as the model of Reshare: selling the textiles to (regular) consumers in foreign countries, and funding charity projects with the profits. The main difference between Sympany and Reshare is in the fact that Sympany is doing its own projects whereas Reshare is funding the Salvation Army.

Twente textile circle

The Twente textile circle is a new initiative, consisting of four organisations including waste collector Twente milieu, thrift stores het Goed en de Beurs, and innovation centre Texperium (Bas Assink, personal communication, March 2015). The principle is as follows: Twente milieu is collecting the waste, thrift stores het Goed en de Beurs are sorting out the waste with the help of SROI\textsuperscript{19} people. A small part of the waste is sold in the thrift stores; the rest is sold on the market. The Twente textile circle is set up because of frustrations with traditional parties (Peter Bos, personal communication, March 2015). In their own words: the Twente textile circle does not have problems with the chain deficit, because it works more efficiently and it is not required to spend money on charity.

\footnote{\textsuperscript{19} Social Return On Investments: Employees with disabilities / distance from the labour market (Ministerie van Sociale Zaken en Werkgelegenheid, n.d.)}
Origin of figures
Regarding Reshare, if not indicated differently, all figures and data in this comparison are extracted out of the annual financial report 2013 of Reshare. As Sympany is a fusion party of KICI and Humana that exists since 2014, there is no annual report available yet. Therefore, information of the annual reports of the fusion partners in 2013 is used. The information of the Twente textile circle is gained via the partners of the initiative: Peter Bos (Texperium), Bas Assink (Twente milieu) and Auke van der Hoek and Roel Muis (het Goed). Some figures were given during the interviews; some figures were gathered through the ‘example calculation’ - set up in 2013 - that was delivered by Peter Bos from Texperium. It is relevant to mention that the figures of the Twente textile circle are based on assumptions and intentions. The result can therefore differ from the real situation. Key figures and formulas that are used in the comparison can be found in appendix 3.

4.4.1. Communication
As explained in paragraph 4.2., the first requirement to come to a higher recycling rate is to make more textile collection possible. More communication towards citizens is needed in order to do this. Therefore, it is interesting to see how the collecting organisations are willing to improve the collection performances and what their actual budgets are.

A. Reshare
Reshare is quite unclear about their practical plans to come to more recycling in the future. An important reason for this is that the financial space is limited. Because of the fees that a lot of municipalities are asking nowadays, the standard financial contribution to the Salvation Army is decreasing (Jolande Uringa, personal communication, May 2015). For this reason, there is not much money left to invest in communication. Nevertheless, in their annual report over 2013, Reshare mentioned the importance of better communication, and claims to support municipalities in it. They also mention the green deal, which has communication as one of its key points. However, the green deal has stranded. Reshare faces the same problem of the chain deficit: when more clothing will be collected, the quality will decrease and the deficit will increase even more.

B. Sympany
Because of the recent fusion of KICI and Humana, there is no clear action plan yet, as the future is still too unclear (Marc Vooges, personal communication, April 2015). However, it is likely that the problems of Sympany regarding the chain deficit are mainly the same as the problems of Reshare. In 2013, KICI declared in their annual report that they want to improve their communication to citizens, to be able to collect more textiles. Central theme is to communicate the new separation rule to citizens to tell them that they can deliver all sorts of textiles, also the damaged stuff. The merged organisation Sympany communicates the new separation rule to citizens though their websites and public appearances on TV, radio and newspapers (Sympany, n.d.).

C. Twente textile circle
The Twente textile circle has quite a clear vision on the journey to 50 % more textile collection despite the fact that they do not have an action plan on paper yet (Bas Assink, personal communication, March 2015). The textile circle is willing to invest a lot in communication, because that is the main reason why people are not handing in their waste. To reach this goal, all containers will be replaced with clear information, and campaigns will start. The first brochure and the first flyers has been released already (Auke van der Hoek, personal communication, May 2015). According to Bas Assink of Twente milieu (personal communication, March 2015), results are already visible as the collection performances in Enschede are better this year. Nonetheless, Twente milieu just started last year with collecting the textiles, so it is too early to draw conclusions.
Communication budgets

Table 1 shows what the communication budgets of the collecting organisations are. Reshare does not have a communication budget included in their annual report 2013.

<table>
<thead>
<tr>
<th>Communication budget</th>
<th>Reshare</th>
<th>Sympy</th>
<th>Twente textile circle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not communicated.</td>
<td>Humana 2013: 0,0015 per kilogram: (0,19 %) (2012: 0,0112 euro’s per kilogram: 1,19 %) KICI 2013: 0,0008 euro’s per kilogram. 0,17 %</td>
<td>0,14 euro’s per kilogram (29 % of total revenues)</td>
</tr>
</tbody>
</table>

Table 1. Investments in communication

As shown in table 2, the Twente textile circle invest much more in communication than the charitable organisations Humana and KICI were doing in 2013.

A critical point from Marc Vooges, former director from Humana (now director by Sympy) is that new (commercial) initiatives such as the Twente textile circle are wasting money on communication and “expensive advisors” (personal communication, April 2015), as they have to discover the market on their own. Experienced companies such as Sympy do not have to make these costs because they know the market already. Jolande Uringa from Reshare added to this that the Salvation Army is such a strong brand that further investments on communication marketing are not really needed (personal communication, April 2015).

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20 As media (newspapers, radio and television programs) gave Humana the opportunity to expose itself, less money had to be spend on communication. Therefore, the figures from 2012 - a “normal” year - are given as well.

21 As explained by Bas Assink (personal communication, March 2015), a part of the communication budget is included in the 0,18 euro’s that Twente milieu is charging. Therefore, it is likely that the 0,14 per kilogram investments in communication will be higher in reality.
4.4.2. Innovation

The theoretical report showed that a vital theme in the textile recycling market is innovation. To make the textile industry more sustainable, innovations in fibre recycling should make some serious progress. All collecting companies claim to contribute to innovative projects with a main aim to find ways of making new yarns out of old textiles in a more efficient and profitable way (Jolande Uringa, personal communication, May 2015). As explained in paragraph 4.2.1., it could also be a solution for the chain deficit.

Table 3 shows what the collecting organisations are spending on innovation.

<table>
<thead>
<tr>
<th>Innovation budget</th>
<th>Reshare</th>
<th>SympaNY</th>
<th>Twente textile circle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not known</td>
<td>KICI: 0,00029 euro’s per kilogram (0,05 % of total revenues)</td>
<td>Humana: 0,00317 euro’s per kilogram (0,40 % of total revenues)</td>
<td>0,05 euro’s per kilogram (10 % of total revenues)</td>
</tr>
</tbody>
</table>

Table 3. Investments in innovation.

In table 3 it appears that the Twente textile circle is investing a lot more in innovation than the charitable organisations are doing.
4.4.3. Other added values

To clarify what the main differences are between the business models of the Twente textile circle and the charitable organisations, the added values - that do not have a direct relation to the main bottlenecks in the market - are concerned as well. This includes the contribution A. local recycling; B. social employment and C. Charities.

A. Local recycling

As explained in paragraph 2.3., basically all textiles that are collected separately are reused or recycled in some way. In this research, it is assumed that the three textile collecting organisations in Twente are reliable partners who stand for high quality reusing and recycling. Therefore, it is likely that the application of the waste is mainly in accordance with the material flow analyse of FFact that is reprinted in paragraph 2.3.

Local recycling recyclable waste

Although the main part of the textile application is considered to be the same, the Twente textile circle is employing a different model regarding their recyclable waste. Namely, circa 20 % is recycled at VAR Frankenhuis (Auke van de Hoek, personal communication, May 2015), a textile waste recycling company who mainly focuses its activities at this moment on low quality textiles for applications such as insulation materials and felt. This 20 % is the so-called “unmarketable” part of the textiles, which means that the collection costs are higher than the revenues.

The reason for keeping these materials in the region is to close the loops locally. As explained by Peter Bos (personal communication, March 2015), manager R&D and innovations from VAR Frankenhuis, local recycling is valuable because of the poor working quality of employees of recycling companies in India, where these types of textiles are normally recycled. Additionally, a small part of the waste is going to innovation centre Texperium, and is used for fundamental research.

<table>
<thead>
<tr>
<th>Recyclable textiles applied in the Netherlands</th>
<th>Charitable organisations (Sympany &amp; Reshare)</th>
<th>Twente textile circle</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,4 % (estimation(^{23}), based on research FFact)</td>
<td>20 %(^{24}) (estimation) (Auke van der Hoek, personal communication, May 2015)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Application of the waste.

Although it is just an estimation, it can be concluded that the Twente textile circle is confessing more local recycling than the charitable organisations. This is one of their main values.

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\(^{22}\) Recyclable textiles are meant in the definition of Custers et. al. (2014). The production of fibres in order to make cleaning rags is included. The cutting of cleaning rags is not included.

\(^{23}\) The 8,4 % is neither specifically assigned for Reshare, nor for Sympany. In this table, an assumption had been done, based on the nationwide picture, drawn by Custers et al. As Reshare and Sympany are two of the biggest textile collectors in the Netherlands, it is likely that this percentage will be more or less the same. However, on individual level, there could be small differences.

\(^{24}\) As this only concerns the “unmarketable” part, the total percentage of recyclable textiles that is applied in the Netherlands might be higher.
B. Social employment

Reshare, Sympany and the Twente textile circle are providing local employment for their activities. Most of the times, it concerns sorting activities (Sympany, 2015). This includes employment for SW-people\(^{25}\), in this report indicated as SROI (Social Return On Investments).

All organisations are striving for the local aspect of this employment and Reshare and Sympany have sorting facilities spread through the Netherlands. The Twente textile circle tries to keep the sorting facilities as close to the municipalities as possible, and strives for regional (or municipal) sorting facilities, executed by local thrift stores het Goed and de Beurs. According to Auke van het Hoek (personal communication, May 2015); it is basically possible to enrol this system in all municipalities, as long the “critical mass”\(^{26}\) could be reached.

<table>
<thead>
<tr>
<th>Amount of SROI’s(^{27}) per 1000 kg</th>
<th>Reshare</th>
<th>Sympamy</th>
<th>Twente textile circle</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.093 SROI</td>
<td>0.049 (assumption) SROI</td>
<td>0.25 SROI</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. The amount of SROI’s per 1000 kg.

As can be seen in table 5, the Twente textile circle is proving more SROI’s per kg than the charitable organisations.

Regular employment

A more developed textile waste market does not only provide SROI-jobs, but also normal jobs. Per 1000 kg, 7 FTE’s are needed to sort out the textiles, according to estimations extracted from the example calculation of the Twente textile circle.

\(^{25}\) Employees with disabilities / distance from the labour market. Municipalities should provide jobs for these people, as defined in the Social Employment Law (Ministerie van Sociale Zaken en Werkgelegenheid, n.d.)

\(^{26}\) A critical mass is the amount of collected textile waste that is required to make a sorting facility feasible (Auke van de Hoek, personal communication, May 2015)
C. Charity
The main goal - and even the right to exist - of the charitable organisations is to earn money for their charities. In table five it is shown how much money was spent on this goal in 2013 and in what way the goals of Reshare and Sympany differ.

<table>
<thead>
<tr>
<th></th>
<th>Reshare</th>
<th>Sympany</th>
<th>Twente textile circle</th>
</tr>
</thead>
</table>
| Main activities/projects | Goals Salvation Army:  
- Development work in third world countries  
- Evangelization  
- Care and welfare project in the Netherlands (shelter, health care et cetera)  
- Textile related training programs in Malawi & Congo  
- Other charity projects (sustainable agricultural developments) | None |
| Expenses on charity per kg | 0,18 eurocents/kg (26 % of nett revenues) | KICI:  
0,13 eurocent/kg (25 % of nett revenues)  
Humana:  
0,24 eurocent/kg (31 % of nett revenues) | None |

Table 5. Expenses on charity.

As shown in table 6, the charitable organisations are spending 23 up to 31 % of their revenues to charity.
Reshare supplies the Salvation Army with incomes; Sympany is doing its own projects.
The Twente textile circle is not spending any money on charity.
4.5. Analysis Textile Collecting Organisations

In this short analysis, the first two bottlenecks - a lack of communication to citizens and a lack of scalable innovative recycling methods - are linked to the business models of the collecting organisations, which were explained in paragraph 4.4.

The main and secondary values of the collection organisations are summarised in table 6.

<table>
<thead>
<tr>
<th>Main values</th>
<th>Charitable organisations</th>
<th>Twente textile circle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charity projects</td>
<td>• Charity projects</td>
<td>• Communication</td>
</tr>
<tr>
<td>Innovation</td>
<td></td>
<td>• Innovation</td>
</tr>
<tr>
<td>Local recycling</td>
<td></td>
<td>• Local recycling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary values</th>
<th>Charitable organisations</th>
<th>Twente textile circle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social employment</td>
<td>• Social employment</td>
<td>• Social employment</td>
</tr>
<tr>
<td>Innovation</td>
<td>• Innovation</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>• Communication</td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Summary of main and secondary values collection organisations.

It is clear that the Twente textile circle is focusing on the bottlenecks communication and innovation. The charitable organisations focus mainly on charity and treat innovation and communication as additional activities.
5. Conclusions

Based on the results in chapter 4, two main conclusions were drawn in order to answer the problem description.

Problem description

In which way could the municipalities in the Twente region support the textile waste market in Twente to ensure more textiles will be recycled for the highest quality possible?

Conclusion 1 - Make textile waste a high priority

Taking into account the environmental impact of textiles, as explained in paragraph 2.3., it is clear that the textile waste stream has a lot of environmental impact and at the same time a big recycling potential. Paradoxical is the lagging collection rates of textiles and the reticent attitude of the municipalities at this moment. In most municipalities, policies are the same for many years, although improvement is needed. More textiles should be collected and innovation should be boosted, as different innovation centres are working on textile recycling techniques and are dealing with several problems. Municipalities could support these developments.

Some municipalities in Twente are even counteracting positive developments: by asking remunerations from textile collecting companies, the collection costs are driven up. This simply means that less money will be available for charities, communication and innovation. In the case of the municipality of Rijssen-Holten, an argument to ask remunerations is to give the money that collecting organisations are earning back to the citizens. However, Schalwijk & Mulder (2012) concluded in their research that costs reduction is no motivation for people to deliver their waste. Therefore, said argument is invalid.

The municipality of Wierden does not have a container collection system at all and is preventing more textiles from being collected that way.

Municipalities should look at the environmental impact and the recycling possibilities of the waste stream, rather than the amount of kilograms. Besides decreasing the environmental impact, more textile recycling could have various benefits such as reducing the incineration costs and increasing the employment of SROI people. This could be of value because of the low employment rates in Twente. In short, Twente is missing some interesting opportunities that could lead to a higher recycling rate of textiles and more employment.

Conclusion 2 - Expand the Twente textile circle.

Based on the facts that are presented in chapter 4, it is likely that the Twente textile circle is a good partner to cooperate with in order to come to more textile collection and high quality recycling. In paragraph 4.2. it became clear that the lack of communication and innovation are two important bottlenecks in the market that prevent more textiles from being recycled.

Paragraph 4.4. made clear that the Twente textile circle invests a lot more money in these developments than the charitable organisations: their communication and innovation budgets are considerably bigger.

Because the charitable organisations - Sypany and Reshare - view ‘charity’ as their main goal, they will always have to spend money on charity. The Twente textile circle does not have this commitment. Therefore, it is likely that the Twente textile circle will not have (or has less) problems with the chain deficit and is able to start today with communication in order to collect more textiles, as they are doing already.

The charitable organisations are more or less frustrating the process to more textile recycling, because they are facing a chain deficit and do not have clear targets on higher separation rates. This is understandable from their perspective, but it does not help to recycle more textiles.
Another argument for the expansion of the Twente textile circle is that they are trying to close the loop locally, which means less recyclable textiles will have to be transported to countries such as India, where the working circumstances are poor. These local activities provide local (SROI) employment as well. This is highly valuable, as the Twente region knows low employment rates.

Furthermore, it is important to take the future developments in waste management into account. To prepare on future developments such as post-waste separation and reversed waste collection, it could be beneficial to bring textile under the responsibility of Twente milieu. In this way, textiles can be included in the future system anytime.

Although the expansion of the Twente textile circle seems to be very positive, it is wise not to hurry. The textile circle is working on expanding its activities to six municipalities at this moment. It is highly required to give the organisation the time to elaborate their system in these municipalities, before expanding it to others. Moreover, it is important to take the time to roll out the system in phases, so that the system could be monitored and checked in order to make sure that they are really achieving their goals. Actually, the Twente region is a perfect organisation to monitor the actual benefits of a new initiative such as the Twente textile circle. Because charitable organisations are adding important values as well, it is highly desirable that this system will remain intact in some way, so that citizens can decide by themselves where to deliver their textiles.

Important to mention is that the actual value of charitable organisation is absolutely not dismissed as inferior. In this conclusion is explained what is - based on the results - the most suitable organisation to cooperate with in the future in order to come to more textile collection and high quality recycling. In the end, it is a political choice what is concerned as more important: more textile collection and high quality recycling, or charity. A value judgement is not given in this report.
6. Discussion

In this research, a couple of things should be discussed before proceeding to the recommendations. These things influenced the research in such a way that the results could be determined as less reliable.

1. The use of example calculations
Because the figures that are used of the Twente textile circle are based on estimations from an example calculation, there must not be rewarded too much value on those specific figures. The figures that are presented in paragraph 4.4., are meant to explain the differences between the Twente textile circle and the charitable organisations. The figures do not represent the real situation.

2. Applicability of national information on the Twente region
Some sources that are used in this research - such as the material flow analysis of Custers et al. (2014) - are focused on the situation in the Netherlands. In this research, these figures are used and applied to the situation in Twente. Nevertheless, it is possible that the situation Twente is significantly different from the national situation. This item is also relevant for some of the interviews. In these interviews, people were looking at the textile waste market in general. Not all their views and ideas may be directly applicable to the Twente region.

3. Lack of data on efficiency
Looking at the results, it may seem logical to conclude that the Twente textile circle is working more efficiently, because the total expenses on their main goals (communication and innovation) are slightly higher than the expenses on charity of the charitable organisations. However, based on the facts that are presented in this research, this conclusion cannot be drawn. There are simply too many figures unknown. For example, many municipalities are asking for remunerations. These costs are invoiced in the actual collection costs of the charitable organisations. This means that the expenses on their goals are lower than they could be. The Twente textile circle does not work with these charges. Therefore, their collection costs are lower anyway.

4. Lack on specific information on values municipalities
In this research, the theme of municipal involvement in the textile waste market is considered in a generic way. The interviews with Karin Fakkert from the municipality of Almelo and Theo Matton from Enschede showed that a lot of municipalities do not see textile as a prior stream. This impression was corroborated by national sources and the fact that some municipalities are asking for remunerations. However, not all municipalities in Twente were contacted about their exact aims and future goals on the textile recycling issue. Due to time constraints, it was simply not possible to do so. Therefore, it could be the case that the lack of interest is not justified for all municipalities. For example, the municipality of Enschede is quite innovative in terms of textile collection. They are the first municipality where the Twente textile circle is active, and they are working with fines in order to make sure the textile circle is really achieving its goals.

5. Valuating activities of collecting organisations
In this research, solutions for the main problems and bottlenecks in the textile waste market are unravelled. The main aim to do this is to come to a higher (high quality) recycling rate of textiles in Twente. Based on this underlying goal, the textile collecting organisations were compared and conclusions were drawn. However, there are a lot of different views on what is the most important theme in the textile recycling market. Some municipalities - such as Almelo - and of course the charitable organizations consider charity as the most important issues to be pursued. Therefore, it is important not to see the conclusions in this report as a value judgment, as there are different views on what is important.
7. Recommendations

In order to make the conclusions practically applicable, eleven recommendations are given. The knowledge centre of living environment (KCL) is also provided with a recommendation on how to strengthen and use this particular research in their overarching research. The recommendations are presented in no particular order.

Conclusion 1 - Make textile waste a high priority

In order to prioritise the textile waste stream, some practical actions could be undertaken.

1. **Invest in textile recycling innovations**
   In Twente, some organisations are working on textile recycling innovations, such as Texperium and the Saxion University of Applied Sciences. These organisations struggle with the scalability of their innovations. It would probably help if municipalities or the region offer those organisations pilot projects. For example, required clothing for their municipal services could be procured or ordered at those organisations. When these organisations already have a client for their product, it could be easier to attract investors from the business world.

2. **Stop asking remunerations**
   By stopping to ask remunerations, municipalities are given a perfect possibility to influence the activities of the charitable organisations and to improve collection rates. When a municipality decides to stop it, they could force collecting organisations to invest in certain things. For example, the waste collecting organisation should invest the saved money - or a part of it - in communication to improve the collection rates.

3. **Implement extensive collection systems in all municipalities**
   As the municipality of Wierden does not have a container collection system yet, it is essential to mention the importance of implementing it.

Conclusion 2 - Expand the Twente textile circle

Although the expansion of the Twente textile circle is likely to be beneficial in order to overcome the bottlenecks in the textile waste market, some terms and conditions should be taken into account when implementing the system. These recommendations can make sure that the right decisions are made and goals are achieved.

4. **Roll out the system in phases**
   When the region is aiming to expand the Twente textile circle to other municipalities, it is recommended to start with the municipalities in which the system could be implemented the easiest way. This means that the system could be brought to municipalities that already use the waste collecting services of Twente milieu. Local thrift stores could be involved as well. When the system is implemented in the Twente milieu municipalities, there could be looked at the five municipalities that are not connected to Twente milieu (yet). The waste collectors in these municipalities (ROVA and municipal waste services) could be pursued to set up a similar system, or to corporate in the system of Twente milieu. The last option is preferred, because the initiators of the Twente textile circle set up an entire system already. It would be a waste of effort and money to set up a new system.
5. **Take care of proper result monitoring**

It is recommended to take care of a contentious monitoring system of the actual textile collection results of the textile circle, and compare this to the collection results of the charitable organisations. If the goals are successfully achieved, the system could be rolled out as explained in the first recommendation. In this comparison, there should be looked at relative improvement, based on percentages. If the goals are not achieved, expansion could be reconsidered or incentive mechanisms could be used, such as fines. The municipality of Enschede is working with these fines already.

6. **Demand an annual report of the Twente textile circle**

Following up recommendation 5, the monitoring system should include an annual report with an elaboration on the money streams in the textile circle, basically in the same way as Humana and KICI published their figures over 2013 and the previous years. The figures that are used in this particular research come from an example calculation from 2013. The Twente textile circle is claiming to work much more efficiently. They should support this claim with a clear financial report.

7. **Trade-off sorting facilities**

One of the benefits of the Twente textile circle is the developments of small sorting facilities in the municipalities where they are active, because it provides employment. However, it is likely that in some smaller municipalities it would not be possible to collect a “critical mass” that makes local sorting centres feasible.

To solve this problem, tuning with other sorting activities of Twente milieu could be an option. For example, SROI employees could also sort out electronic waste. When there are two small municipalities that are both not able to reach the critical mass, sorting facilities could be “traded-off”. One municipality gets the electronic sorting centre, the other one gets the textile sorting centre.

8. **Keep door-to-door collection system alive**

It is recommended to keep the door to door collection system of charitable organisations alive, also in the municipalities where the Twente textile circle is active. This is not harming the collection performances of the textile circle and it will only lead to more textile collection. Furthermore, it is important to make sure that these organisations are reliable and are actually spending their profits on charity. This can be controlled through the CBF certificate.

9. **Explore possibilities on cooperation charities and Twente textile circle**

In municipalities where charitable organisations are active in container collection, options for cooperation with the Twente textile circle could be explored by municipalities or the region. A cooperation could mean that the Twente textile circle implements their textile collection system in a municipality, for example Almelo. They will work together with Reshare and they share their revenues. Reshare will maintain its market share, and the Twente textile circle could make money from the extra 50 % that they aim to collect. Of course, clear and uniform communication is needed, so charitable organisations should actively work together with the Twente textile circle in order to adapt the containers and to set up a communication plan.
Practical recommendation on the overarching research of the Knowledge Centre for Living Environment (KCL)

10. Research the (expected) future developments in terms of waste collection and separation
For the overarching research of KCL, it would be useful to look more detailed into the developments like separation issues (pre- and post-separation and reversed collection). A hypothesis could be that in the future, post-consumer separation is likely to develop itself extensively, and that textiles could and should be included in this system as well. If this is true, it could be another strong argument to start outsourcing the textile collection to Twente milieu (Twente textile circle).

Recommendations for further research

11. Research the feasibility of (local) textile recycling
For the Twente region, exploring the possibilities on developing a local textile recycling industry could be highly interesting, as there are a lot of textile related parties operating in Twente which are willing to develop itself. Due to changing market developments, high quality textile recycling in Twente could provide interesting possibilities.
Literature


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Appendices

Appendix 1 - The situation on waste collection in Twente

Appendix 2 - Contact information municipalities

Appendix 3 - Key figures and formulas

Appendix 4 - Interview reports
## Appendix 1 - The situation on waste collection in Twente

<table>
<thead>
<tr>
<th>Municipalities</th>
<th>Container collection organisation</th>
<th>Remuneration</th>
<th>Household waste collector</th>
<th>Number of inhabitants (CBS, 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enschede</td>
<td>Twente Milieu (Twente textile circle)</td>
<td>no</td>
<td>Twente milieu</td>
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<td>Almelo</td>
<td>Reshare &amp; Sympany</td>
<td>no</td>
<td>Twente milieu</td>
<td>72.300</td>
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<td>Hengelo</td>
<td>Het Goed (Twente textile circle)</td>
<td>no</td>
<td>Twente milieu</td>
<td>81.069</td>
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<td>Hof van Twente</td>
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<td>Twente milieu</td>
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<tr>
<td>Rijssen-Holten</td>
<td>Reshare</td>
<td>Yes: 0,20 euro’s per kilogram</td>
<td>Twente milieu</td>
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<tr>
<td>Wierden</td>
<td>No legal containers yet. (plans to start with container collection)</td>
<td>Not yet, but when Wierden starts with container collection, they will ask remunerations</td>
<td>Waste collector Leemans</td>
<td>23.855</td>
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<tr>
<td>Dinkelland &amp; Tubbergen (cooperational agreements)</td>
<td>De Beurs (Twente textile circle)*</td>
<td>No</td>
<td>Ter Horst groep (from 2016 ROVA)</td>
<td>26.143 (Dinkelland) 21.092 (Tubbergen)</td>
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<tr>
<td>Haaksbergen</td>
<td>Reshare (contract until 2018)</td>
<td>No</td>
<td>Has plans to cooperate with Twente milieu (not yet)</td>
<td>24.314 (2015)</td>
</tr>
<tr>
<td>Losser</td>
<td>Twente Milieu (Twente textile circle)</td>
<td>No</td>
<td>Twente milieu</td>
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<td>Hellendoorn</td>
<td>Reshare</td>
<td>Yes, 0,03 eurocents per kilogram.</td>
<td>Municipal waste service</td>
<td>35.591</td>
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<td>Twenterand</td>
<td>Reshare</td>
<td>Yes (not allowed to publish sum)</td>
<td>ROVA</td>
<td>33.900</td>
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<tr>
<td>Borne</td>
<td>De Bornse kringloopwinkel (Borne thrift store)</td>
<td>Yes, 0,02 eurocents per kilogram.</td>
<td>Twente milieu</td>
<td>22.166</td>
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<tr>
<td>Oldenzaal</td>
<td>Twente milieu (Twente textile circle) &amp; Reshare</td>
<td>no</td>
<td>Twente milieu</td>
<td>32.045</td>
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</tbody>
</table>

---

28 Only in Enschede, all the containers of het Goed are replaced for Twente milieu containers, in some municipalities, they are not replaced yet, or partly replaced. In the future, all containers will be from Twente milieu.
## Appendix 2 - Contact information municipalities

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Contact person</th>
<th>Email address</th>
<th>Date of contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enschede</td>
<td>Theo Matton</td>
<td><a href="mailto:t.matton@enschede.nl">t.matton@enschede.nl</a></td>
<td>01-04-2015</td>
</tr>
<tr>
<td>Almelo</td>
<td>Karin Fakkert</td>
<td><a href="mailto:K.Fakkert@almelo.nl">K.Fakkert@almelo.nl</a></td>
<td>05-03-2015</td>
</tr>
<tr>
<td>Hengelo</td>
<td>Franc Talsma</td>
<td><a href="mailto:F.talsma@hengelo.nl">F.talsma@hengelo.nl</a></td>
<td>30-04-2015</td>
</tr>
<tr>
<td>Hof van Twente</td>
<td>Rob van Veen</td>
<td><a href="mailto:r.vanveen@hofvantwente.nl">r.vanveen@hofvantwente.nl</a></td>
<td>16-04-2015</td>
</tr>
<tr>
<td>Rijssen-Holten</td>
<td>Wim Haase</td>
<td><a href="mailto:w.haase@rijssen-holten.nl">w.haase@rijssen-holten.nl</a></td>
<td>30-03-2015</td>
</tr>
<tr>
<td>Wierden</td>
<td>Jan Reefhuis</td>
<td><a href="mailto:j.reefhuis@wierden.nl">j.reefhuis@wierden.nl</a></td>
<td>30-03-2015</td>
</tr>
<tr>
<td>Dinkelland &amp; Tubbergen</td>
<td>Theo Leferink op Reinink</td>
<td><a href="mailto:t.leferinkopreinink@noaberkracht.nl">t.leferinkopreinink@noaberkracht.nl</a></td>
<td>30-03-2015</td>
</tr>
<tr>
<td>Haaksbergen</td>
<td>Ben Nijland</td>
<td><a href="mailto:b.nijland@haaksbergen.nl">b.nijland@haaksbergen.nl</a></td>
<td>30-03-2015</td>
</tr>
<tr>
<td>Losser</td>
<td>Johnnie Rouwers</td>
<td><a href="mailto:j.rouwers@osser.nl">j.rouwers@osser.nl</a></td>
<td>30-03-2015</td>
</tr>
<tr>
<td>Hellendoorn</td>
<td>Gerard Oonk</td>
<td><a href="mailto:g.onk@hellendoorn.nl">g.onk@hellendoorn.nl</a></td>
<td>30-03-2015</td>
</tr>
<tr>
<td>Twenterand</td>
<td>Hetty Looms</td>
<td>hloomstwenterand.nl</td>
<td>30-03-2015</td>
</tr>
<tr>
<td>Borne</td>
<td>Wim van Schooten</td>
<td><a href="mailto:wh.vanschooten@borne.nl">wh.vanschooten@borne.nl</a></td>
<td>30-03-2015</td>
</tr>
<tr>
<td>Oldenzaal</td>
<td>Aart Koers</td>
<td><a href="mailto:a.koers@oldenzaal.nl">a.koers@oldenzaal.nl</a></td>
<td>30-03-2015</td>
</tr>
</tbody>
</table>
Appendix 3 - Key figures and formulas

4.4.1. Communication budgets
Communication budget per kg formula:

\[
\frac{\text{Total communication budget}}{\text{amount of collected kg}}.
\]

Communication budget percentage formula:

\[
\frac{\text{Total communication budget}}{\text{total revenues}} \times 100
\]

Key figures Humana 2013 (annual report 2013):
- Communication budget: 13,904 euro’s
- Collected kilograms: 8,997.189
- Total revenues: 7,079,053 euro’s

Key figures Humana 2012 (annual report 2012):
- Communication budget: 95,801 euro’s
- Collected kilograms: 8,573,000
- Total revenues: 5,997,000 euro’s

Key figures KICI 2013 (annual report 2013):
- Communication budget: 10,000 euro’s
- Collected kilograms: 11,455,822
- Total revenues: 5,951,131 euro’s

Key figures Twente textile circle ('example calculation of a city with 80,00 people’ 2013):
- Communication budget: 40,000 euro’s
- Collected kilograms: 282,615
- Total revenues: 137,775 euro’s

4.4.2. Innovation budgets
Innovation budget per kg formula:

\[
\frac{\text{Total innovation budget}}{\text{amount of collected kg}}
\]

Innovation budget percentage formula:

\[
\frac{\text{Total innovation budget}}{\text{total revenues}}
\]

Key figures Humana 2013 (annual report 2013):
- Innovation budget: 28,557 euro’s
- Collected kilograms: 8,997.189
- Total revenues: 7,079,053 euro’s

Key figures KICI 2013 (annual report 2013):
- Innovation budget: 33,258 euro’s
- Collected kilograms: 11,455,822
- Total revenues: 7,079,053 euro’s

Twente textile circle ('example calculation of a city with 80,00 people’ 2013):
- Innovation budget: 14,130,73 euro’s
- Collected kilograms: 282,615
- Total revenues: 137,775 euro’s
4.4.3. Added values

Local recycling
Application of the recyclable textile waste stream in the Netherlands percentage formula:

\[
\text{amount of kg that is used for fibre recycling, applied in the Netherlands} \quad \frac{\text{total amount of separated textile waste}}{\text{amount of collected kg}} \times 1000
\]

Key figures charitable organisations, based on figures of FFAct (Custers et al., 2014)
- Amount of kg that is used for fibre recycling, applied in the Netherlands: 7.6 Kton
- Total amount of separated waste: 90.2 Kton

Estimated share of recyclable waste that is going to VAR Frankenhuis in Haaksbergen is 20 % (Auke van der Hoek, personal communication, May 2015)

Local employment
Amount of SROI’s per 1000 kg formula:

\[
\text{total amount of SROI’s} \quad \frac{\text{amount of collected kg}}{\text{amount of collected kg}} \times 1000
\]

Key figures Sympany (annual reports KICI & Humana, 2013)
- Total amount of SROI’s: 100 (source: website Sympany, 2015)
- Collected kilograms Sympany, assumption: 8.997.189 +11.455.822= 2.045.3011

Key figures Reshare 2013 (annual report 2013)
- Total amount of SROI’s: 200
- Collected kilograms: 21.600.000

The Twente textile circle guarantees to provide 1 SROI per 4000 kg collected textiles (‘example calculation of a city with 80.00 people’ 2013).

Charity
Expenses on charity per kg formula: \(\frac{\text{amount of money spending on charity}}{\text{amount of collected kg}}\)

Expenses on charity percentage formula: \(\frac{\text{amount of money spend on charity}}{\text{nett revenues}}\times 100\)

Key figures Reshare (annual report 2013)
- Amount of money spend on charity: 4.005.716 euro’s
- Amount of collected kilograms: 21.600.000
- Nett revenues: 15273443 euro’s

Key figures Humana 2013 (annual report 2013)
- Amount of money spend on charity: 2.116.524 euro’s
- Amount of collected kilograms: 8.997.189
- Nett revenues: 6.811.838 euro’s

Key figures KICI 2013 (annual report 2013)
- Amount of money spend on charity: 1.493.000 euro’s
- Amount of collected kilograms: 11.455.822
- Nett revenues: 6.011.000 euro’s
Appendix 4- Interview reports

In chronological order:

2. Peter Bos- Texperium - 03-03-2015
5. Marijn Maesen - FFact - 09-03-2015
6. Bas Assink- Twente milieu - 09-03-2015
13. Hanneke op den Brouw - Department of Public Works (Rijkswaterstaat) - 28-05-2015
1. **Interview report- Harrie van Bommel**
Lecturer sustainable international business at Saxion University of Applied Sciences
27-01-2015

1. **Which main trends and developments would you determine in the current textile waste market?:**
What I see is that the textile waste has become a more profitable product over the last years. As a result, all sorts of parties are getting involved in textile collection. Some municipalities are even collecting and selling the textiles themselves.

I also see that big retail stores such and H&M and WE are starting to collect textiles as well. This trend is really continuing. You could say that the market is booming.

2. **These companies claim to recycle a part of these textiles themselves, is this actually happening?**
Yes, although we are talking about small percentages round 20 %. But those companies are really working on these developments.
Nudy jeans in Sweden is another company that is using recycled fibres in their clothing.

I think those developments are positive, as it is possible that through the collection programs of H&M people separate more waste, and there will be more consciousness. However, it is likely that as people start to deliver more textiles, the quality of the textiles that are left for charitable collectors, is likely to go down. This is causing problems for the business models of these organisations.

Looking at other trends and developments, in terms of innovation, some interesting things are happening as well. In southern countries fiberization techniques is happening. Texperium is also working on this. It is not feasible yet, but the techniques are improving.

Promising as well, is a new way of recycling, called “chemical recycling”. On Saxion they are working on a project called Saxcell, which makes it possible to recycle in a high quality way. Chemical recycling means that the textiles are demolished to its basic elements - cellulose - to be build up again for recycling. Mechanical recycling is the “traditional” way of recycling. In this type of recycling, materials are pulled apart, also called fiberization. A disadvantage of mechanical recycling is that the quality of the fibres is going down, which means you will always have to blend the recycled fibres with new fibres.

Finally, textile separation is a promising development; however it is still in early stages. Wieland Textiles works on these separation techniques that make it possible to separate different types of textiles in order to make high quality recycling possible.

3. **How is textile collection organized at this moment?**
A lot of people think that when their clothes are brought to the containers of Reshare (the Salvation Army), it will be gifted to the poor. This is not true. Most textiles are just sold in order to make money. This money is invested in charity projects.
The clothing that is sold is mainly reused in Africa and south Europe. The non-reusable part of the waste is recycled in a low quality way: it is pressed together for insulation materials and that kind of products. This is often called ‘down cycling’.
4. **Could you determine some other trends in the waste market in general?**
Regarding waste separation in general, I expect that in the future, we will only have three separated waste streams. One dry stream (with textiles), one wet stream (GFT) and residual waste. So basically separating textile waste will be superfluous at a certain point. I think post-waste separation is the future.

5. **Extra question, asked through email on 09-06-2015: What do you think of the expectations on rising market prices of textiles and especially cotton?**
A lot of experts expect the cotton prices to increase the next couple of years because of the population growth and the lacking production capacity in the future. Until today, it has not been visible yet.
The economic crisis of 2008 is seen as a reason as the last couple of years, demands were not rising as fast as expected. But it is not foreseeable when these prices are going to increase, I do not know research that is elaborating these expected developments.

Doing predictions on these themes is very hard, you see the same thing with the oil prices. It is expected for many years that the prices will go up, but currently the prices are very low.
2. Interview report- Peter Bos
Manager R&D and innovations at VAR Frankenhuis
Chairman at the open innovation centre Texperium
03-03-2015

1. Can you explain what the main activities of VAR Frankenhuis and Texperium are and how the organisations are connected?

“As you can see, the two organisations are located next to each other. We make use of the same building for our activities. Texperium is an innovation centre and is not aimed to make profit or to produce huge amounts of textiles and is just working on new techniques, mainly focused on making recycled yarns to experiment with.

VAR Frankenhuis is a profitable organisation that produces large amounts of raw materials for different types of industries such as the automotive industry. The materials VAR Frankenhuis is delivering are very often used as insulation materials or covering materials. The quality of the clothing VAR Frankenhuis is using is not good enough to resell in thrift stores in the Netherlands or in Africa, and is therefore recycled in this way.”

2. Which main trends and developments would you determine?

The quality of the clothing is going down because of the increasing popularity of clothing companies such as Primark, who are selling clothes with a low quality. Besides, there is a decreasing demand for reused clothing in Africa, because the developing countries are slowly getting richer, they want new clothes now. We expect that this development will continue. As a result, a bigger part of our textiles will be available for fibre recycling. Additionally, we shall collect more clothing in the future. Taking all those issues into account, it is likely that the amount of recyclable waste will increase a lot. The share of reused textiles is approximately 45 % at this moment; we assume it will be around 33 % in 2020, this means that more textiles will have to be recycled in the future.

I expect that the recycling of fibres into new yarns will develop itself the next couple of years. The last couple of years, some clothing companies like H&M and WE started taking their clothes back in charge for a voucher. At this moment it is only possible to put a small percentage of recycled materials into new products. It is likely that the techniques will improve the next couple of years. However, there is a limit to mechanical fibre recycling because the fibres are getting shorter, so you will always need virgin materials to make a blend. We managed to make new jeans with 50 % recycled materials. At this moment, there are also experiments in chemical recycling. This means that fibres are broken down to really small elements. In this way, high quality recycling is easier. Polyester can be recycled for 100 % already. An example of this is Returnity, a fibre of Dutchawareness.

However, at this moment, the cotton prices are low. This means that textile recycling is not viable in most cases. However, due to population and demand growth, I expect this will change in the future.

3. How does the current recycling market looks like?

“It actually is quite simple. At this moment, the biggest part of the textile waste is collected by charitable organisations such as Sympany (a merger of Humana and KICI), the Salvation Army (in Dutch: Leger des heils) and smaller voluntary organisations. A small part is collected by Thrift stores such as ‘het Goed’ and ‘de Beurs’.
4. **What do you think is the main problem in the market at this moment?**

Basically, the current situation is absolutely not right. There are a couple of problems.

1. **The destination of the waste**

The vast majority of this waste that is collected by charitable organisations is sold to big waste sorting companies. On their turn, these companies are selling the reusable waste to mainly African countries and the majority of the non-reusable waste to India. Regularly, the sorting of the waste in these countries is done by children. So indirectly, “we” are contributing to child labour in foreign countries. Additionally to this, many people are assuming that their clothing is donated to developing countries, but this is simply not true. The clothing is sold, and with the money that is earned with the sales, the charitable organisations are doing projects in the Netherlands.

2. **Inefficiency and conservatism**

Another problem with charitable organisations is that they are working in an inefficient and old fashioned way. Originally, they are relying on the incomes of mainly reusable waste. A certain percentage of these incomes are spent in local charity projects. The last couple of years, the charitable organisations are getting treated because of the new waste separation targets, set in the green deal in 2012. The main target of this green deal was to make sure more textiles are collected separately, at this moment a lot of people are putting their damaged clothes in the residual waste because they think that it cannot be reused anymore. The green deal aimed to prevent this, because damaged clothes could be recycled in different ways such as fibre recycling. At first sight this may sound good, but it has direct implications for the charitable organisations because the average quality of the waste will probably decrease. This means that less waste will be suitable for reusing, and more waste of low quality will be collected. The charitable organisations are therefore afraid that the benefits of selling the waste won’t provide enough money, because the waste is of less economic value, and in the main time they will have to invest in more waste separation. This is what they call the “chain deficit”. It is the main reason that the Green deal has stranded.

I think this chain deficit does not really exist, because the charitable organisations are asking way too much money for their waste. It can be done much cheaper.
5. **What are you doing to solve these problems?**

Together with Twente Milieu and waste collecting thrift stores ‘het Goed’ and ‘de Beurs’, we work on the ‘Twente textile cycle’. This is a partnership in which these parties work together on more local textile recycling. We already set up this system in the municipality of Enschede. Twente Milieu is collecting the waste, het Goed and de Beurs are sorting the waste with the help of people with disadvantages. This could help municipalities with their WSV\(^{29}\) activities. In the next picture, the pursued system is visualised.

![Diagram](image)

We found out that we can conduct this system for 0,23 eurocent per kilogram. Comparatively, charitable organisations need 0,40 up to 0,70 eurocent. They need this to finance their charity goals. Actually we do not have a chain deficit. Our system is paying for itself.

Important to mention is that we do not want to push the charitable organisations away. We won’t strive to collect “their” 1/3 of the textile waste but we are focusing on the 2/3 that is not separated yet. We assume that it is realistic to collect another 1/3 of the textile waste. That is 50% more than is collected at this moment. The other 1/3 will probably always be thrown into the residual waste.

**Question 4 - What could be the role of the region in this?**

They should join the Twente textile circle. Municipalities have to see the possibilities. In most cases governments are willing too much, and it is technically not feasible. In the case of Textile recycling it is completely the opposite. Municipalities do not really know what is possible. They are just sticking to the way they always did: working just with the charitable organisations and not thinking about new ways.

\(^{29}\) Dutch Social Employment Law (Wet Sociale Werkvoorziening). Nowadays a responsibility of municipalities. Municipalities should help disadvantaged (SROI) people to work.
3. Interview report- Agnes Koopman, Karin Fakkert & Mirian Kock
Project leaders ‘steering group zero waste Twente’ of the Twente region.
05-03-2015

1. How would do describe the main problems in the textile waste market from a municipal perspective?
   Agnes Koopman: There is quite some disagreement on the direction we are aiming at. Some municipalities are working together with the charitable organisations, such as Almelo. Other municipalities, such as Enschede are working together with the Twente textile circle. I would like to tell you that my knowledge on the textile issue is not so big, that I why I invented Karin and Mirian, they are working on these issues in the municipalities of Almelo and Enschede and are project leaders of the ‘steering group zero waste Twente’.

   Karin Fakkert: Almelo is sticking to the charities as this is concerned as being highly valuable, also on a local perspective. The Salvation Army is active in Almelo and is doing important work. I think it is essential to look at the textile waste market from both perspectives: the textile circle and the charitable organisations.

   Mirian Kock: Furthermore, it is relevant to know what the trends and developments in the textile waste market are, then we can respond to this, for example the clothing collection activities of retail stores, or trends in recycling techniques. Actually we think the textile waste market is pretty organized already, and the loops are pretty much closed. However, maybe you will find out that this is not the case and that we should change things.

2. What are the current policies on textile collection and marketing in the region?
   Mirian Kock: “It is diverse. In 2030 we want to have collective waste policies. Of course these policies will have to be customized to the specific municipalities.”

3. What is the role of the region on waste policies?
   Karin Fakkert: “We are an overarching organisation. We do not have formal power, which means that we can force municipalities to do certain things. However, all municipalities agreed upon collective policies in 2030. Therefore, the role of the region will become bigger in terms of waste.”

4. What is the future goal of the Twente region in terms of waste?
   Mirian Kock: At the end, we are heading towards a zero waste Twente in 2030. So we want to diminish the amount of residual waste to a minimum level.
4. Interview report- Paul de Bruin
Director and researcher of IPR Normag- worked on the research report ‘Towards a zero waste Twente’ in 2012.
06-03-2015

1. In the report on ‘Towards a zero waste Twente’ (Naar een afvalloos Twente), you wrote a part about textile recycling (chain agreements). What are the outcomes of these meetings?

Our research was mainly focused on the way municipalities can cooperate on waste management (e.g. policy development, operations, et cetera). The steering group ‘zero waste Twente’ - consisting of councillors of the participating municipalities - asked IPR Normag in addition to examine the possibilities of innovative recycling methods for specific waste streams and perspectives for cooperation between municipalities and private companies in the Twente region. Textile was one of them.

We examined a couple of initiatives in the region such as the innovation centre Texperium and VAR Frankenhuis. These initiatives and organisations offer more possibilities for the reuse of textile by processing used clothing and fabrics, and by producing thread. We concluded: 1. that the technical options for processing used fabrics and clothing and producing reusable threads are available, and 2. a lot of useful textile waste is still ending up as residual waste. Therefore it is important that more textile waste can be collected, by using more collecting possibilities and stimulate the awareness amongst citizens. An overarching goal is to close the ‘textile loop’ in the Twente region itself.

2. In the report, you also write about further research on the theme, what do you mean with that?

I think it is really useful for your research Ivo, to look into the business models of the charitable organisations, because there are big differences. An important question is: “what would you consider as charitable?”

In the Netherlands, reusable clothing can have a really high market value, and that is why used clothing is a trading product. The business models of charitable organisations can focus on reuse clothing in the Netherlands, on trading, on producing high quality threads or low quality cleaning cloth. The first mentioned are examples of (real) recycling and last of ‘down cycling’.

Other business models focus on reusable clothing that are exported to developing countries and sold to local entrepreneurs to start up their own business. In this way they are trying to stimulate local economies.

I know that the Textile circle Twente provides local working opportunities for people who are falling under the Social Employment Law (WSW). Especially in Twente this is an interesting opportunity, as the employment rates are low.

3. Which other problems would you determine in the recycling market?

1. When textile streams are exported to developing countries, there is a big chance of losing materials in the end. In the Netherlands, we have a proper collection system, but in African countries this is probably not the case. So closing the loops in Twente, has some advantages, including the manageability of the textile streams.

Regarding the chain deficit, we see that some organisations are cherry picking; they just want to collect the waste with the high quality and value. We could conclude that we need a new system to be able to collect more, and also the less valuable textile waste. Maybe you could solve this to involve the charitable organisations more active in the Textile circle Twente.
2. For some other waste streams, chain responsibility is established and really applicable. The problem with textile is that it is a really big worldwide market with thousands of companies. You cannot really oversee the situation.

4. In your report, you mention the “waste pays” (afval loont) initiative. Is this a serious option in Twente? Do you know example initiatives?

We discussed this model with the steering group. There are a couple of initiatives in the Netherlands, but only on a really small scale. On the one hand I do not see the idea to be practised on a bigger scale yet. On the other hand positive financial incentives can motivate and stimulate citizens to collect more used textiles and help to create a circular economy (circular cities and villages) in Twente. Maybe a pilot project in Twente can be of help by examining the possibilities.
5. Interview report- Marijn Maesen

Researcher of FFact- worked on the report “mass balance of the collected and imported textiles in the Netherlands”.
09-03-2015

1. Can you tell a little bit more about the background of your research?
   Basically, our research is the first research that completely sorted out the way the textile waste streams are exactly going to. It was really difficult to convince companies to share their data with us, although we have a duty of confidentiality. The ministry of infrastructure and environment was the client. They had the question whether there would be a dump of textile waste in foreign countries.

2. What sort of trends do you see in the market?
   If we look at fibre recycling, that is mainly happening in India and Pakistan. A part of this waste is used for mechanical recycling (insulation materials, felt et cetera). What we want of course is to use the materials for new clothing. A new interesting development is chemical recycling.

   In many other waste streams, producer responsibility is implemented. This means that producers are vailing money for waste funds, and out of these funds, investments in waste management are been paid. In the textile industries, this is really difficult because there are 5000 importers of textiles, only in the Netherlands. This is an enormous group which is not easy to “handle”.

   The ministry for infrastructure and environment does not have the intention to enter such a system in the Netherlands in the near future.

   We also see that the demand for second hand clothing in Africa is decreasing, because there is more cheap clothing from Asia available.

   What quite surprised me was that there is a real market for recyclable materials in India and Pakistan.

3. Do you know what is happening with the reused clothing in Africa after use? Is it ending up on landfills of incinerated?
   We asked a couple of experts this specific question, and they said that quite a lot of the clothing is actually recycled over and over. For example Kenya has quite a good textile collecting system. Of course, there will be some loss of textiles but I think there is more collected separately over there, than in the Netherlands. The big risk in “losing” clothing is in the textiles that are going to foreign (mainly eastern bloc) countries to be sorted. Those sorting companies are cherry picking the most valuable materials and the rest is thrown away, but we think this doesn’t happen that much because we checked a lot of these companies, and most of the time we found companies that are really similar to Dutch sorting companies, but they are working cheaper.

4. Something that triggered me in your research, was that at the same time, recyclable waste is imported, while there is a lot of waste is exported at the same time?
   This is a little biased picture, because some of this waste is going to the Netherlands to be distributed to other countries. Another significant part of the waste is going to a cleaning rags producer in Sneek. But the main part is distributed to India again. It is quite cheap to transport the textiles to India.

5. Don’t you think is would be smarter to keep the waste in the Netherlands/ Twente, looking at environmental impacts?
   Looking at transport, the CO2 footprint isn’t that big. I think the value of local recycling could be in the high quality recycling. VAR Frankenhuis could be able to recycle the waste in a better way.
I doubt whether Frankenhuis could be a real competitor to the Indian companies, because if they would be competitive, why isn’t the waste already going to them? I would be interested in that: are they cheaper/more expensive than shipping it to India?
I think it would be also interesting to look at the clothing companies like H&M, who are collecting worn clothes (the I:CO program) but the biggest part of this waste is also going to SOEX, a big sorting company in Germany, and they are also bringing their waste to India and Pakistan.

6. **Have you recognised the problem of the chain deficit?**
Actually we just don’t know if the fear for this problem is right. Some organisations are afraid that when we collect twice as much as we do now, we will get more subspecies\(^\text{30}\). This could cause a deficit, but we are not sure of this. I think sometimes, organisations dramatize the problem.

7. **What do you think of the standpoint that the role of the charitable organisations should be disappearing?**
I don’t think this would be a good idea, because these organisations have a lot of experiences in sorting and distributing the waste, they know the international textile market really well.

I think for your research it is really important that the municipalities understand the market, and that they know where their waste is going to. At this moment, their awareness is low. It should be really interesting for municipalities, to have insight in the way the collecting companies are distributing their waste. But this is really difficult because these companies don’t want to share their figures, for me, it was really difficult to fetch over those people to share their data.

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\(^{30}\) Subspecies are textile streams that could not be used for reusing and has lower values than the reusable textile.
6. Interview report- Bas Assink
Advisor at Twente Milieu- works on the Twente textile circle
09-03-2015

1. Can you explain the system of the textile circle in your own words?
Twente milieu is collecting the textiles through containers. Thrift stores het Goed and de Beurs are sorting and marketing the waste, with the help of Texperium. As much textiles as possible are sold in the Netherlands. All unmarketable textiles are going to recycling company VAR Frankenhuys in Haaksbergen.

Twente Milieu earns 18 eurocents per kilogram from het Goed and de Beurs. This includes a part of the communication costs, and the actual collection costs.

The benefits for municipalities are in efficient collection, employment for SROI’s, and the willingness to collect more textiles. We strive for local valuation and innovation, to close the loop as local as possible. Furthermore we expect to be able to collect more waste that charitable organisations do, as we do not face the chain deficit.

I would like to emphasise the importance of a logical collection structure, at this moment it is a mess, as a lot of companies are collecting textiles, and they are all sending out different messages.

2. Do you agree with my analysis that because of high costs that are made by charitable collection organisations, there is a limit to the textiles they can collect?
Yes, if you ask me, I think the role of the charitable organisations is played out. They work inefficient and they are not contributing to closing the loops locally. Basically everything is going to foreign companies in Africa and India. Furthermore, as there are so many collecting organisations in Twente, there is no clear message to citizens in terms of textiles that can be delivered and the actual application of these textiles.

3. People from charitable organisations (Marc Vooges from Sympany for example), are saying that when a party like Twente milieu will start to collect textiles, people will not deliver their clothes anymore. As people want to deliver clothing for charity.
Yes, I know this objection. However, we experience the opposite. As Twente milieu is carrying out reliability, and people know the containers, they are delivering more textiles. That is why we already started to replace the container of the thrift stores in return for Twente milieu containers. Furthermore, a lot of charitable organisations are collecting door-to-door as well, which is inefficient and negatively impacts collection results.

Of course, we don’t give money to good causes (except for the SROI jobs of course), such as Reshare and Sympany are doing, but we have a profit which we could invest in a better collecting infrastructure, communication and innovation.

4. In which cities is the textile circle implemented yet?
Tubbergen, Dinkelland, Enschede, Hengelo, Oldenzaal, Losser and Hof van Twente.

5. Karin Fakkert from the municipality of Almelo doesn’t want to work with the Twente Textile circle, because she thinks the charitable organisations are very important and good work. How do you want to convince her?
I think we don’t have to push the charitable organisations away. Why couldn’t we cooperate with them? They could do additional work in terms of communication for example.
6. Do you have an action plan on communication on paper already?  
No, it is under construction.
7. Interview report- Theo Matton
Policy advisor at the municipality of Enschede, first participant in the Twente textile circle. Theo Matton is responsible for textile collection.
01-04-2015

1. Can you tell me what the textile waste stream means for the municipality of Enschede, and how the market has changed over the last couple of years?

Textile waste is a strange waste stream; it is really different from other waste streams. One of the reasons for this is that textile waste is a stream with a lot of economic value. Market parties started to engage a couple of years back. Some municipalities are willing to get money out of the stream and are asking remunerations before they give a permit to collect the textiles.

Traditionally, charitable organisations always collected the waste. This was done in a budgetary neutral way. The municipalities were just giving permits.

We as Enschede are posing conditions which collecting companies should meet. In these conditions, local recycling and working force are main drivers. That is why the Twente textile circle is a great initiative for us. At the same time, the riding school for disabled people east and Reshare are collecting the waste door-to-door. We chose them, instead of Sympany for example, because they are supporting local purposes and are creating local job opportunities.

We do not get any money from the Twente textile circle (Twente milieu) for the permit to collect waste.

2. Have you any idea what is happening at this moment with the waste?

Except from a part of the waste collected by Twente Milieu, no. A con of Reshare and the VPGO is that we do not have any idea where their waste is actually going to.

Besides the organisations I mentioned, the clothing bank is also getting a little bit of clothes, but they are not collecting. Their clothing is gifted by people and organisations. The system works the same as the food bank: Poor people can buy clothing for very little money. This organisation is subsidised by the city council. I am currently trying to get them work together with the VPGO, so they will be collecting as well. In this way, they could also make a profit so we would not have to subsidise them anymore.

3. How much waste is collected door-to-door and how much waste is collected by containers?

442 ton through containers, and 180 door-to-door and depot collection.

By the way, I must say that textile is not a prior waste stream in municipalities. We rather look at the kilograms/tons of the waste and textile is just a little stream (around 3 %), instead of environmental impacts.

4. Are there figures about collection result of Twente Milieu?

Not yet, they just finished their first year and I expect to get the first figures next month, I will send you them.

There is one other thing I would like to explain as well. We are using stimulation tools to make sure as much textile as possible are collected. Participant in the Twente textile circle ‘het Goed’ is also collecting other second hand stuff such as furniture. However, some furniture is not good enough to sell in the shops from het Goed, so normally het Goed does not take this furniture with them. We want them to do so, because now they are advising people to call another company to pick this stuff up. This is needless transport. We want het Goed to take this stuff directly with them, but this is costly for them. So, now they get a funding from us to make it feasible, under the condition that the textile circle is achieving their collection goals on textiles.
I understand that this is a complicated system, but it helps us to ensure that the Twente textile circle is achieving their goals. Other municipalities could do this as well. As collecting organisations are competing to each other, these pressure methods could also be applied in other ways. Municipalities have quite some power in this market. We also made performance agreements with the Twente textile circle, if the collection goals are not achieved; het Goed is compensating us financially.
8. Interview report- Gerrit Bouwhuis
lector smart functioning materials at Saxion university of applied sciences
05-04-2015

1. You are working on a project called “Saxcell”, can you explain what that is?
Yes. I am actually working on a very small part of the textile waste market, the research and
development of a new way of textile recycling, called “chemical recycling”. It is expected that in 2050
the demand for clothing will be twice as big as today, but the land that is needed to grow the crops,
will also be needed for food production. That is going to be a big problem.

When we throw away a piece of clothing that is made from natural fibres such as cotton, we basically
throw away cellulose. That is a polymer that is the most important ingredient of textile. At this
moment, we burn a lot of it.

The project I am working on focusses on a process that recycles the clothing to get rid of the colour
of the clothing, and to get of the “finish”. The rest is pulled apart. Subsequently, we are making the
cotton ready to dissolve in a sort of a paste. This paste can be sprayed into dreads which are sunk
into a liquid to become solid again. Through this “depolymerisation”, cellulose is made again. At the
end, new fibres could be made with it. The current “mechanical” recycling method of natural fibres
has some disadvantages, such as the wearing and tearing of the materials. Chemical recycling does
not have this disadvantage. Almost 100 % recycling of the cellulose is possible.

2. What organisational problems are you facing in this project?
The big problem with innovations in this field is that we need investors to boost the developments
and to try it out on a bigger scale. That is not possible in Saxion. However, the big clothing companies
are shivery, as it is no “proven” technique yet. Though, we can only prove the actual effectiveness of
the technique when we test it. This is vicious circle.

3. Are there any other parties that are working on these types of developments?
Yes, we work together with Euratec and SAC. However, I think we are the most developed in this
field. You also got Reware in England and Renewcell in Sweden. Textile producing companies AKG
and ten Cate are working on shredding polyethylene.
9. Interview report- Marc Vooges
Director of Sympany. Charitable textile collector
16-4-2015

1. Can you tell something about Sympany in general?
Sympany is a merged organisation of KICI and Humana. We are the second textile collector in the Netherlands (just after Reshare). As we are a charitable organisation, we are doing all sorts of projects in poor countries; the projects are mainly focussed on sustainable and social textile production. This is our core business; at the end all activities should provide money for our projects.

For example, we do development projects in Africa and India to help people to set up their own spinning mills. We also try to improve working circumstances in big spinning mills.

In the Netherlands we are sorting the waste in different sorting centres. A part of this work is done by SROI’s, people with a distance to the labour market.

2. Differences between you and Reshare?
Looking at the actual textile collection, there are no big differences. In terms of innovation activities there are some differences, although it is not demonstrable yet.

3. Are you in direct contact with your purchasers?
Absolutely, we actually know our partners very well. We also visit them regularly.

4. What do you think about the commercialisation of the Textile market?
The last couple of years, all sorts of companies started to engage in the market. Especially the remuneration policies of municipalities are really harmful for us as less and less money is going to our charity goals. This is a serious problem, as research of TNS Nipo concluded that people are expecting that the clothing and the earned money is going to good causes. But municipalities want to make money with the textiles themselves.

Finally, there are a lot of commercial parties getting active in the market. We have to compete with them in in tendering processes; this is also decreasing the money that is going to charities.

Furthermore, I see that the portion of non-reusable waste is growing; this means we will have to recycle the fibres. We have a 33 % share in a company which makes insulation materials out of old textiles. This is OK, but what we want, is to make new yarns out of it. Therefore, we fund the textile recycling project “the house of denim”.

5. What do you think about new initiatives such as the Twente textile circle?
Twente Milieu (the textile collector) is a commercial company, which means that a part of their revenues is going directly to their shareholders. Furthermore, those organisations have to find out the textile waste market themselves, which is a big task. To do this, they have to hire expensive advisors. This is all about money that can also be invested in charity. These organisations are pretending to be cheaper, but they actually are not.

At the same time, we are delivering good service. There are no complaints coming from municipalities. I do not see any reasons to stop working with us.

6. The Twente textile circle says that they collect in a much cheaper way, and therefore they have fewer problems with the chain deficit, is that true?
The line of reasoning is understandable, but they actually do not know what our collection costs are. They do not know where they are talking about. I do not believe that they are working more efficiently.
7. Can you share your collection costs with me?
No, we have agreements with companies we work with (transport et cetera), and we do not publish these figures. I’m sorry.

8. Looking at the innovation activities of yours, are there big differences with the Twente textile circle for example?
There are none, we are all looking at innovative recycling methods. We also work together with Texperium and VAR Frankenhuis, so we are all connected and looking for the same things.

9. Do you have an action plan on improving the textile collection rates?
Because of the recent fusion of KICI and Humana, there is no clear action plan yet as the future is still too unclear.
10. Interview report- Jolande Uringa
Manager marketing & communication Reshare
30-04-2015

1. Can you explain the main difference between you and Sympney, besides the different goals?
We are doing more, we are the biggest collector in the market. Furthermore, we are doing other projects, because we are part of the Salvation Army, so we do not work for other organisations, like KICI did. We do not really save money, as all the revenues are going to the charity of the Salvation Army. Therefore we may be a little bit more vulnerable than other organisations.

2. Is Reshare also sorting the textile waste?
Yes. We do a big part of the sorting activities ourselves; we have six sorting facilities in the Netherlands, spread out in different regions. We have two goals in this case:
1. Less transport
2. The local for local principle (reselling clothes in the region and social local employment). After this, a part of the textiles are going to our head office in Oosterhout to be distributed to foreign separation centres.

3. Are you in direct contact with purchasers?
Absolutely, to ensure the reliability of the organisations we are in direct contact and we also work with tenders.

4. In Twente, the Twente textile circle is a new initiative, what do you think of the developments?
We are just a part of the market. We were the first textile collecting organisation in the Netherlands. We were a monopoly in the market, which completely changed over the last 10/20 years. First other charitable organisations rolled in, then commercial parties, so that is competition. Of course we are not happy with these developments, but we have to deal with it.

5. How do you see the future then?
I am honestly afraid that at a certain point, the charitable organisations will be pushed away and our business model won’t be feasible anymore. Municipalities are asking a lot of money from us, and we cannot really compete with the commercial parties, so the part of our revenues that we can spend on the Salvation Army is decreasing. At a certain moment, we won’t be able to comply with our mission.

6. Why would municipalities choose to work with you then?
There has been done quite a lot of research on the motives of people to hand in textiles, for example by Agentschap NL a couple of years ago. That research made clear that people want to give their clothing to charities. So I think if you want to collect more textiles, cooperation with charitable organisations is essential. Furthermore, we have a really strong brand. This spares out money for communication and marketing.

7. The Twente textile circle is willing to extract more textiles out of the residual waste. According to Peter Bos, you are facing a chain deficit and you are not really able to collect more textiles. Can you handle a bigger textile stream?
At this moment, we are able to handle it. We are also coming from a higher textile collection. However, a problem is the non-reusable part, because high quality recycling is not really possible yet in a feasible manner. All clothing collecting companies are trying to fill this gap through investments in innovations. Then we can get more money for that part of the clothing, and the chain deficit won’t
be a real problem anymore. Unfortunately, the techniques are still being developed and not scalable yet, although we are working on it.

Another problem is that Primark clothing is really popular, but the quality is really low, which means that it is not reusable most of the times.

At this moment, the margins are low because of the troubles in Ukraine. At the same time we work with fixed prices for municipalities, you could say that it is an entrepreneurial risk.

I would like to ask the government to support these developments. For example: They could help to scale up the recycling innovations with new police uniforms with recycled fibres. Then you can close the loop locally.

8. You also work on innovation, as you just explained. Can you mention a couple of partners? Texperium, Defence, some south European partners.
11. **Interview report - Fred Spronk**

Director and owner of door-to-door collecting organisation ‘Spronk, G E’ in Enschede. Collects textiles on behalf of the riding school for disabled people east (VPGO)

11-05-2015

1. **Looking at your long career in the world of textile collection and marketing: in what way has the market changed over the last 20 years?**

I think the main change could be determined in the amount of companies that are active, the competition is huge. Although the last few years it is decreasing again, because of the economic crisis and the trade boycott with Ukraine and Russia. However, there are too many organisations nowadays that are collecting waste. In the old days, it was mainly us, together with Reshare who were collecting. Throughout the years, textile became more valuable and other parties were getting interested. I think it is not a good development, because there is no control. Everybody is allowed to collect! Another development is that we are obligated to accept all sorts of textiles, originally we were just collecting reusable clothes, but that is not allowed anymore.

Finally, there are a lot of thieves. Many times we discover that clothing bags are stolen, before we were able to get it.

All these things together make me doubt about the future for door-to-door collectors. I would not recommend my son to take over my business; I think that says it all.

2. **Can you explain in short what you do?**

We do the door-to-door collection for the riding school; the revenues (minus the costs I make) are going to the riding school. Textile marketing is their biggest income. I have 5 employees working for me, they are mainly driving and loading & unloading. We are doing door-to-door collection in quite some municipalities, mostly we are alternating with other collecting companies, such as Reshare. Because of the competition, it is getting more difficult to keep it all feasible. What we practically do is delivering collection bags. Then people can fill it with old clothes and we take it to sort it partly, we have our own sorting centre and then we sell in on the market for the best price.

3. **Ben Nijland from the municipality of Haaksbergen said he does not see competition between the door-to-door collection system and the container system, is that true?**

Yes, I don’t see competition in the container system, because the motives of the people who are collecting for us, is mainly that they are sympathizing with the riding school. That is our strength.

4. **Are there differences between the way you collect the waste and the way other companies such as Reshare collect the waste?**

Because of our small scale way of working, we are relatively cheap. Therefore, we are able to collect in a more expensive old fashioned way, and I think a better way, because we collect more Kg. through door-to-door collection. There are two reasons for this: 1. We collect with bigger bags, so people can put all their clothes in it. This is more expensive for us, but we collect more. 2. We deliver our bags separately, instead of doing it together with the advertising folders, this is also more expensive but it prevents people from throwing the bags away.
12. Interview report- Roel Muis & Auke van der Hoek
Roel Muis and Auke van der Hoek are project managers at thrift store ‘het Goed’ in Enschede and responsible for clothing collection and marketing.
12-05-2015

All the answers were provided by Auke van der Hoek.

1. What has changed for you, since you are participating in the Twente textile circle?
Our activities regarding textile collection will stop. In Enschede we just finished our first year of - or basically a half year - of the Twente textile circle. In Enschede all our containers are replaced for containers of Twente milieu. In other municipalities where we are active, the same things will happen.

2. Could you see positive results already?
Yes, we can see that in Enschede, last year there was collected more waste than the year before. However, it is hard to prove that this is our achievement, as we are just started. The real communication campaign is just about to start *shows examples*. The economy is also growing again, so that could positively affect the collection achievements as well. However, we are convinced that we can make some big progress in collecting textiles, with the help of our communication campaign.

3. Would it be useful to compare your performances regarding waste collection to the performances of the charitable organisations?
Yes, definitely. However, it is important to look at differences between cities, as Enschede is a poorer city than Hengelo. As a result, more clothing will be bought in Hengelo per citizen and more textiles will be collected as well. Moreover, the overall waste separation performances of Enschede are much worse than the separation performances of Hengelo. So it is not ono-on-one comparable.

4. How much waste is actually recycled at VAR Frankenhuis?
I estimate that it will be around 20 %. A small part is going to Texperium for research of new recycling techniques. In the future, it would be great that we could sell recycled clothes, produced by Texperium or VAR Frankenhuis in our shops.

5. What are your plans regarding the local textile sorting centres?
The plan is as follows: we have small separation centres in the municipalities that provide employment, mainly for people with disabilities (SROI). We are talking about rough sorting here. What we want is to set up a big separation centre somewhere in a central place in Twente, where we can do more fine-sorting. This sorting will provide local low-skilled work. A vital theme in Twente, were unemployment rates are low and the municipalities have to provide social jobs. We can help municipalities with that.

6. Would you like to expand you activities to more cities in Twente?
Yes, of course it is the easiest in cities where we are active already; municipalities are mainly joining because we always collected their textiles in the city. However, we could expand to other cities, or other thrift stores could join our initiative. There are some difficulties we will face when we want to set up a system like I just explained in a small municipality, because to make a sorting centre is not feasible of we couldn’t reach a so-called ‘critical mass’. A critical mass is the amount of collected textile waste that is required to make a sorting facility feasible.

7. So do you say it would not be possible to unroll the Twente textile circle to other cities?
No, there are possibilities. When we expand our activities to smaller cities, Twente Milieu could play a big role. Namely, on other waste streams, such as electronic waste, local low-profile separation
work could be provided also. Twente milieu could make trade-offs, one city gets the electronic waste separation centre; the other city gets the textile separation centre. In this way, we are bundling the amount of waste so we could reach the critical mass.

8. **What are the collection costs of your organisation?**
All together, we pay 23 cents per kilogram. This is 18 cent for Twente milieu, and 5 cents for innovation at Texperium. This is more expensive than doing it by ourselves; however, we are happy with the way it goes now.
13. Interview report- Hanneke op den Brouw (short telephone call)
Advisor chain efficiency at the Department of public works (Rijkswaterstaat). Worked on the green deal in 2012.
28-05-2015

1. You were actively involved in the green deal for the collection of textiles, I heard it has stranded, is that true?
It has completely stranded, the cooperating companies were not able to agree on solutions for the problems. Our main goal was a better communication strategy to persuade citizens to hand in their textiles.

2. I read that one of the important reasons was the chain deficit, textile collectors cannot handle 50 % more textiles, is that true?
Yes. It is simply not feasible for the involved collecting organisation to invest in communication, while the quality and price of the clothing is decreasing. Therefore, the will is lacking. However, this is not the only “threshold”. The Dutch Association for Municipalities (VANG), was not willing to cooperate. The collecting organisations did not want to continue with the process without the involvement of the VNG.

3. What is the department of public works doing at this moment to solve the problems in the market?
We (ministry of infrastructure and environment) try to reach the same goals as we set in the green deal, but in other ways. We cooperate in initiatives focused on innovation of fibre recycling techniques. When those techniques are developed in such a way that non reusable textiles will become more valuable, the collecting organisations will also be able to collect more textiles. Besides, we work on the program “from waste to resource” (VANG), and textile is one of the prior streams. In this way we also try to draw attention for textile waste collection in municipalities.