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FROM RAGS TO RICHES
A STUDY OF THE ENVIRONMENTAL GOVERNANCE OF USED TEXTILES IN NORWAY AND FOLLO REN IKS

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Abstract

This master's thesis explores the topic of used textile management in Norway. Around 50% of all used textiles from Norwegian households end up in the residual waste. As Norway plans to develop a circular economy, resources such as used textiles must be exploited to their fullest extent to lower their environmental footprint and keep them cycling back into the economy. At the local level, municipal waste companies are trying to participate in the circular management of used textiles by capturing these resources separately from other waste fractions. This thesis aims to understand what causes suboptimal management of used textiles in Norway and how these challenges should be addressed at the national level, which is the first research objective. The second objective is a case study of inter-municipal waste company at the local level, Follo Ren IKS. We explored how they can implement a system for separate collection of used textiles that captures a larger share of the used textiles their inhabitants dispose of. These objectives were addressed through qualitative interviews with expert informants involved in used textile management and a survey data collection conducted on inhabitants of the Follo Region. Through the environmental governance systems framework, the findings suggest that the main causes of suboptimal management of used textiles in Norway are due to lacking infrastructure, lacking technologies, insufficient collaboration amongst all the economic actors, and a lack of responsibility placed on the textile producers. For the second objective, the theories of human action combined with policy measures and instruments allowed for the systematic interpretation of the survey data. The findings indicate that certain demographic groups amongst the Follo region inhabitants are more likely to dispose of their used textiles in the residual waste, hindering any chance of reuse or recycling. The groups which stood out were men, people under 30, single-person households, people with higher education, and households with one child or no children. The inhabitants were positive about the idea of implementing a pick-up solution for used textiles, which could capture a larger share of the textiles going to waste. Such a system should be structured to be easy to use and strongly communicated to the inhabitants, to increase separate collection.

Acknowledgements

List of abbreviations

CO2: Carbon dioxide

EEC: European Economic Community

EGS: Environment Governance Systems

EPR: Extended producer responsibility

EU: European Union

FIAS: Fjellregionens Interkommunale

GHG: Greenhouse gas

IATA: Indre Agder and Telemark

IKS: Inter-municipal company

IPCC: Intergovernmental Panel on Climate Change

NF&TA: Norwegian Fashion and Textile Agenda

NGIR: Nordhordland og Gulen Interkommunale IKS

NOK: Norwegian kroner

ROAF: Romerike Avfallsforedling IKS

UFF: Ulandshjelp fra Folk til Folk

VAT: Value added tax

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1. Introduction

1.1 Background

We cannot continue living the way we are today. Our current ways of life pose threats to our very existence, and all aspects of our lives and activities must be confronted if we are to combat the ecological crisis the world is facing. Actors at all governmental levels are acknowledging that swift action must be taken if we want to keep the worst consequences at bay. The latest instalment of the sixth IPCC report laid it clear, once again, that our window of opportunity to prevent irreversible damage is rapidly closing and it is now or never (Harvey, 2023).

The imperfections of our current political and governance systems and structures are becoming more and more apparent. When we analyse them with ecological concerns at the forefront, it is easier to spot the flaws, such as the poor divisions of risk and responsibility between economic- and political actors and citizens, and how the short-term prioritisation of profits translates to little regard for the long-term effects that our ways of living have on the planet.

The environmental impact of our activities is heavily linked to both our production and to our consumption habits. Negative impacts occur in all stages, from resource extraction and processing to producing to transporting to consuming to disposal. Extraction can put vulnerable ecosystems at risk, disrupting natural processes. Processing and production can lead to pollution and environmental degradation while also being hazardous to the health of the workers. Transportation leads to the emission of greenhouse gases, GHG. Certain products have emissions directly linked to their usage. Finally, we have disposal. This is usually the end stage of any product and material, typically ending up in a landfill or being incinerated. This stage has much potential to become more environmentally sound, especially for the product group we will address in this thesis.

Textile management has become a hot topic over the years. With fast fashion pushing out poor-quality textile products at a low price, styles in and out of trend at lightning speed, and

little focus on quality, repair and reuse, the textile industry is plagued by consumerism rather than materialism. Materialism is not bad in and of itself, but combined with consumerism it can lead to unsustainably high consumption rates and a disregard for the impacts these consumption habits have on the environment. This is not to say the blame is only on the consumer. Rather, we see the arguably natural consequences of the more or less unregulated global structures of textile production.

While all stages of the life cycle of textiles must be addressed in waste analysis, the stage of disposal is particularly interesting. In our case, we will look at how this is managed in Norway. Here, the management of used textiles has traditionally been somewhat disjointed, with municipal waste companies responsible for what is considered waste, humanitarian organisations responsible for reusable textiles, and used textiles fit for material recycling often falling between two stools. While this division has allowed the actors to manage the type of used textiles they have the expertise and infrastructure to manage, we do still see textiles ending up in the wrong place, leading to suboptimal treatment of the textile resource.

The textile industry is a significant polluter and a material-intensive industry. The industry is also responsible for around 10% of the world's total CO_2 emissions, textiles make up between 7-12% of waste in landfills globally, and textiles are the consumption area with the 4th largest environmental impact in the Nordic countries (Make Good, n.d.; Energi- og miljøkomiteen, 2022; Schmidt et al., 2016). For these reasons, textiles are one of the seven value chains emphasised by the EU and Norway to be addressed to create a more circular economy (Avfall Norge, 2020). Optimal treatment of used textiles can lead to a more sustainable and circular textile industry, where the textiles are both used and otherwise utilised in other products for as long as possible, ideally lowering the need for new textiles.

1.2 The status of textiles and circularity in Norway

Before we can start exploring the challenges of used textiles that this thesis aims to tackle, we must look at the status of both textiles and used textiles in Norway today.

Norway is known for being a rich, developed nation with high standards of living for its inhabitants. This is recognizable in high consumption rates, which also extend into the realm

of textiles. Norwegian households consumed around 80.000 tonnes of textiles in 2018, equaling 15 kg per capita, which includes both clothing and furnishing textiles (Watson et al., 2020). This number has been stable for the last decade and shows few signs of slowing down.

A comprehensive report conducted by *PlanMiljø* and *Østfoldforskning* at the request of *Miljødirektoratet* detailing used textiles and textile waste was published in 2020. It found that while the degree of household sorting of used textiles has increased over time, around 50% still ends up in residual waste in Norway (Watson et al., 2020). When textiles are not sorted at the household level and the waste company that handles residual waste is not equipped to sort it after disposal, the textiles lose their chance at a second life through reuse or recycling and head straight for "energy recovery" through incineration or end up in landfills. Here, we experience both environmental and economic losses through the limited utilisation of the resource.

Increased separate collection of used textiles can help reduce the demand for new textiles by allowing more textiles to be reused or materially recycled which is necessary when aiming to reduce our GHG emissions and the environmental impacts of our textile reduction and consumption (Miljøverndepartementet, 2013). Not sorting textiles separately means skipping multiple steps in the waste hierarchy by going straight to energy recovery through incineration along with the residual waste. Additionally, many contemporary waste processing facilities are unequipped to handle textiles which can harm or destroy equipment, wasting time, money and energy (Knezevic & Aasen, 2022).

Comparing the two second-life options, reuse is the more sustainable option as it has ten times lower GHG emissions compared to material recycling (Grimstad Klepp & Skårdal Tobiasson, 2019; Lyng & Prestrud, 2018). For this reason, reuse is placed higher than recycling in the waste hierarchy model. This will be revisited in later chapters. Reuse also creates economic and social values through employment in businesses selling used textiles, many of which are humanitarian and charitable. These businesses thus provide value by using the income generated for charitable causes. Reduced demand for new textiles will mean less use of natural resources, chemicals, water and energy, which will result in reduced GHG emissions (Miljøverndepartementet, 2013). Used textiles are therefore both a potential resource and a waste problem.

The 2020 report mapping used textiles and textile waste in Norway found that presumably, 88% of all textile consumption comes from households (Watson et al., 2020). As this group consumes the most new textiles, it is interesting to see how they handle their used textiles. This is also the group that waste management companies, such as the one we will do a case study of, are most eager to communicate with, regarding the disposal of textiles. For this reason, this thesis will focus on used textiles from households. This will not exclude used textiles from private and public businesses, such as work uniforms, but will not explicitly explore these. On the other hand, unsold textiles from shops are not treated in a similar way to used textiles and managing these poses different challenges (ibid). These are not handled by waste companies such as the one I am collaborating with and thus fall outside the scope of this thesis.

The separate collection at the household level is mainly conducted by humanitarian organisations, making up 79% of all collections in Norway (Watson et al., 2020). Some of the most established actors are Fretex, Kirkens Bymisjon, Røde Kors and UFF. The remaining collection is conducted by either private actors who sell the used textiles for profit, or through publicly owned waste companies. The textiles donated are almost entirely donated through bring-bank containers at public and private grounds, with the exception of around 4% of textiles being collected through pick-up (ibid). Of all textiles collected, only a small share remains in Norway. 97% is exported to foreign countries for detailed sorting, mostly in the EU, to be reused and recycled there where they are more equipped to handle the massive amounts of textiles donated. As of 2018, almost 32.000 tonnes of used textiles were collected in Norway, indicating high per capita disposal.

The Norwegian government is one of many countries in the world that aims at developing a green, circular economy (Klima- og Miljødepartementet, 2021). This national strategy entails more efficient use of resources, such as recycling, reducing obsolescence of products by offering repairs when possible, choosing less material-intensive means of production, and overall reducing the demand for unnecessary material goods. The Circular Gap Report from 2020 stated that Norway has one of the highest consumption rates per capita in the world and less than 3% of the consumed materials are recycled back into the economy (Circular Norway, 2020).

1.3 Definitions

Before moving further, we will have a deeper look into the terminology used in this thesis and clarify the meaning of these concepts.

1.3.1 Textiles

While textiles are by definition often understood as cloth and woven fabrics, or just any type of fibre-based material, this thesis requires a different definition when looking at the products and byproducts waste companies and humanitarian organisations collect.

The working definition for textiles in this thesis was established in collaboration with Follo Ren. Here, we work with what actors in the waste management industry understand as textiles, in terms of what waste companies and humanitarian organisations both receive, collect and accept. Subsequently, this is what is communicated to individuals and households that waste managers mean when referring to textile waste, so our definition is meant to be practical. The term *textiles* thus include personal textiles such as clothing, shoes, and accessories, as well as home textiles such as towels, curtains, blankets, linens, covers, etc. Some products are in the grey zone and are not included, such as products where textile fibres are not dominant, e.g. furniture upholstery, or products a majority of textile waste handlers are not equipped to handle, e.g. large carpets. Other products in the grey zone are included, like duvets and pillows, as some municipalities and humanitarian organisations accept them and do recycle them, though this varies. While destroyed shoes are technically still a textile they will not be considered as such in this thesis. They are not fit for reuse and recycling technologies are not yet advanced enough to pick them apart for their materials (Sortere.no, 2023).

The umbrella term for the textiles we are interested in is *used textiles*. In this context, this refers to textiles individuals or businesses dispose of. The obvious distinction is how the textiles are disposed of. The Norwegian Environmental Agency, *Miljødirektoratet*, delivered an updated definition at the behest of *Avfall Norge* in 2021. If the textiles are reusable and are donated to a humanitarian organization that sells them second-hand they are legally considered to be *donations*. If used textiles of any quality are disposed of in the residual waste bin or otherwise wasted, we refer to them as *textile waste* (Miljødirektoratet, 2021). At what point one can refer to textiles as waste is a big point of discussion in the industry, as the

means of disposal is not synonymous with the quality of the textile product. Norwegian authorities refer to all used textiles delivered to humanitarian organisations from households and businesses as donations, but the increased share of destroyed textiles among the reusable and recyclable textiles further complicates the use of this terminology (Måge, 2021). Used textiles fit for reuse sometimes wind up in the waste bin, and sometimes soiled textiles end up among donations.

The new definition by *Miljødirektoratet* did open up a more flexible understanding of recyclable or destroyed textiles that have been donated. This demands an evaluation of the textile itself where its appearance and functionality determine its status. If it is reusable without requiring repairs it is considered a donation and if not it is considered waste, which is challenging to evaluate in practice (Miljødirektoratet, 2021). The definition did not differentiate between textiles fit for material recycling and textiles that are entirely destroyed. As remarked by several informants involved in reuse, the legal implications of how we define what is a donation and what is waste, are massive. Pointed out during the interview with Kristin Voll (personal communication, March 20, 2023), Executive Director for Textile Collection in Red Cross Norway, the definition says something about the property rights of the textiles, who is responsible for handling them, what value they hold, etc. The importance of definitions in assigning responsibility was further emphasised by Arnt-Willy Hjelle, Head of Sustainability at Fretex Miljø AS (personal communication, March 23, 2023).

For the thesis, we will distinguish between donations and textile waste as described above. Other means of altering the ownership of textiles that do not require the services of third parties, such as hand-me-downs, are excluded. Further, we will make three distinguishments when referring to the quality of the textile, which implies at what stage in the waste hierarchy it should be handled. These are:
- Reusable textiles: the highest quality textiles, which should be donated.
- Recyclable textiles: lower quality textiles, which are unfit for reuse, usually due to wear and tear, but can be materially recycled into other products.
- Destroyed textiles: soiled, dirty and/or wet textiles that can neither be recycled nor reused. These are best treated through incineration, where they can be used for energy recovery.

The table below lists the legal definition of the used textiles depending on how they are treated downstream and the three fractions of textile quality. The table then states which downstream solution each fraction is suited for.

Table 1: Textile definition, quality and downstream solution

Textile definition	Textile quality		
	Reusable textiles	Recyclable textiles	Destroyed textiles
Donations	Yes	Generally, yes	No
Textile waste	No	Generally, no	Yes

1.3.2 Circularity

The concept of a circular economy has increased in popularity over the years and has become a staple in planning economic activities. Much of the world's resources are finite and must be treated as such. A circular economy aims at changing the way we produce and consume to be eco-effective through material flows that allow for upcycling materials over time (SB Insight, 2019). As mentioned, the circular economy focuses on the efficient use of resources and at reducing demand. A more detailed insight can be found by looking at the circular economy model. The model is built on three core principles: the optimization of resource yields, fostering system effectiveness and designing out negative externalities, and preserving and enhancing natural capital.

The first is the *optimization of resource yields*. We can distinguish between renewable resources, often with biological life cycles, and nonrenewable resources, with technical life cycles. Textiles are non-renewable resources, so we will consider technical life cycles, shown in blue in the figure below. These cycles are ways in which products can be cycled back into the economy. The more times it cycles back and the tighter the loop it can stay in, the more optimised the resource yield. The resource is optimised in terms of environmental benefit as fewer materials are wasted and less energy and materials are typically needed for e.g. repairs compared to producing new products. As our economic system is largely built upon a use-and-throw principle, looping materials back into the economy is not necessarily the

economically most efficient strategy. As shown in the illustration, the tightest loop with the highest utility in the technical cycle is repairing the product. When repairing is not an option, it is best to reuse or redistribute the product.
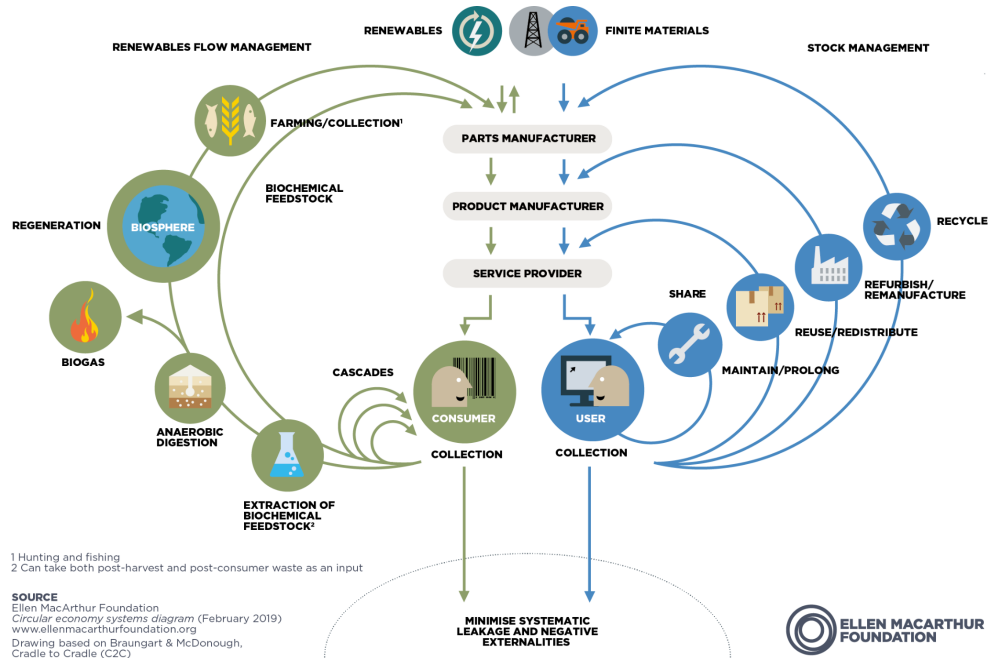
Figure 1: The Butterfly Diagram (Ellen Macarthur Foundation, 2023)

The second principle is to *foster system effectiveness and design out negative externalities*. Foster system effectiveness entails minimising damage to already existing systems while designing out negative externalities, which means developing systems with as few externalities and managing and controlling for those externalities that cannot be removed.

The third principle is to *preserve and enhance natural capital*, by being selective in the choice of materials and providing them through processes that are resource-effective and renewable (SB Insight, 2019).

We see circularity firmly established in policymaking through many of the guiding policy frameworks around the world, such as the UN's *Sustainable Development Goals*, the EUs *Circular Economy Action Plan*, and Norway's *National Strategy for a Green, Circular Economy* (United Nations, 2023; European Commission, 2020a; Klima- og Miljødepartementet, 2021).

1.3.3 Waste Hierarchy

In waste management, we can interpret the technical cycle through the waste hierarchy model, more commonly known as the waste hierarchy. This model is the foundation of most modern waste management, notably the EU's Waste Framework Directive (European Commission, 2020b). It is a five-step, upside-down hierarchy that prescribes the prioritised order for handling and disposing of waste. It ranges from most desirable to least desirable, from waste prevention to land fillings. The further down the hierarchy, the worse the environmental impact. Reuse is the optimal second-life option for waste types such as used textiles and furniture.

Figure 2: The Waste Hierarchy (European Commission, 2020b)

1.4 Justification of the thesis

The design phase of textile products, such as choice of materials, spinning, and dyeing, is the area of the textile industry that has the highest environmental impact (Energi- og Miljøkomiteen, 2022; Klepp & Tobiasson, 2019). In fact, around 80% of the total environmental impact occurs here, through CO_2 emissions, water and chemical consumption, and chemical pollution, but this is something Norway has little influence over as it is mainly a textile importer (ibid; ibid). However, with a high per capita consumption rate, Norway must, first of all, do what it can to reduce consumption and then ensure responsible disposal of used textiles in households. In this case, responsible disposal would entail following the waste hierarchy by attempting to reuse as much of the textiles as possible. What cannot be reused would then be materially recycled, and what cannot be recycled would be incinerated. Used textiles should be collected separately from other waste, as this will lead to a higher

share of textiles reused and materially recycled, keeping them in a circular loop for longer. This, combined with reused textiles replacing some of the need for new textiles, can lower the environmental impact of the textiles and the industry overall. The collection of used textiles is also important due to the sheer size of textiles being disposed of each year. In 2018, Norwegian households disposed of approximately 62.000 tonnes of used textiles, or around 12 kg per capita, with around half of that ending up in residual waste and later incinerated (Watson et al., 2020). The industry assumes that roughly 95% of all clothing and textiles can be either reused or materially recycled (ROAF, 2022), providing large potential gains in separate collecting.

In collaboration with the local waste management company 'Follo Ren IKS', this thesis is done on the topic of used textile management. Following the EU directive, national strategies such as *'Avfallsstrategi'* by Miljøverndepartementet, and in accordance with their own frameworks, Follo Ren is to make efforts to separately collect domestic used textiles by 2025 (European Commission, 2020b; Miljøverndepartementet, 2013; Follo Ren, 2018). The 2021-22 proposal to the Norwegian government from the energy- and environment committee, Innstilling 259, also demands a plan for a separate collection of textiles to make Norway's economy more circular (Energi- og Miljøkomiteen, 2022).

Follo Ren's annual report from 2021 announced that Follo Ren is slightly ahead of the rest of Norway, with the share of used textiles collected at 55% at the end of 2021 (Follo Ren, 2022). While this achievement is commendable, there are still ways to go to achieve the EU and the national goals of 65% recycling of municipal waste by 2025 (Watson et al., 2020). This thesis aims to shed light on various ways in which Norwegian municipal waste companies, with Follo Ren as our case study, can go about increasing the share of used textiles separately collected.

When diving into the literature on the topic of used textiles in Norway, one quickly realises that it is an unusually complex waste fraction to manage. Many different actors and institutions are involved, all with their own interests in how these used textiles ought to be handled. These actors have also very much worked separately from each other, with limited collaboration on common challenges. And similar to other waste fractions, producers have largely till now not been held accountable for their products once they reach the end of their life cycles and become "waste", in one shape or another. This thesis will attempt to give an

overview of those involved in the management of used textiles in Norway and find where the flaws in the current system reside, what challenges are the greatest and how the Norwegian government, policymakers, and other actors should respond to these challenges.

1.5 Method and case

The thesis will utilise mixed methods in the research. This will be a combination of a literature review, in-depth interviews with expert informants on the topic of used textile management, and a survey of a representative sample of Follo Rens inhabitants on the topic of separate sorting of used textiles on the household level.

As mentioned, I am collaborating with the inter-municipal waste company Follo Ren IKS for this thesis. More specifically, research objective two was created in response to the company's need to adapt new requirements regarding a system for separate collection of used textiles by 2025. The thesis will thus have two perspectives relating to the study areas, one being at the national perspective when looking at Norwegian used textile management as a whole, and one being at the local perspective looking at Follo Ren IKS and the Follo region.

1.6 Structure of the thesis

The introduction of the paper has already established the topical background of used textiles in Norway and problematised it in the context of sustainability and circular economy. The following chapter will present the aim of the study, including the problem statement, research objectives and corresponding research questions. After that, we move on to the theoretical frameworks this thesis will use to help answer our research questions. As the topic of used textile management in Norway is, as you will see, quite broad, we will move into a literature review on the topic. Here, we will address the most crucial elements of used textile management, from the various types of collection and material recycling to the national and international frameworks that establish the goals of used textile management, to the implications of a future extended producer responsibility on textiles. The next element is a chapter on the methodology, which will give more detailed insight into the research design mentioned above before we move on to the analysis of the findings from our primary data collection. These findings will then be discussed in relation to our theoretical framework and

literature review, and be used to answer our research questions. Finally, we will make some concluding remarks and present our interview guides and the survey in the appendix.

2. Aims of the study

2.1 Problem statement

For the reasons brought up in the previous chapter, used textiles constitute not only a resource but also a waste problem. In the middle of an ongoing, global environmental crisis largely fueled by overconsumption and irresponsible management of resources, we are in grave need of restructuring how we manage our waste domestically. As a highly developed and rich country, Norway carries a responsibility to be at the forefront of these developments. This thesis will therefore look at the management of used textiles in Norway on both a national and local level, the way it is currently structured and identify how it can be improved in a way that is more sustainable and circular.

2.2 Objectives and related research questions

This thesis will be structured around two research objectives.

The first objective will focus on how the management of used textiles in Norway is structured. Here, I will analyse the current system: how and by whom it is managed. In order to do this, I will utilise Vatn's environmental governance system model to put the Norwegian system for used textiles management into context and identify which elements cause suboptimal governance and management. I will dive into the drivers and barriers to more circular and sustainable management of used textiles in Norway. Here, we will explore challenges with the current system and possible solutions that can make it more circular through expert interviews with relevant actors in this field.

RQ1: What does the structure of used textiles management look like through the lens of the EGS framework?

RQ2: What major challenges do the different actors that manage used textiles currently face, and what solutions can be introduced or improved upon to address these challenges and make used textiles management more circular and sustainable?

The second objective will follow the case study of the waste management company Follo Ren, specifically their challenges related to handling and sorting used textiles from their inhabitants. In consultation with Follo Ren, this thesis will focus on what the company can do to ensure a separate collection of used textiles in its area of operation. This entails figuring out which methods of textile collection the company ought to offer, how to make this simple and attractive for the inhabitants to comply with through relevant policy measures and instruments, and how to get relevant and motivating information regarding the collection across to the inhabitants. I compare the different ways of collection that are available in Norway today and conduct a survey to assess which solutions the inhabitants want. Identifying perceived barriers to sorting will be crucial, and this will also be part of a questionnaire sent to the inhabitants of the Follo region. When considering which sorting schemes the company should implement, it should be done in deliberation with the inhabitants and the employees of Follo Ren, further informed by the experience of other sorting systems and projects done elsewhere.

RQ3: How can Follo Ren structure a system for used textiles that ensures a higher degree of sorting and what policy measures and instruments can be implemented to ensure compliance and that this system will be easy to use for Follo Ren's inhabitants?

3. Theoretical framework

In this chapter, we present the three theories that make up the theoretical framework of this thesis. These are the environmental governance systems framework, theories of human action, and policy measures and instruments.

3.1 Environmental governance systems framework

The environmental governance systems framework, EGS, was developed by institutional and ecological economist Arild Vatn to analyse environmental governance structures and

processes. More practically, it is used to study environmental problems and identify where these issues within the structures are found and in what way they prevent or constrain optimal and appropriate governance of environmental resources.

The EGS framework includes three institutions: the institutions governing the policy processes, the resource regimes, and civil society. These institutions relate to different actors: political actors, economic actors, and civil society actors. These institutions and actors interact with each other, actors driven by their own motivations and the institutions operating within their roles. Out of the three institutions, this thesis will place more emphasis on analysing the resource regime as this is the institution which governs the protection and use of environmental resources. However, in order to get a grasp of the full picture we will still also look at the whole EGS framework.

Institutions can be understood in many ways. A broad understanding is that institutions are the rules of society, which shape people and society at large by influencing behaviour and norms. Institutions are not static and are in turn shaped by people. More specifically, institutions can be defined as conventions, norms and legal rules that shape how we interact with each other and the world around us. Institutions help coordinate action, how to handle conflicts and protect certain interests (Vatn, 2015).

The resource regime encompasses institutions that govern and protect environmental resources and their processes, with the two most important institutions dealing with property and use rights, and the interaction rules between economic actors.

Property and use rights are concerned with what kind of access is granted to a resource or the benefits from a resource. The types of use rights emphasised by Vatn (2015) are rights to **access**, access to enter a physical property, **withdrawal**, right to withdraw products or byproducts of a resource, **management**, to be able to transform the resource and regulate its use, **exclusion**, to determine access rights, and **alienation**, to sell/lease the other rights. In some cases, people Vatn (2015) further specifies that the owner of a resource will have all of the five rights. Who the rights-holder is, determines what kind of property we are looking at. Simplified, we would consider property owned by an individual or a group of individuals to be **private property**. **Common property** is also owned by a group of individuals, but these individuals do not have the right to sell without consulting the group. **State property** is, as the name implies, property with the state as the rights-holder, including

lower state levels. This also implies municipalities, which we will further explore when discussing objective one. Lastly, when no one holds particular rights there is no defined property, and we have what we describe as **open access**.

The other institution to understand when looking at resource regimes is those of interaction rules between economic actors. The first type is **trade**, which in modern society is understood as the voluntary trade of goods and services in exchange for a monetary payment. The second form of interaction is **command**, where one actor commands another actor's use of a resource. This occurs both internally in e.g. an organisation, where there is a hierarchy that follows a chain of command, and between actors, where there is a third party that holds the authority to form and protect property rights. **Community rules** are interactions less formal than the aforementioned interactions, rooted in cooperation and reciprocity between individuals and groups, typically found in smaller, intimate communities. The fourth type of interaction is quite simple in that there are **no rules** to regulate interaction. This is typically where we see the negative externalities related to resource use most evidently, such as pollution (Vatn, 2015). We will put these different types of interaction rules up together with the variety of property and use rights in our discussion later on, to understand what resource regimes we are dealing with when analysing used textile management in Norway.

Economic actors can be roughly defined to include producers and consumers, those holding rights to productive resources. Producers and consumers can in some instances be the same, such as household-based production units. In larger forms of organisations, private property producers are often firms while state property can be organised as firms or public management entities. In governing environmental resources, these forms of state property economic actors are often seen as useful entities. This is because these actors are often motivated by more complex goals than just profit maximisation such as environmental concern and care, unlike most traditional private property firms. This can lead these state property firms or public management to internalise the negative externalities we would otherwise see, such as pollution. Common property-based production is far less extensive than that of private- and state property-based production and is not so relevant for this study, and will thus not be explored in this chapter.

Another important group of actors in governing environmental resources are political actors. These can be divided into public authorities within a state, which in our context means the state, while the others are international governmental organisations. These actors, especially

the state as a nation's foremost public authority, are in charge of the rules which govern political and economic processes, what Vatn (2015) calls the political institutions: constitutional- and collective-choice rules. These institutions give political actors the power to define the resource regimes and the policy process. Constitutional rules define the fundamental principles of the state, such as power distribution and structure, and collective-choice rules are the result of individuals coming together to front their interests, e.g. through voting. Political actors are given legitimacy through the engagement and approval of civil society.

Civil society actors encompass both individuals and groups, which include non-governmental organisations and the media. Civil society reflects many aspects of society and also participates in shaping the norms, interests and values of society as a whole.

This framework can be used to address environmental dimensions by further including the environmental resources with their processes and attributes, what technologies and infrastructures are available, the patterns of interaction among economic and political actors, and the outcomes - where the use of the resource and state of the resource influence economic and political choice. Figure 3 below illustrates the framework.
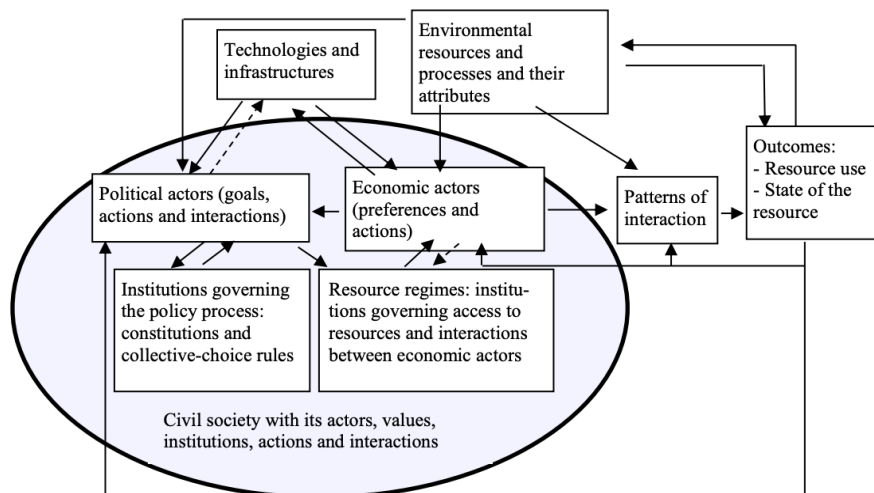
Figure 3: The EGS framework (Vatn, 2015)

The framework will be used to contextualise the management of used textiles as a resource in research objective one, to get an overview of actors and institutions involved and the technical aspects of textiles. This will pave the way to understanding the dynamics in used textile management and identify points of tension and potentially conflicting interests.

3.2 Theories of human action

There are many theories for understanding why people act the way they do. Those who subscribe to an individualistic understanding see people as either "rational", making calculated decisions to secure their self-interest and preferences, or as having "bounded rationalities", taking into account that people have restricted capabilities and information. Bounded rationality assumes people make the best with what they got, that while they cannot maximise their utility they will try to make sufficiently good choices according to their preferences. These preferences are understood as personal. On the other hand, we have the social constructivist position. This position argues that people's preferences are not shaped in a vacuum, but are rather continuously shaped and reshaped by the society they live in. Many constructivists also expand by taking pluralistic rationalities into account, meaning people act both individually and socially. Individual rationality accounts for when people act selfishly to maximise their utility, while their preferences and norms are socially constructed. Social rationality distinguishes between 'we' rationality and 'they' rationality. 'We' refer to when people's actions are in favour of a group they belong to, acts of solidarity, and 'they' refer to when people act in favour of groups separate from themselves, through acts of altruism. Considering how social constructivism emphasises pluralistic rationalities and the influence of society, institutions are crucial to understanding when and why people utilise the different rationalities.

In other words, institutions can be understood as rationality contexts. This means that based on what institutional context a person finds themselves in, what is considered to be appropriate behaviour differs and they will be inclined to follow different types of rationality. In a context such as the market, actors will likely operate as economic actors where their main objective is to maximise their own utility, i.e. individual rationality is at the core. However, our actors will behave differently in their community. Here, norms of care and cooperation are far more central, and 'we' rationality is more dominant.

When looking at waste sorting at the municipal level, as we will when answering research question three, it is important to understand what motivates people's sorting behaviour. Waste sorting is strongly encouraged across Norway but it is difficult to ensure appropriate

compliance at the household level. For example, the Pollution Act § 79 details punishment through fees and/or jail for illegal treatment of waste, if it could harm the environment (Forurensningsloven, 2022, § 79 a). But household waste sorting mostly takes place within the home and is difficult to monitor or regulate. Because of this, waste sorting is in practice voluntary, and the challenge lies in finding ways to change sorting behaviour through policy measures and instruments.

3.3 Policy measures and instruments for environmental action

Policies are implemented to influence behaviour, such as encouraging pro-environmental behaviour. These can both be helpful practically, by incentivising desired behaviours, and by providing information that helps people make better decisions of their own volition. Policies reformulate the resource regime by changing what economic actors can and will do. Policies explored in this chapter will be used to inform Follo Ren's future system for a separate collection of used textiles and address research objective two.

Firstly, it is important to distinguish between a policy measure and a policy instrument. A measure is a change one wants to make, such as making people use public transportation in a city rather than drive personal vehicles. An instrument is something you implement to make this change happen, by influencing the behaviour. In the same example, this could be by reducing the ticket price for public transportation and reducing the number of available parking spots. Policy instruments are the means while the policy measures are the ends. Policy instruments are crucial in changing resource regimes so that people will act more environmentally friendly, by impacting rights, duties and norms (Vatn, 2015).

We distinguish between three categories of policy instruments, these being: economic, legal, and pedagogical. In some instances, changing the resource regime also requires pro-environmental changes and developments in infrastructure to be even more impactful.

Economic instruments incentivise desired behaviour monetarily through, e.g. taxes and subsidies, which form what is economically profitable to do. These instruments will have either a positive or a negative dimension, with taxes being negative and subsidies being positive, monetary resources either being given to an agent or taken away from them. Legal

instruments set the legal rules of what is and what is not formally allowed by assigning rights and responsibilities, thus forming what is appropriate to do. These instruments are regulatory and generally place stricter constraints on what is allowed to do, ranging from unconditional and conditional prohibitions. Pedagogical policy instruments, also known as informational policy instruments, have been recognised as increasingly important over the years, especially as they are useful in influencing behaviour. Information can be "pure" by simply giving facts about a product or behaviour. More importantly, it can have a cognitive effect by educating and thus changing the receiver's perception of an issue, forming what is deemed sensible to do. The receiver's motivations could potentially be altered as their perception impacts their preferences. Some of the most common informational instruments are knowledge transfers, like "pure" information, communication of reasoned argument and moral appeals. They usually hold a positive or a negative dimension, similar to economic instruments, by persuading or dissuading an agent from performing certain behaviours (Vatn, 2015; Vedung & van der Doelen, 2007).

The waste sector has utilised all types of policy instruments in the past to influence behaviour. One famous Norwegian example is the deposit-refund system for plastic bottles and aluminium cans. Consumers pay a small deposit for each plastic bottle purchased, which they can only get back by disposing of the empty bottles and cans at deposit-refund machines (Sortere.no, 2022). This economic instrument is celebrated as a success, as pollution from these products is minuscule compared to other countries without similar schemes (TOMRA, 2022).

Regardless of the impact of the policy instruments, people's behaviour will not change unless an infrastructure is in place to facilitate the desired behaviour. Simply put, it is a matter of feasibility. If there is no system in place to deal with used textiles, there is no reason or opportunity for households to sort it separately from residual waste.

The choice of policy depends on what type of human rationality we assume, as rationality dictates what motivation people have, and the policy instruments have to target these motivations. For example, economic policy instruments generally assume individual rationality in which people evaluate their choices against each other and act in ways that financially reward them. On the other hand, informational policy instruments often assume a

social or pluralistic rationality in which preferences and norms are socially constructed and can thus be changed.

In this thesis, we will explore what policy measures and instruments Follo Ren can utilise to increase the degree of separate sorting of used textiles. The policy instruments will therefore need to be ones that can be implemented at a municipal level. We will evaluate what policy instruments are necessary and feasible for Follo Ren to implement in our discussion.

4. Literature review

This chapter reviews relevant literature on the subject of used textile management, both in Norway and globally. The first subchapters summarise literature that will be used to inform research objective one. These are the present frameworks dictating the goals of used textile management, material recycling of textiles, and the extended producer responsibility on textiles. The latter half informs research objective two, which explores the local management of used textiles by the waste company Follo Ren. Here, we look at empirical literature on separate collection of used textiles based on European and Norwegian experiences.

4.1 Frameworks regarding textile waste

To understand why there is such a drive for new systems for managing textile waste and the emphasis on circularity and sustainability in these systems, we need to understand the political and social frameworks that request these changes. There are many policy frameworks detailing how used textiles are to be managed at different governance levels. As the EU and other European countries are looking towards green transitions, the waste sector must keep up, as this is one of the sectors with a high potential for circularity. The frameworks put forth in previous years set ambitious goals on how to ensure sustainable waste management, with used textiles represented. This subchapter will briefly overview some of the most important frameworks on the different levels, starting from the top with the EU's political frameworks.

The *European Green Deal* and the *EU Circular Economy Action Plan* are both political frameworks describing the measures and strategies the EU must implement to ensure a transition towards a circular economy, with the goal of becoming carbon neutral by 2050. Presented in 2019, the Green Deal works across multiple political arenas to ensure green and circular economic growth while maintaining the competitiveness of the EU. In addition to carbon neutrality, the Deal aims at decoupling economic growth from greenhouse gas emissions and will not leave out any place or individual. The Action Plan was put forth shortly after, in 2020, detailing 35 measures to make products more sustainable. Some of the objectives of these measures are to expand product lifespans, empower consumers of specified products, ensure less waste and become a world leader in building circular economies (European Commission, 2020a).

The Green Deal and the Action Plan informed many later EU directives, including the *EU Waste Framework Directive*, which details the overall principles and rules of waste management. As an EEC member state, Norway is obliged to follow the directive through the Waste Regulation (Miljøverndepartementet, 2013; Deloitte, 2022). Regarding used textiles and textile waste, the Waste Framework Directive demands the establishment of systems to separately collect textiles in place by 2025 (Deloitte, 2022). It also sets targets for separate sorting of food waste by 2023 and reuse and material recycling of household waste: 55% by 2025, 60% by 2030, and 65% by 2035 (ibid). These goals guide the strategies of waste companies such as Follo Ren, as many are now actively working towards increasing the share of waste for material recycling with the EU-mandated deadlines in mind.

The directive is currently under a targeted revision by the European Commission, expected to be published during the second quarter of 2023. Here, the Commission has stated that circular and sustainable management of textile waste is central to the policy formulation (European Commission, 2020b).

Another offspring of the Green Deal is the *EU Strategy for Sustainable and Circular Textiles*. The strategy, proposed by the European Commission, aims to target the whole value chain of textiles to reduce the negative environmental impacts of the industry. Some policy measures in the strategy include extended producer responsibility for textiles and ecodesign requirements, which will be explored in a later subchapter (Klima- og miljødepartementet, 2022a).

Green transitions and shifts from a linear to a circular economy will affect most sectors and industries in Norway to various extents. Waste management is essential in many of these, especially in the seven key value chains presented in the Circular Economy Action Plan of the EU. One of these key value chains is textiles, in addition to other products with much potential for improved circularity, such as plastic-, food- and electronic waste. *The National Strategy for a Green, Circular Economy* is Norway's continuation of the Action Plan and is the foundation for the government's circular economy efforts (Klima- og miljødepartementet, 2021).

The most important regulations for Norwegian waste management are those found in the *Pollution Act* and the *Waste Regulation* (Miljøverndepartementet, 2013). The Pollution Act contains the central framework for waste management in Norway, prescribing laws to prevent and reduce pollution, reduce waste and improve waste management. For waste management companies such as Follo Ren, the Pollution Act establishes the rules for collecting, receiving, managing and processing waste at the municipal level. The Waste Regulation complements the Pollution Act, prescribing more detailed regulations for recycling and for how different waste types are to be treated. While the directive sets the guidelines and principles for waste management in Norway, the Waste Regulation implements it into Norwegian law (Deloitte, 2022).

At a micro level and for the intent of this thesis, we will look at the *Follo Ren Strategy 2019-2035*. The laws and demands of the government are incorporated into the strategy as goals for both Follo Ren and the waste sector in general (Follo Ren, 2018). These goals are largely centred around utilising waste as a resource and tightening the loop of these resources' life cycles, also by treating them as high up in the waste hierarchy as possible. Such goals are in line with the principles of the circular economy model. Some of these goals are to facilitate reuse and sharing services, develop a market for recycled materials, and develop technology for all stages of waste management. The strategy sets specific targets in line with the *EU Waste Framework Directive*, such as increasing the share of household waste being recycled and ensuring separate collection of food-, textile- and hazardous waste. The company aims to achieve these internationally determined goals, whilst also working on the ground level to provide good, easy-to-understand services to its inhabitants at a reasonable price (ibid).

4.2 Material recycling of textiles

When exploring the opportunities and challenges of managing used textiles in research question two, we need a better understanding of what the third level of the waste hierarchy entails. As previously mentioned, reuse and recycling are the most desirable second-life options for used textiles as they have the lowest environmental impact and in addition to having economic benefits. Reuse is the best of these two but recycling is often the only option if the textile is unfit for reuse, such as from wear and tear or being polluted. However, this alternative does come with its own comprehensive set of challenges that need to be understood when looking at the drivers and barriers to the circular management of used textiles in research objective one. Types of recycling and challenges for textile recycling will be addressed in this subchapter.

We can differentiate between multiple forms of textile recycling. One of these is repurposing textiles, in which textiles are most commonly downcycled into other products such as industrial cloths, furniture upholstery, fleece blankets, etc. This is the most widespread form of material recycling today (Watson et al., 2020). A challenge for these downcycled textiles is that most end up as low-grade products, which generate little economic gains. In many cases, the profits hardly cover transportation costs, if at all (Dubois et al., 2020). Additionally, the demand side of the recycling market is dwindling, which is pushing the prices of the downcycled products further down. This is becoming a major economic challenge for the humanitarian organisations that handle the used textiles (Follo Ren, 2022).

In some cases, textiles are also repurposed to maintain their value through upcycling/redesign and becoming new products. This is the recycling option with the lowest environmental impact, in some cases even positive, as the upcycled product can replace the need for a brand-new product. The downside is that this option is more labour-intensive and costly, and is currently operating on a very small scale (Watson et al., 2020).

Textile-to-textile recycling, also known as fibre-to-fibre recycling, is another form of recycling. This can take place in two ways, through mechanical or chemical recycling. Mechanical recycling is more common and entails ripping the textiles apart and spinning the released fibres into threads. A major downside to this type of recycling is that the fibres become shorter, making them less suited for new production than longer virgin fibres.

Chemical recycling is a process of breaking the textile's fibre contents down to a molecular level before creating pure fibres, but this technology is still in its early stages. Less than 1% of all textile recycling is textile-to-textile, but it is one with a lot of potentials if several present barriers are dealt with (Watson et al., 2020). Some barriers listed in the Watson et al. (2020) paper are addressed below.

A major challenge for textile recyclers is that many of the textiles they receive are composed of multiple fibre types, but to produce new textile products one needs pure fibres, also known as mono-materials (Watson et al., 2020; M. Haugland, personal communication, March 17, 2023). Unfortunately, the technology for separating the fibre types in a textile unit is not yet there. While this could effectively address this challenge, we will have to wait for the technology to further develop and become accessible and, ideally, affordable.

Zooming out a bit further we have challenges regarding sorting used textiles by fibre content, normally done manually. Manual labour puts a cap on the sorting scale and is very costly. Combined with the low value of recycled fibres and the small market for recycled fibres in new textile production, there is a need for this sorting to become automated. This technology for automated sorting is further along than that of separating fibre types within the same textile unit, able to recognise both colour and fibre composition. This solution would make it possible to take the recyclable textiles and break them up into pure fibres that can be further utilised in textile production (Dubois et al., 2020). A North-West European company called *Fibersort* has developed optical technologies that allow them to do this automatic sorting, aiming to close the loop of textiles' technical lifecycles (Interreg NWE, 2022). Sweden has built the large-scale facility *Siptex*, which uses near-infrared light to sort textiles by composition and colour (Siptex, 2022). To further prepare the sorted textiles for a second life, we see innovation in the shape of companies such as Swedish *Renewcell*. This company creates what they refer to as Circulose, a textile fabric made from dissolving pulp cellulose, i.e. made from textiles with high cellulose content, such as cotton (Renewcell, n.d.). Similar facilities to sort textiles automatically are being built in Norway at the time of writing this thesis.

Norwegian Re:Textile is a company that is planning to construct a collection and sorting facility for textiles, establishing the largest textile sorting facility in the world (Iversen, 2022). In collaboration with the Varner group, renovation companies and Fretex, this system will

better prepare used textiles for reuse and recycling by sorting them according to fibre contents. An advanced sorting of textiles on such a large scale will help improve the Norwegian market for used textiles and ideally incentivise the establishment of material recycling companies in Norway. UFF Norway is also planning a sorting facility in Bodø, with plans to engage in material recycling in the future (NF&TA, 2023b).

These are just a few of the many challenges for improved textile-to-textile recycling. Barriers are technical, economic, systemic, regulatory, etc., and they need to be addressed on both the demand and the supply side if we are to create a more circular and sustainable textile industry. However, recycling is not the answer to everything. Material recycling tackles the issue of fibre production, which only stands for around 15% of the environmental impact of textile production (Klepp & Tobiasson, 2019). So while facilitating upscaling and improving recycling technologies and markets is important, it is even more important to address the levels higher up in the waste hierarchy: prevention and reuse.

4.3 Extended producer responsibility in Norway

Many of the challenges we encounter when exploring the management of used textiles in research question two are directly related to the decisions and responsibilities of textile producers. From aesthetics to functionality to durability to material composition, all these decisions are made by the producer and have a great impact on the life cycle of the product. The implications of such decisions become particularly evident when a textile product eventually becomes waste and how it then can be managed.

Extended producer responsibility, EPR, is an environmental principle and policy approach and a set of policy measures that expand a producer's responsibility for their product beyond the consumption stage of the product's life cycle. In other words, the producer is responsible for the management of the product after it has become waste and the costs associated with the management (OECD, 2022). EPR is based on the Polluter Pays Principle, keeping the producer of a product responsible for any negative environmental externalities associated with the product throughout the lifecycle. In the *Revision Waste Framework Directive 2023*, the EU will propose EPR schemes for various product groups currently not covered, textiles being one of these groups (Klima- og miljødepartementet, 2022b). This proposal will attempt

to create harmonious EPR schemes for the member countries, to establish a collective infrastructure and system for the EU (Boiten, 2022).

A report by senior policy officer Boiten (2022) from the Ellen MacArthur Foundation gave recommendations for what an EPR on textiles in the EU should consider. This report emphasised measures to ensure separate collection and preparation for reuse and recycling. Some measures mentioned are: increasing separate collection rates, calculating EPR fees to include costs for reparations and remanufacturing, prioritising textile-to-textile recycling when reuse is not an option, and potentially having differentiated fees on different products based on the feasibility of both reusing and recycling these products. The report also mentions harmonising an EPR on textiles with ecodesign requirements for producers.

Ecodesigns are product designs that intend to make a product more environmentally sustainable throughout the product lifespan, such as improving a product's durability, repairability, and energy and resource efficiency (Miljødirektoratet, 2022). The EU is evaluating a proposal raised to the European Parliament regarding establishing a framework for setting ecodesign requirements for sustainable products, as part of the Green Deal and the EU Strategy for Sustainable and Circular Textiles (Klima- og miljødepartementet, 2022c). Textiles with ecodesign will have a combination of qualities that make them more environmentally friendly, such as being made without the use of harmful chemicals, being free of fossil materials, being made of a certain percentage of reused fibres, etc. The combination of textiles having a high potential for becoming more circular and the negative environmental impact of the textile industry is the reason why textiles are one of the product groups to be prioritised going forward (ibid).

As an EEC member state, Norway must follow the Revision Waste Framework Directive and its eventual inclusion of an EPR scheme. Still, there has yet to be a directive regarding an EPR regarding textiles in the EU. However, there is a national working group established in 2022 by the Ministry of Climate and the Environment (Klima- og Miljødepartementet). The group is tasked to propose how EPR for textiles can be implemented by September this year, 2023. An EPR on textiles will also encompass importers of textiles, which is crucial as Norway is mainly a textile importer as opposed to a producer. The Ministry of Climate and the Environment also emphasises the importance of the whole value chain and how the EPR

on textiles must look into the upper levels of the waste hierarchy: waste reduction, reuse, and recycling (ibid).

While we do not yet know what an EPR on textiles will look like or how it will impact on the responsibilities of municipal waste companies like Follo Ren, it is necessary to know one is in the making. An EPR arrangement will lift some of the burdens off of traditional managers of used textiles, such as municipal waste companies and humanitarian organisations, and shift more responsibility onto the producers and importers, which will likely impact future downstream solutions. Gaining insight into how actors involved in the management of used textiles anticipate adapting to this sort of policy and what implications it will have for municipal waste companies' responsibilities can be beneficial when addressing the first research objective.

4.4 Success factors for separate collection of textile waste

When addressing the second research objective, it is important to look towards what has proven successful already. Follo Ren can learn both from their own experiences in collaborating with humanitarian organisations and from the following EU study.

The European Commission requested a study documenting the success factors for the separate collection of various types of household waste, one of these being used textiles. The goal of separate collection in this study was to achieve a high share of used textiles cycling back into the economy through reuse and material recycling. The authors categorised these factors into four fractions, these being: economic incentives, legal enforcement, customised facilities, and engaging communication (Dubois et al., 2020). These factors are reminiscent of the policy instruments categories previously explored. From the comprehensive list found in the study, we will look into a select set of factors deemed particularly relevant in the Norwegian context.

Economic incentives are crucial to ensure that any company or organisation is willing to collect used textiles and that they can sustain their practices in the long run. Reuse is the main economic driver for these companies as reuse is the second-life option with the highest economic yield. As the market of recycled textiles stands now, a significant portion of the

textile waste collected has to be reusable for the companies to remain economically viable. EPR arrangements combined with research funds can tackle this market problem by investing in recycling technologies that are able to separate fibre types. If these technologies are further developed to be able to handle mixed fibres, they would increase the economic viability of the non-reusable share of used textiles. EPR can also be extended to obligate producers to provide financial help for relevant services, such as collection, communication with citizens, research and development, and scaling up existing technologies (Dubois et al., 2020).

Legal enforcement can continue on the EPR by setting minimum standards for the eco-design of textiles. These standards would then encourage producers to make new textiles more durable, repairable and recyclable, keeping them in use for longer and increasing their value once disposed of and collected.

The authors point to customised facilities as part of the solution. One of these factors would be for newly established used textile collectors to draw on the knowledge of experienced collectors, such as humanitarian organisations. Another is to utilise a range of complementary collection methods to reach a broad range of citizens. Through various pick-up and bring options, such as door-to-door pick-up, bring-banks, mobile units, and recycling stations, collection rates will increase as the citizens can choose the options that work for them.

A challenge in collecting used textiles is the contamination of textiles due to both water and non-textile waste. This can be combated by encouraging citizens to pack their used textiles in sealed bags, improving the design of bring-banks, or providing pick-up options.

Engaging with citizens through clear communication is vital to establishing trust that the collected textiles are responsibly handled and ensuring that the citizens know how to sort their waste and dispose of it. Earning trust can be done by being transparent about what happens to the used textiles, that both second-life options are more sustainable and valuable than non-separated disposal, and what the income generated is used for. Here, communicating the desire for recyclable textiles is also important to ensure the separate collection of all textiles, as many citizens express confusion about how to dispose of these. Finally, a communication factor the study mentions is conducting citizen surveys before designing measures (Dubois et al., 2020). This factor bears resemblance to arguments made regarding how good solutions and policies that ensure compliance is best developed in

dialogue with the actors that receive them. Treating the actors of new solutions and policies as stakeholders can lead to more engagement and compliance with said solutions and policies, as they have a say in what form they take and can potentially tailor them to better suit their needs and wants.

4.5 Bring vs pick-up solutions

Research objective two is concerned with finding possible ways for Follo Ren to structure a sorting system for used textiles. In Norway, the responsibility for sorting has traditionally been shifted to humanitarian organisations. The same is the case for Follo Ren, as the company does not have its own infrastructure for receiving and handling used textiles. Instead, the company has an agreement with two humanitarian organisations, UFF Norge and Røde Kors, who have placed bring-banks for textiles at 36 recycling points in the Follo region (Follo Ren, n.d.). As new EU regulations demand separate sorting at the municipal level by 2025, waste companies need to take charge of establishing new and better systems, so one must consider the different ways collection can be conducted when building a system from the ground up.

There are currently two dominant alternatives for a separate collection of used textiles from households, these being *bring* and *pick-up*. *Bring* is the most common alternative for separating textiles in Norwegian households. The textiles are brought from people's homes to be disposed of in containers on public or private land, so-called bring-banks (Watson et al., 2020). *Pick-up* means that the used textiles are gathered directly from households. As of 2018, only 4% of all collected textiles were reported collected via pick-up solutions, while 93% were delivered to bring-banks. The remaining percentages were collected through various means, such as over the counter at second-hand shops (ibid).

An evaluation conducted by *Østfoldforskning* on behalf of *Renovasjon i Grenland* looked into the climate footprint of these two types of textile collection systems. Part of the foundation for this climate footprint evaluation was: the share of used textile sorting, the share that is reused, and to what extent the reused textiles replace new textiles. The authors point out that pick-up services for other waste types have typically yielded more sorting in the past, drawing parallels to glass- and metal sorting increasing by 35% in areas with a pick-up

solution (Lyng & Prestrud, 2018). While this is not to say that identical results are expected, it is reasonable to assume that separate sorting will increase as households get access to more simple disposal options. The report finally concludes with a hypothesis that around 60% of bought, used textiles end up replacing the purchase of new textiles, further proving the importance of separate collection (Lyng & Prestrud, 2018).

However, there are several reasons why pick-up is not the most common option for municipal waste companies. These reasons are partly financial and practical in the sense that pick-up is more costly and demands more infrastructure and planning on the municipality's side (Miljøverndepartementet, 2013). More collection points, i.e. door-to-door, lead to higher costs associated with labour, equipment and transportation. In the case of the most common fractions of household waste, such as residual-, food-, and plastic waste, the frequency and volumes of waste make door-to-door pick-up beneficial. These costs are covered by the waste collection fee all Norwegian households pay, and the volumes of the pick-up fractions are in general quite similar across demographic groups. On the other hand, the volumes of used textiles and textile waste vary greatly. From households with young children that grow too big for their clothes frequently to households of elderly who rarely dispose of or replace textiles. For this waste fraction, most municipalities have been able to rely on humanitarian organisations for textile waste collection. These organisations were responsible for almost 80% of used textile and textile waste collection in 2018 (Watson et al., 2020). Textiles have also proven to be more complex to handle compared to many other waste types since they must be both clean and dry to be prepared for reuse and recycling and to prevent damage to other textiles (Sortere.no, 2023). Opposed to garden waste, used textiles can not be put in a bag on the curb as this puts the waste at risk of getting wet and dirty. The costs related to pick-up and this demand for the state of the textiles raise questions and challenges as to what pick-up collection for used textiles must look like and how it can be done.

While it does pose some practical and financial challenges, pick-up collection is possible. The same data from 2018 showed that only 4% of textiles were collected through pick-up solutions managed on a municipal level (Watson et al., 2020). Out of the 75 municipal waste companies that were contacted in the Watson et al. study (2020), seven of them did report having pick-up solutions. Further research into how these solutions are managed and what benefits they may have will be in Follo Ren's interest when looking into ways of increasing the sorting rate of used textiles.

4.5.1 The seven pick-up solutions

The Watson et al. report mapping textile waste in Norway reported that of the 75 municipal waste companies that responded to their survey, 11 claimed to have their own separate collection system for textiles. Seven of these reported collecting via door-to-door pick-up at the time of the survey in 2018. The companies were both municipal (Tinn, Stavanger, Ullensvang) and inter-municipal (IATA, NGIR, FIAS, Vefas). Note that some of the company names have been changed from the report to fit current municipal names and inter-municipal collaborations.

With the possibility that these pick-up solutions could inspire other municipal textile sorting systems in mind, we looked up the websites of the municipal and inter-municipal waste companies, as the report did not provide details of how the pick-up was conducted. Of the seven companies listed, only three of them stated that they offer pick-up services for textiles on their website.

IATA, an inter-municipal waste company for "Indre Agder and Telemark", states on their website that in addition to their recycling stations, whole and destroyed textiles can be picked up from their homes twice a year alongside hazardous waste (IATA, n.d.). The textiles are donated to Fretex for reuse and recycling.

"Nordhordland og Gulen Interkommunale IKS", now including Solund municipality and goes by the name *NGIR*, offers pick-up services. Inhabitants receive purple plastic bags for their reusable textiles, which are picked up every two weeks (NGIR, 2023).

Stavanger municipality utilises a free order-based, online pick-up service for used textiles, in addition to regular bring-banks (Stavanger kommune, 2023). This only applies to whole and reusable textiles, while non-reusable textiles go into the residual waste. Through the website *hentavfall.no* the inhabitants can choose which humanitarian organisation of the four available they wish to donate to: *Fretex*, *Fileks*, *Norge gir*, and *UFF Norge*.

These three waste companies show variations of how a pick-up solution can be structured. The vastly different frequencies of pick-up by *IATA* and *NGIR* imply different costs related to the service, while Stavanger's order-based system likely bears both logistical and cost-related challenges. Insight into the companies' experiences can prove to be beneficial when looking into solutions for Follo Ren. For these reasons, we contacted and interviewed representatives from these companies on behalf of Follo Ren for this thesis, using their experiences to help inform objective two.

Fjellregionens Interkommunale, FIAS, does offer pick-up for textile waste. However, their solution is not specifically targeting textiles. The only pick-up option mentioned on their website is a "waste taxi" (FIAS, 2022). This is a car that inhabitants can book to pick up many types of waste, typically targeting those who cannot visit the recycling station for various reasons. Contrary to the three pick-up solutions mentioned, this service is not free and costs 400 NOK. Due to the relatively high cost, we can assume that the service is likely used when moving large amounts of waste, e.g. heavy furniture rather than a few bags of used textiles. Compared to the solutions offered elsewhere and what Follo Ren considers implementing, we do not consider this a proper textile pick-up solution.

The three remaining municipal waste companies were contacted to confirm if they currently offer pick-up solutions or did at the time of the survey. Tinn and Ullensvang municipality responded that they utilise Fretex bring-banks and they do not, nor have they ever, offered pick-up solutions for textile waste (Tinn kommune, personal communication, March 6, 2022; Ullensvang kommune, personal communication, March 6, 2022). Vefas did not respond, but their website only states that they have bring-banks from UFF (Vefas, 2022). We chose to assume they do not offer pick-up solutions either, as other waste companies with pick-up solutions promote this on their websites.

To make sense of this, we got in touch with one of the authors of the mapping report. The report only mentions the survey when presenting the data on the various textile collection methods of municipal waste companies. The survey the companies received was attached to the report. The question regarding pick-up solutions was formulated like this: "*Har dere separat henteordning (dør-til-dør) for tekstiler?*" which translates to "*Do you have a separate pick-up solution (door-to-door) for textiles?*", followed by a request to tick off which groups the pick-up solution applies to. These groups were households, private and public businesses, plus an additional option to state that they do not offer pick-up for textiles. While the question is straightforward, it is worth noting that the term "pick-up solution" is not defined beyond the "door-to-door" specification in parentheses anywhere else in the survey. Due to this, we can imagine that some of the respondents misunderstood the question and thus responded positively to having pick-up solutions while not offering them.

4.5.2 Mepex pilot project

As the previous chapter indicated, there is a general lack of empirical data on different used textile collection methods, particularly pick-up solutions. A project led by Mepex and NF&TA addresses this by running pilot projects and systematically collecting data from these projects (NF&TA, 2023a; Mepex, 2023). As of January 25th 2023, six areas in Norway are trying out different solutions for collecting used textiles in pilot projects led by Mepex and NF&TA. For the project, the waste handlers will accept the same types of textiles that Follo Ren currently accepts, meaning both whole and destroyed textiles, clothes and shoes (ibid). Mepex was not more specific about their definition of textiles but we can assume this also includes accessories, as most suppliers of used textiles accept the same range of products. The project's purpose is to test a variety of different solutions, as practical knowledge and experience will be highly beneficial when formulating sorting solutions for used textiles in the future. The goal is to get all types of used textiles, both reusable and recyclable, out of residual waste (IVAR, 2023). Follo Ren is just one of many municipal and inter-municipal waste companies that need to restructure their textile sorting solutions to meet the EU 2025 demand for separate sorting of textile waste. As the results from the project are not published at the time of thesis submission, we cannot use this project to address objective two and help Follo Ren design a new separate collection system. However, this project can be highly informative for the first research objective as it works with a variety of different relevant actors with different insights into the field of used textiles, and so we have interviewed representatives of both Mepex and NF&TA.

5. Methodology

This chapter details the methodology of this thesis and methods used to gather both primary and secondary data for this thesis. The thesis utilises mixed methods in both research objectives to triangulate and increase the robustness of the research. The objectives and the subsequent research questions require different approaches, so each objective relies more heavily on one method. The research design will keep this in mind by using the most appropriate approaches for each of the research objectives, which we address later.

5.1 Study area

The study area of this thesis follows the two research objectives and will therefore be split in two. The first study area is Norway as a whole, following actors and institutions involved in used textile management on a national scale. Because the first objective follows a wide array of actors, it is necessary to keep the scale at this level. The second study area comprises Follo Ren's area of operation, as the second objective is a case study of the company and the inhabitants who utilise its services. Follo Ren is an inter-municipal waste company that is owned by four municipalities: Nordre Follo, Nesodden, Frogn, and Ås. These municipalities are located southeast of the capital Oslo and are relatively densely populated. In 2021, Follo Ren was responsible for the waste management for 117.033 inhabitants with over 45.000 subscribers (Follo Ren, 2022). In this thesis, we will refer to Follo Rens's area of operation, i.e. its four municipalities, as the Follo region.

5.2 Research methods for the objectives

This thesis is built upon two objectives. Objective one is addressed through two separate research questions, these being:

> RQ1: "*What does the structure of used textiles management look like through the lens of the EGS framework?* "

> RQ2: "*What major challenges do the different actors that manage used textiles currently face, and what solutions can be introduced or improved upon to address these challenges and make used textiles management more circular and sustainable?*"

These questions are both concerned with the overarching system for used textile management in Norway, with a theoretical foundation in the EGS framework. As used textile resources are not being optimally managed under the governance system, I decided to delve deeper into this topic to identify where the challenges lie and how they can be addressed. For these reasons, the objective one questions will be explored through both a literature review and qualitative interviews. The interviews are in-depth and semi-structured with key informants involved in the management of used textiles in Norway. As we have seen in the literature review, the practical management of used textiles takes many shapes. Representatives from

the waste industry, humanitarian organisations, used textile sorting, and the textile industry are all present. These informants are strategically selected to be representative of the actors involved in handling and processing used textiles in Norway today. Seven informants representing different sides of used textile management in Norway were contacted and interviewed for this thesis. This number was deemed to be sufficient to highlight aspects not found in the reviewed literature, as the literature review heavily informs research objective one already.

The data collected through interviews was coded to help analyse the content of the interviews, which was necessary as our seven interviews ranged from 30 to 60 minutes each, amounting to around 65 pages of interview transcripts. Codes were created based on the themes and concepts that were recurring in both the literature review and in the interviews themselves, as these elements were deemed most important to answer the research questions. The thematic codes are based on themes related to the downstream value chain of used textile management, with these being **collection and sorting of used textiles**, **reuse**, **material recycling**, **consumption and consumers**, and **producers and EPR**. The conceptual codes are **the waste hierarchy** and **circular economy**, which are central concepts to this thesis. Finally, I also coded for mentions of **actors** involved in the management of used textiles, and further specified mentions, both explicit and implicit, of **conflicting interests among the actors**. These codes are crucial to identify political and economic actors, as well as patterns of interactions between economic actors, which become important when applying used textile management in Norway to the EGS framework as part of research objective one.

For objective two, we approach the regional level with Follo Ren's four municipalities. Here, we asked the question:

> RQ3: "*How can Follo Ren structure a system for used textiles that ensures a higher degree of sorting, and what policy measures and instruments can be implemented to ensure compliance and that this system will be easy to use for Follo Ren's inhabitants*?"

To answer this research question, it was deemed important to understand how the inhabitants of the Follo region manage and dispose of their used textiles and what they think of potential new solutions. To obtain this understanding, we conducted a survey of the Follo region's

inhabitants. Both the survey and the interview guide can be found in the appendix. The survey was sent out to a sample of 5.0000 of Follo Ren's inhabitants, to which 1.160 individuals responded. This data collection is used to identify which groups in the population are most likely to dispose of their used textiles in the residual waste, as a new system for separate collection should target these groups to ensure a higher degree of sorting, and what type of sorting system the inhabitants want. By addressing the inhabitants as stakeholders, their opinions will both shed light on what barriers to separate sorting of used textiles are experienced and how these can be addressed by Follo Ren. Due to their previous positive experiences with the company, Follo Ren proposed to use the research institute Sentio to collect the data. This can be done in many different ways, but from previous experience, Follo Ren suggested that Sentio conducted the survey over the phone.

5.3 Trustworthiness in qualitative research

Trustworthiness is one of the criteria suggested by Lincoln and Guba (Bryman, 2016) for assessing the quality of a qualitative study. Trustworthiness is used in qualitative studies to parallel the validity, reliability and objectivity more accessible in quantitative studies. These parallels are found when dividing trustworthiness into four additional criteria, these being: credibility, transferability, dependability, and confirmability.

The *credibility* of a study is important as it helps a reader assess whether or not the researcher conducting the study has been able to get a good grasp of the social reality they studied. Are the findings believable? The researcher's own preconceived notions and assumptions on a topic can impact how they perceive the information they receive from the people they study, making them interpret the social reality they studied differently from what their informants or study subjects intended. Lincoln and Guba emphasise two tools for ensuring credibility. One of these is to follow the principles of good practice, in other words, providing insight into the research process and showcasing how the research followed the principles associated with the research method. Bryman (2016) states that sampling is strongly associated with good practice in quantitative research. This thesis utilises mixed methods, with an emphasis on qualitative data. This means the number of informants, which informants were selected and how the interviews were conducted. I interviewed seven informants representing different aspects and interests in the management of used textiles in Norway. In the interviews, I

followed the same interview guide for all informants but came with different follow-up questions according to which direction the interview took. During the interviews, the informants were asked open questions and were given the time and space to talk with very little interjection from me. The other tool mentioned is respondent validation, which I deemed unnecessary for this study as the previously mentioned presence of good practice and triangulation was comprehensive enough to ensure credibility.

Another criterion for the trustworthiness of research is how applicable the findings are in other contexts, the research's *transferability*. In qualitative research, the groups and individuals studied typically share certain characteristics and, in some cases, interests. Due to the relatively narrow scope of the research conducted in this thesis, it requires what is called *thick description*. This entails providing comprehensive insight into the specific context studied so that the readers can for themselves determine how transferable the findings are to other situations and settings. For this thesis, I have already given a thick description of the status of used textile management and circularity in Norway today.

The *dependability* of the research, which parallels reliability in quantitative research, is dependent on how consistent the findings are over time and in different conditions. Typically, this is done by keeping an audit trail of the whole research process and having a peer evaluate if they find the research process and findings to be acceptable. Transparency of the research process by keeping an audit trail allows the reader to evaluate if they deem the research process and findings to be acceptable. As Lincoln and Guba acknowledge, this is a demanding and unpopular way of ensuring dependability in most qualitative research. We will not have peer auditing of the research process of this thesis. However, this research is conducted as a master's thesis, meaning the research is supervised by an experienced professor who has been involved throughout the research process.

While complete objectivity is recognised to not be feasible in most social science research, especially in qualitative studies, the authors have to strive to show they acted in good faith in order to ensure the *confirmability* of the study. Personal values, preconceived notions, and other biases can impact both the research process and the interpretation of the findings. While these may not be taken completely out of the research, it is crucial to not let them sway the research. A technique that we use in this thesis to strengthen the confirmability of the research is triangulation. By using more methods and data sources we strengthen the

robustness of our research. We are mixing methods by collecting both qualitative and quantitative data, and our sources are made up of both primary and secondary research. The primary data collected qualitatively seeks to represent actors from many positions of the used textile management sector, with different viewpoints and interests, and the quantitative data is based on a representative sample of the inhabitants of the Follo Region.

5.4 Interviews and sampling of informants

For research objective one I conducted a strategic sampling of informants. The strategy was to get informants from companies that play or represent, central roles in the landscape of used textile management in Norway. Three were selected to represent the humanitarian organisations that sell used textiles to Norwegian consumers: Norwegian Red Cross, UFF, and Fretex. Fretex also conducts the largest scale of manual sorting of used textiles in Norway. While most sorting and recycling of Norwegian used textiles happens abroad, the company Norwegian Re:Textile is planning to build an automatic sorting facility in the near future. To represent the municipalities I reached out to Samfunnsbedriftene, an organisation that represents a wide array of municipal businesses as both an employers' and an interest organisation. Lastly, I contacted NF&TA and Mepex. NF&TA is the national business cluster for the fashion and textile industry in Norway, heavily engaged in circular initiatives in the industry. Mepex is a consulting company specialising in the waste and recycling industry, which also focuses on sustainability and circular practice.

This section details the informants selected for interviews to address the first research objective. We start by introducing our informants representing the humanitarian organisations.

First, we have Kristin Voll from the Norwegian Red Cross. Her role as the executive director of textile collection is why she was contacted directly. She was believed to have deep insight into the challenges related to used textile management in Norway. Compared to our next two informants, the Norwegian Red Cross is a small actor in used textile collection. In 2022, they received around 5% of the used textiles donated in Norway (NF&TA, 2023b). They are a relatively new actor in this field as they only started large-scale collection five years ago, and the volume of used textiles collected has steadily increased over the past few years (K. Voll,

personal communication, March 20, 2023; NF&TA, 2023b). Unlike the other humanitarian organisations I interviewed, Norwegian Red Cross does not sort and sell the textiles themselves. Instead, they resell the collected textiles to other companies, which is how they generate income from these activities (K. Voll, personal communication, March 20). Their textile collection service is newly established, so they might experience challenges that other more established actors may have overcome.

For the humanitarian organisations that operate their textile collection services on a larger scale, I contacted Arnt-Willy Hjelle from Fretex and Kaj Pihl from UFF Humana. Hjelle works for Fretex as the Head of Sustainability and Innovation division for the daughter-company Fretex Environment, which focuses on environmental work. Fretex is Norway's largest collector and seller of used textiles today, with 45% of all donations in 2021. It has been the largest actor since its establishment in 1971 (A.-W. Hjelle, personal communication, March 23, 2023; NF&TA, 2023b). They have around 40 stores nationwide and an online store gaining traction. Currently, they are the only actor with large-scale sorting facilities in Norway (ibid). As the arguably most established actor in the field in Norway, their opinions and experiences may lend much insight.

The final humanitarian organisation we contacted was UFF Humana. Kaj Pihl was contacted after a recommendation from a Follo Ren employee due to his long experience as an environment and recycling advisor for UFF in Norway and Denmark. UFF is the second largest reuse company in Norway after Fretex and collected roughly 25% of all donated used textiles in 2021 (NF&TA, 2023b). Unlike Fretex, UFF does not currently have centralised sorting in Norway but exports their collected textiles to professional sorting abroad, mostly in North-Eastern Europe (K. Pihl, personal communication, March 27, 2023). While not the biggest actor in Norway, UFF is part of the larger network known as Humana, which has similar recycling and reuse systems in many countries worldwide. UFF was contacted due to both their market share of donated textiles in Norway and the global scale of their operation as part of Humana.

To get some perspective from municipal waste managers, I contacted Samfunnsbedriftene. They represent municipal businesses as both an employers and interest organisation. Marianne Haugland was the representative we contacted due to her position as chief advisor for waste and resources and former employee of Follo Ren. In our interview, she also detailed

extensive experience in business policy for municipally owned waste companies. As we were interested in the municipalities' point of view regarding managing used textiles as both waste and a resource, it was reasonable to consider interviewing an employee from Follo Ren. I decided that my proximity to the employees of Follo Ren carried the risk of an interview being partial due to the familiarity. In addition, Follo Ren also utilises an after-sorting facility for household waste which is a bit of an outlier in Norway that struggles significantly with handling textiles, as explained in a previous chapter. I then considered contacting other waste companies, but as textile waste makes up only a tiny share of the total volume of household waste, I opted to talk to Samfunnsbedriftene instead. This was considered the best course of action, as they have a broad perspective from representing municipal businesses from all of Norway, which is our study area for this research objective.

Our next informant, Frode Syversen, is the CEO of Mepex. Mepex is a consulting company that popped up on our radar due to their engagement in circular textile initiatives, such as the pilot project on used textile collection they are leading together with NF&TA. The company is specialised in waste and recycling and advises municipal companies (F. Syversen, personal communication, March 30, 2023). Syversen has worked on textiles for the last 10 years, especially on the downstream solutions and how used textiles are handled further down the value chain. He explained how he has worked with a wide array of actors in the industry, from humanitarian organisations to producers and politicians.

The sustainability officer in NF&TA, the national cluster for the fashion and textile industry, was also selected as an informant for this thesis. Gro Haram has been with NF&TA for two years. The 13 years before that, she worked for the Norwegian Environment Agency. Haram described NF&TA as working in a circular, industrial model with the overarching goal of addressing and solving collective challenges in the industry in collaboration with the industry, universities, municipalities, researchers and consultants. This is largely done through various projects, such as the pilot project with Mepex. Haram was directly contacted as she is responsible for overseeing "collecting, sorting and material recycling" of used textiles, which are the most relevant aspects of the industry in this thesis.

Our final informant for research objective one is the co-founder of Norwegian Re:Textile, Jacob Bakkerud. The company was founded to construct an automatic sorting facility for used textiles, which would be the first in Norway and the largest facility of this kind in the

world. The company was inspired by previous work on reusing and repairing textiles for Bakkerud and his colleagues, where they faced challenges posed by a lack of material recycling options in Norway today. The facility is currently not under construction as the company is still waiting for the final financing necessary to begin. Still, they are hopeful they will receive this soon (J. R. Bakkerud, personal communication, March 24, 2023). The research leading up to this thesis shows that material recycling faces many challenges for various reasons. However, it is also for these reasons that I requested an interview, as I was intrigued to see how the recycling industry perceives these challenges and their role in building a circular textile economy.

On behalf of Follo Ren, I also contacted the three municipal waste companies that offered pick-up solutions for used textiles. When addressing research objective two, we draw on their experiences, assessing what solutions Follo Ren can offer their inhabitants. The table below lists all of our informants by name, position and which company they represent. The data we got from the municipal waste companies were collected on behalf of Follo Ren, and we will thus not provide names or positions.

Table 2: List of informants

Category	Company	Representative	Position/role
Humanitarian organisation that handle used textiles	Røde Kors	Kristin Voll	Executive director for textile collection
	Fretex Miljø	Arnt-Willy Hjelle	Leader of the Sustainability and Innovation Division
	UFF Humana	Kaj Pihl	Environment & Recycling Advisor
Automatic sorting of used textiles	Norwegian Re:Textile	Jakob Retvedt Bakkerud	Co-founder
Employers' and interest organisation for municipal businesses	Samfunnsbedriftene	Marianne Haugland	Chief advisor for Waste and Resources

Circularity in the Norwegian textile industry	NF&TA	Gro Haram	Sustainability officer
	Mepex	Frode Syversen	CEO
Municipal and inter-municipal waste companies	Stavanger		
	NGIR		
	IATA		

When presenting our findings from the interviews in the next chapter, I will use codes to cite our informants more efficiently. The citation codes are the following:

Table 3: Codes for informants

Representative	Norwegian Red Cross	Fretex	UFF	Norwegian Re:Textile	SamfunnsBedriftene	NF&TA	Mepex
Code	RC	FX	UF	RT	SB	NF	MX

The interview guide was developed to answer research question two, with some variation of the questions depending on the interviewee. The questions were chosen to be thematically appropriate, answering key questions while leaving room for the interviewees to go deeper into topics relevant to their fields, creating a good flow. This semi-structured interview type also allows for follow-up questions, which can open up the possibility of making interesting, unforeseen discoveries.

Six of the seven interviews were conducted over Microsoft Teams. As most of our informants were based in or nearby Oslo, I gave the informants the option to choose whether to meet up physically for the interview or online. The option of online interviews is beneficial in its flexibility. As all our informants are working professionals, I understood that meeting physically can be challenging to arrange on a hectic workday. This proved to be a good course of action, as nearly all informants responded promptly and scheduled meetings in the near future. Also, compared to pre-pandemic, most working professionals are more used to online meetings, and so we experienced little to no technical difficulties during the online

meetings. I opted to transcribe the interviews to avoid losing any important information from these interviews. Transcribing is more time-consuming than making notes throughout the interview but pays back by allowing the interviewer to be fully present in the interview and more accurately cite the interviewee. The transcription was easily done by recording the interviews with the Microsoft Teams recording tool. The recordings were then uploaded and transcribed with the Microsoft Word transcribing tool and then reviewed and corrected using the transcription software Inqscribe to go over and correct the automatic transcription from Microsoft Word.

The interviews were all conducted in Norwegian. All our informants, save one, are Norwegian themselves; thus, conducting the interview in Norwegian allowed for smoother communication. Our exception was our UFF informant, Kaj Pihl, a Danish citizen. He was recommended as our UFF informant by a colleague at Follo Ren, who vouched for his long experience with UFF Norway. Due to this, he is experienced in communicating with Norwegians in Danish, which led to the interview running smoothly without much of a language barrier. Thus, all direct citations from the interviews in this thesis are translated from Norwegian and Danish to English by myself. I take full accountability for any mistakes in the translations.

5.5 Survey

Due to the collaboration on research objective two with Follo Ren, the survey was conducted by the company Sentio. The reason for the decision to outsource the data collection and analysis is multifaceted. For one, Follo Ren has utilised their services many times in the past and has been happy with the results as the company is specialised in data collection and analysis and is capable of delivering professional results in a timely manner. Secondly, Follo Ren offered to finance such a data collection before the semester started, as they are interested in the findings for planning future solutions. Outsourcing the data collection and some of the analysis allowed this thesis to have two large objectives, as combining both qualitative and quantitative data collection of this scale would be incredibly time-consuming. The survey questions were developed by myself with input from Follo Ren's leader for communication, who has experience in using Sentios services before. Sentio further controlled the questions before the data collection started.

The survey was sent out via SMS to a randomly selected sample, a probability sample, of the population of the Follo region. The requirements for being selected were to be over 18 years of age and a resident in the Follo region, which ended up being 5.000 individuals. Sentio selected the sample from the phone number registry (I. Bolsø, personal communication, May 3, 2023). Their residency was controlled twice, first by strategically sampling only those living in the Follo region according to their phone number registry and a second time as part of the survey, as one of the demographic questions inquired about which municipality they lived in. If the respondent stated to live outside of the region, the survey was to stop. The survey was conducted between April 17. - 27. of 2023. The survey ended on the 27th as we had accumulated many respondents, N=1160, and needed to wrap up to keep up with the thesis schedule. There is no definitive answer to how big a sample size should be, but the larger the sample, the greater the precision of the sample (Bryman, 2016). However, Bryman (2016) describes a sample size of 1.000 as large and states that the increase in precision becomes less pronounced as the sample increases from 1.000. In addition, I also decided to compare the demographic composition of our sample, found in chapter 6.3, to that of one of the Follo region municipalities. I used the municipality of Nordre Follo as a comparison and found that the composition of both demographics are very similar (SSB, 2022). For these two reasons, I conclude that our sample size is sufficient to be representative of the inhabitants of the Follo region.

The report received from Sentio detailing the data collection and findings from the survey tested for the significance of differences between the demographic groups. These were made explicit in the report, with a confidence level of 95%, which were helpful when evaluating which groups stood out amongst the others.

5.6 Ethical consideration

Keeping up ethical standards is central to all research, and this thesis is no exception. As this thesis contains data collected from expert interviews with the informants identifiable through name, employer, and position, I sent an application to Sikt, the Norwegian Agency for Shared Services in Education and Research, before we conducted the interviews. This application detailed the purpose of the study, the general characteristics of the participants, and what

personal data we would require from the participants. The application was approved before I contacted the informants. After receiving a positive response from the informants agreeing to be interviewed, I sent out a consent form detailing the purpose of the study, how the data would be used, how they could retract consent, that the interview would be recorded, etc. This form was sent out to the informants over email before the interview, giving our informants ample time to respond. All informants signed and submitted the consent form. To control for consent again, I asked the informants at the beginning of each interview if they consented to be recorded, informing them that the purpose of the recording was to transcribe the interview later. To avoid the risk of encouraging a certain type of response from our informants and encourage them to speak freely, we kept our reaction to their responses positive but not overly enthusiastic.

The municipal waste companies were interviewed on behalf of Follo Ren, so I did not apply for approval to conduct these interviews through Sikt. These informants agreed to share their experiences collecting used textiles with Follo Ren to help the company find new solutions, which is what their data is used for in this thesis. As the data from the interviews presented in this thesis does not include any sensitive information, I have decided to include the findings from these interviews. Still, I will not include any data that can be used to identify our informants specifically.

The personal information from the survey respondents is not presented in a way that can identify any of the respondents. Participation in the survey was voluntary, and the respondents could retract their answers by contacting Sentio after completing the survey.

5.7 Limitations

One of the limitations of this thesis is how the interviews were conducted. As our informants were Norwegian, plus one Dane, I opted to conduct the interviews in Norwegian. This means that there is a chance I have misrepresented some of our informants' views and opinions, as English is not my first language. While this is a limitation, it does also offer some advantages. Conducting the interviews in Norwegian meant that both the informants and myself, the interviewer, could talk freely without putting effort into speaking another

language than our native language. As the subject matter required a fair share of professional terminology, I believe this created a better interview flow.

Another limitation is that nearly all the interviews were conducted virtually, as only one informant expressed interest in meeting physically. While this allows for more flexibility for all parties, physical interviews benefit from creating a more organic atmosphere. This can lead to a better flow in the interviews, which can create a better back-and-forth between the interviewer and informant, leading to more follow-up questions.

5.8 Overview of objectives, RQs, theory and methods

Table 4 below details the essential components and structure of this thesis, including the objectives, research questions, methods, and theoretical framework.

Table 4: Overview of thesis

Objective	Research question	Methods	Theory
Objective 1 How is the management of used textiles in Norway structured?	**RQ1** What does the structure of used textiles management look like through the lens of the EGS framework?	Literature review	Environmental governance systems framework Circular economy Waste hierarchy
	RQ2 What major challenges do the different actors that manage used textiles currently face, and what solutions can be introduced or improved upon to address these challenges and make used textile management more circular and sustainable?	Semi-structured interviews with key informants on the management of used textiles in Norway Literature review	Environmental governance systems framework Circular economy Waste hierarchy
Objective 2 How can Follo Ren ensure a simple and effective	**RQ3** How can Follo Ren structure a system for used textiles that ensures a higher	Survey through Sentio on used textile sorting habits, thoughts and preferences amongst	Theories of human action Policy measures and instruments for

separate collection system for used textiles for their inhabitants?	degree of sorting, and what policy measures and instruments can be implemented to ensure compliance and that this system will be easy to use for Follo Ren's inhabitants?	a representative sample of Follo Rens inhabitants	environmental action

6. Results and analysis

This chapter presents our findings and results from our three sets of data, which will be presented in the order of the objectives they will be used to answer. We begin by presenting the data from our expert interviews, which will be used when discussing objective one. Afterwards, we will present our findings from our interviews with the waste companies and the central results of our survey, both to help us answer objective two in our discussion.

Separating results and the discussion is not necessarily the ideal way to structure a social science thesis. Since we are presenting three quite comprehensive sets of data we decided to keep the results and discussion separate as this gives a better overview of the data before we bring in the theoretical framework and literature review as part of our discussion. This means that for our discussion, there will be some repetition of the information already given in this chapter, but we deem this necessary to give the reader all the necessary context.

6.1 Expert interviews on used textile management

This subchapter presents some of our central findings from our expert interviews. We will follow the codes of the themes and concepts detailed in the previous chapter and give a summary of the most important findings derived from the interviews. We begin by presenting actors and the conflicting interests among them. Then we move on to our concepts, the waste hierarchy and circular economy. After that, we will present what our informants had to say on producers and EPR, and on consumption and consumers. Lastly, we will present our findings detailing the downstream management of used textiles, which includes collection and sorting, reuse, and material recycling. Our findings from these expert interviews will help us answer objective one, particularly research question two, "*What major challenges do the different*

actors that manage used textiles currently face, and what solutions can be introduced or improved upon to address these challenges and make used textile management more circular and sustainable?".

6.1.1 Actors in used textile management

Our informants naturally mentioned and discussed in detail which actors they consider relevant to the topic of used textiles. The reasoning behind coding this topic is to assess if the author's impression of which actors are relevant, based on the literature review, corresponds with that of the informants. While the interviews were conducted with the intention of informing research question two, the findings from the code *actors* can also aid us in answering research question one.

Our informants from the humanitarian organisations were clear in their message that actors such as themselves, who have traditionally been the ones responsible for collecting and sorting used textiles, should continue doing so in the future. They emphasise that they already have a track record of doing a good job with this and that other actors, such as municipal waste companies, should take responsibility for the share of used textiles that are destroyed, as they are better equipped for dealing with this share. In addition, they stress the importance of the income generated from reuse sales as this, either largely or entirely, finances their humanitarian work and generates employment.

RC and UF in particular stress the difficulty in coordinating correct and consistent communication towards the public. In some municipalities, households are encouraged to dispose of destroyed textiles in the residual waste, while inhabitants in the Follo region and other municipalities with similar waste processing facilities are encouraged to donate textiles of all qualities to humanitarian organisations. At the moment, most humanitarian organisations accept all qualities of textiles. In 2020, Fretex went out publicly to announce that they no longer wish to receive non-reusable textiles as the economic cost of managing recyclable and destroyed textiles was too high compared to their income (A.-W. Hjelle, personal communication, March 23, 2023). Other humanitarian organisations experience similar issues but have yet to act on these.

The municipality is becoming a more important actor in the management of used textiles in Norway in preparation for the EU's demand for separate collection of used textiles by 2025. This will surely lead to many practical challenges, as the experience from Denmark indicated. Slightly more ambitious than Norway, Denmark announced plans in 2020 to implement a municipal collection of used textiles by January 1st 2021. This was met with a lot of resistance from municipal waste companies, as they experienced the deadline for new systems to be too short and that they lacked both infrastructure and equipment. The deadline was thus pushed to July 1st 2023, to give the municipalities more time to prepare (K. Pihl, personal communication, March 27, 2023). UF stressed that the Norwegian government has a significant role to play in aiding the municipalities to meet the new requirements.

SB also brought up other initiatives the municipality can implement to increase circularity aside from waste management, used textile collecting and sorting. She mentioned how the municipality can facilitate better reuse options, such as reuse and repair centres, and oppose the construction of new shopping malls, targeting the top of the waste hierarchy by discouraging more consumption of new textiles and other products.

Shifting the focus to commercial private actors, SB stressed the need for actors in the textile business sector to step up and take measures to handle the negative environmental impacts of their business. She stated that some are already doing a good job with this, such as Nordic Playground, Berghans, and Norrøna, but everyone needs to follow. RT pointed the finger towards themselves, material recyclers, as relatively new commercial actors that can take the recyclable share of used textiles and utilise these in ways that are both environmentally friendly and economically profitable.

A sentiment echoed in our interviews is the need for collaboration across the industry, with all relevant actors needing to come together to come up with solutions. Our interview with UF spoke of the benefits they saw in NF&TA's textile network "Sirkulære Tekstiler" which lasted from 2020 to 2022. The network sought to gather knowledge from the industry to create sustainable business models in collaboration. RT also spoke strongly in favour of more collaboration, emphasising the importance of communication and collaboration between waste companies, humanitarian organisations such as Fretex, and other private actors when finding solutions, to find solutions together. As textile producers and importers will

eventually have to take an EPR on textiles into account when conducting their business, they also have a self-interest in participating in these processes.

As MX points out, the general challenge regarding the wide array of actors involved in the future solution for used textiles in Norway is building a new system with some responsibilities remaining the same, some expanding, how to communicate with consumers, and how to take advantage of each actor's knowledge and experiences.

The actors brought up in the interviews represent the whole value chain of used textile management, both private and public. These actors can be grouped together in the following groups: waste companies, material recycling companies, humanitarian organisations engaged in reuse, and textile producers.

6.1.2 Conflicting interests among actors

When discussing new and improved solutions to increase circularity and sustainability in a field with such a wide array of actors, it is important to remember that all actors have stakes involved in how a new system is formed and their own interests to protect.

The most apparent conflict of interest, as UF pointed out, is between the textile production industry and actors involved in reuse. From an economic perspective, promoting reuse is not in the best interest of a textile producer. When looking at used textiles in Norway, this conflict must be considered as we are seeing more and more businesses, particularly from the fashion industry, start up their own return systems for used textiles. UF expressed scepticism towards these systems, as the fashion industry has more interest in recycling the returned textiles for fibres for future production rather than selling them for reuse.

From our literature review, we have seen that material recycling can be considered a controversial solution to the problem of low circularity in the textile industry. NF was asked about this directly, as her experience in a national cluster for the textile and fashion industry was thought to provide good insight into this. She states that "reuse versus material recycling" is one of the most prominent conflicts of interest, one that can lead to an aggressive atmosphere in some discussions. RT for their part claims they want as small of a

share of used textile in Norway to end up at their future facility, by having a larger share treated higher up in the waste hierarchy.

Another conflict, producers versus consumers, is a well-known point of tension when discussing the distribution of responsibility for the environmental impact of our way of life. Here, our informants pointed towards shifting more responsibility onto the producers, as they have the capacity to make the greatest impact.

When we look at the responsibility that producers carry to make textiles and how they are managed at the end of their life cycle, we often look at an EPR scheme for textiles and ecodesign requirements. SB stated that their organisation wishes for a neutral third party that evaluates how much different actors involved in textile management ought to pay in e.g. an EPR solution for textiles. She stated that actors with interests and stakes involved should not be in charge of the distribution of rights and responsibilities, whether they be a municipal waste company or a textile producer, and instead hopes that the Norwegian Environment agency could act as a third party. This is echoed in Vatns book on environmental governance (Vatn, 2015, p. 64). However, NF also pointed out that producers should be present in these discussions in order to ensure we create an EPR they can follow, while also emphasising the importance of the government following up thoroughly.

NF also made it clear we need to find solutions which force foreign producers that import to Norwegian consumers to share this burden. The textile industry is globalised, and so the burden of preventing and compensating for environmental externalities cannot only fall to Norwegian actors.

The most central findings of the conflicting interests amongst our actors are those of the actors involved in the reuse of textiles, which are the humanitarian organisations, and actors engaged in recycling, which includes both textile producers and material recycling companies. Actors involved in recycling have inherent interests in getting as large of a fraction of the used textiles as possible, which can potentially be at the cost of how much of the reusable fraction ends up with the humanitarian organisations.

6.1.3 Waste hierarchy and circular economy

One of the central concepts of this thesis is that of the waste hierarchy and circular economy, two intertwined concepts. All our informants either explicitly or implicitly referred to the waste hierarchy when explaining what issues regarding the management of used textiles and the textile industry at large need to be addressed first. From the top, our informants collectively agreed that overproduction and overconsumption are the largest issues in the textile industry at the moment, as they generate large volumes of waste. This waste comes both in the shape of unsold textiles that are often destroyed and from textiles consumers dispose of. Consumers dispose of textiles for many reasons, but much is rooted in an overconsumption of fast-fashion, poor-quality textiles that lose both shape, aesthetics and function after a small number of uses and washes (A.-W. Hjelle, personal communication, March 23, 2023). UF argues strongly for stronger communication towards Norwegian consumers on how to best care for the textiles they already own to ensure long usage and save resources.

Following waste prevention by both producing and consuming less, we have reuse. FX emphasises the importance of getting Norwegian consumers to buy more used textiles and create a stronger culture for this, in addition to improving both used textile collection and sorting to get a larger share of reusable textiles out. This means collecting reusable textiles as donations to prepare them for reuse and prevent them from ending up in the residual waste.

Despite some disagreement in the literature regarding how much we should rely on material recycling to solve the issue of making textiles more circular, our informants agree it needs to be part of the package solution to circulate materials back into the economy, and into new production. SB points out how there is a need for initiatives that incentivise textile producers to use recycled materials in their production. However, MX stresses the importance of finding a balance further up in the waste hierarchy and ensuring that recycling does not become an easy escape from making changes elsewhere.

All our actors emphasise the importance of the waste hierarchy and circular economy and express an engagement in implementing the principles of these concepts as the foundation of their practices.

6.1.4 Producers and extended producer responsibility

The future solutions to increase the circularity of both the textile industry and used textile management are largely dependent on how governments structure their EPRs on textiles and what textile producers and importers decide to do and how they contribute to creating circular solutions. Reducing the number of textiles that will eventually end up as textile waste and producing new textiles designed with circularity in mind will have a huge impact on the state of used textile management.

MX referred to EPR on textiles as the lubrication of the value chain we are constructing for both new and used textiles in Norway. An EPR has the potential of being a great solution if it sets specific targets for both production of new textiles and downstream solutions which enable more reuse and recycling, and follows up with consequences when these targets are not met.

One of the main goals of implementing an EPR on textiles is to make producers take responsibility for their products at the end of their life cycle by financing downstream solutions. When discussing this in the interview, RC noted that it is important to not incentivise recycling at the expense of reuse when creating an EPR on textiles, with return systems and other policy measures. The new systems and structures created should enable humanitarian organisations engaged in reuse to continue doing what they are doing well, while creating new structures to manage the non-reusable share, such as financing sorting- and recycling facilities. FX backed up the importance of creating a new system, while also empathising with how an EPR on textiles can help to raise awareness of the negative environmental impact of the textile industry.

UF was clear in that an EPR on textiles should be harmonised with other EU countries so that each country's EPR scheme bears resemblance to the others and can support each other. SB also expressed hope for this. With the revised framework directive for waste, she hopes the EU will come with minimum requirements for what an EPR on textiles must include, which will make it easier for EU countries to construct schemes resembling one another. This will in turn make the schemes easier for the producers to follow if they do not have to follow 30 different EPR schemes when operating in the same market.

In addition to ensuring circular downstream solutions, an EPR is arguably even more important in targeting the beginning of textile products' life cycle, in the design phase. NF is hopeful an EPR in combination with the future ecodesign directive will be able to increase the share of used textiles that can be materially recycled with our current technology. SB stated that the incentives created by an EPR on textiles need to lie as close to the actors with the power to make the biggest impact, which is the textile producers. The initial sorting of reusable textiles from non-reusable textiles will have to be done manually with the current technology available, and this should be financed by an EPR on textiles. SB, as part of the working group on EPR for textiles, explains that she hopes they will fund large-scale return systems for used textiles. Additionally, she hopes they will make arrangements with the municipalities to take over the collected textiles and compensate the municipalities for the collection service they provide.

A major challenge when tackling the responsibility of producers is what to do about international actors selling to the Norwegian market online. SB, RT, and MX all explicitly mentioned Shein, a fast-fashion brand that is famous for selling large volumes of cheap, low-quality textiles worldwide. These types of actors are far more challenging to regulate than domestic businesses and international brands physically present in Norway.

Producers are arguably the most powerful and influential actors in the management of used textiles, as their decisions regarding design and quantity determine how downstream actors can manage the textiles. Producers' contributions to circular initiatives, be they voluntary or mandatory, are crucial if the textile industry and used textile management are to become circular.

6.1.5 Consumption and consumers

Norwegian consumers are part of both the problem and solution of low circularity in used textile management.

One of the major issues is how Norwegians consume too high volumes of low-quality textiles, as RC and FX stated. This problem is exacerbated by what appears to be a general knowledge gap regarding which new textile products that have the lowest environmental footprints and how to correctly sort used textiles when disposing of them. As RT expressed,

consumers have the power to influence what products are put on the market in choosing what to buy. As textiles of poor quality are usually cheap, NF was adamant that it is not in anyone's interest to scold the public. Rather, producers, political actors, and other actors have a responsibility to ensure that environmentally friendly options are more accessible for consumers and target the least environmentally friendly products with e.g. restrictions and fines. SB also stresses that raising awareness is important to empower consumers to make better choices, such as by making them aware that pure fibre products are easier to materially recycle.

RT also pointed out that there is to better inform consumers on how to evaluate the damage to a textile product, as this evaluation determines how consumers sort their used textiles and textile waste. FX shared his experience with this challenge when Fretex conducted a pilot project regarding used textile sorting a few years ago, which is explained in detail in the next subchapter.

If circularity is the goal, there needs to be a general change in attitude amongst Norwegian consumers, UF explained. This change must include lower consumption of textiles overall, and an increase in second-hand textile purchases.

The essence of our findings on the role of consumers and consumption is that consumption habits need to change if we wish to make both the textile industry and the management of used textiles more circular. Consumers thus need to be empowered to make well informed decisions, and producers and governments need to do their part in making the options with the lowest environmental impact, e.g. second-hand textiles and mono-material textiles, accessible and affordable.

6.1.6 Collection and sorting

Collecting and sorting of used textiles are the first steps of managing textiles after they are disposed of if they are to ideally be circled back into the economy. Currently, we do not have an established infrastructure for collecting and sorting in Norway. As the 2025 goals of the waste framework directive require, the municipalities are one of the economic actors that need to step up further. The job of separate collection and sorting of used textiles has

typically been taken up by the humanitarian organisations engaged in reuse, SB states that established actors such as Fretex have extensive knowledge of what is reusable and what is suited for Norwegian and different foreign markets. UF also makes it clear that Norwegian reuse actors have built up solid systems for collecting used textiles, and that this is the best he has ever seen in his career. This knowledge needs to be taken advantage of as more actors, such as the municipalities, take responsibility for collecting and sorting textiles. However, UF also expressed some worry over waste companies taking responsibility for collecting, as there is a risk that the used textiles will be treated as waste.

SB, as her company represents municipal businesses, stress that their members want to create systems that closely resemble one another, so as to not create more confusion for Norwegian citizens. Many already find it difficult to evaluate what constitutes reusable textiles and what the different organisations want to receive, as we will see from Fretex's pilot project later.

RC expressed doubt that the Norwegian market for used textiles alone is big enough for anyone to establish manual after-sorting, the process of evaluating a product's reusability, at a larger scale than Fretex is currently doing. However, SB states that this will not necessarily be the municipalities' job, but rather a job for textile producers and importers under an EPR on textiles. MX also points out that there might be a need for both manual after-sorting facilities and automatic sorting in Norway. Manual after-sorting, to ensure that the sorting happens close to the markets where the used textiles are to be reused as this is where the market knowledge is the strongest. Automated sorting, as this will be a necessary component of establishing facilities for material recycling.

Our informants from the humanitarian organisations expressed finding it difficult to decide on what quality of textiles to collect and what to communicate to the citizens. RC said Fretex went out a few years ago and said "We'll take anything, it doesn't matter if there are holes, as long as it's clean and dry", thus communicating to Norwegian citizens that both reusable and recyclable textiles were wanted. Later on, they retracted this statement as they experienced economic consequences from the cost of managing recyclable textiles and only wanted to receive "gifts" as donations, i.e. reusable textiles. Other used textile collectors face the same difficulties from receiving mixed-quality textiles.

FX told us that Fretex went together with Oslo municipality a few years ago to conduct a pilot project on used textile collection in a few housing cooperatives in Oslo. The project entailed setting up a second bring-bank next to the one already present in the cooperative, with signs explaining that one was intended for reusable textiles, and the other for recyclable textiles. The cooperatives were also informed of this project through existing information channels. During the first round of the project, Fretex found that the inhabitants of the cooperatives made poor judgement calls regarding what constitutes reusable and recyclable textiles. Both bring-banks contained about 50/50 of each fraction. The main cause of this was the delivery of non-reusable shoes. Another major cause is that people were way too strict regarding what textiles they considered to be reusable. To figure out why this was the case, they conducted several surveys throughout the project, where they discovered that a lot of people resonated with what is of reusable quality by imagining what they could consider purchasing second-hand. Following these findings, they informed the inhabitants that when judging if an item is reusable, they should not restrict themselves to only what is reusable in the Norwegian market. They encouraged the inhabitants to evaluate what would be considered reusable in the Nordic countries, in Europe, and globally. Later on in the project, they further assisted the inhabitants in their evaluations by supplying pictures, videos and interviews on how to make these judgments. Towards the end, they found that the waste composition had improved and that the inhabitants were engaged in sorting "correctly". FX emphasised the increased national focus on the problematic aspects of the textile industry as part of the reason for the engagement of the inhabitants.

Established and upcoming collectors of used textiles must determine for themselves how they want to conduct the collection. They can decide if they want the citizens who donate their textiles in a one-flow or a two-flow system. A one-flow system will entail all reusable and recyclable textiles donated together, with the collector doing an after-sorting of the textiles according to quality, while a two-flow system would put the responsibility of separating according to quality on to the citizens. MX explains that testing these two systems and comparing the results is one of the main purposes of Mepex's and NF&TA's pilot project.

As the first steps of the used textile management value chain, the collection and sorting of used textiles hold a central role in making the management circular. Existing expertise found amongst the traditional collectors and sorters should be exploited to the fullest as other actors will have to participate, as collaboration and communication can strengthen and harmonise

the system. It is important to create systems that are easy to use for Norwegian citizens, to ensure that as large a fraction as possible is separately collected.

6.1.7 Reuse

After reducing general consumption and preventing it from being disposed of in the first place, reuse is the best way to make the life cycle of a textile product more circular. As FX and UF pointed out, Norwegians purchase too many new textiles and reuse too little.

In both Fretex's and UFF's experience, roughly 75% of all collected textiles are reusable. An even larger volume of reusable textiles could potentially be collected if steps are taken to get a larger fraction of used textiles out of the residual waste. According to FX, waste composition analyses conducted by Fretex in the past found that around half of the 8-10 kilos of textiles Norwegian citizens throw in the residual waste could have been reused. Despite the rise of poor-quality fast-fashion in Norway, Norwegians generally purchase good-quality textiles, which makes for a large fraction of used textiles being reusable. Even if Norwegians do not purchase as many textiles second-hand as they probably should, Fretex has many customers abroad who would like to buy used Norwegian textiles. As UF stated, there needs to be a general attitude change in Norway toward buying textiles second-hand and making this more lucrative if we want to make used textile management more circular.

But in the middle of all positive connotations with reuse, as both NF and MX mentioned, is the fact that reused textiles do not replace new textiles in Norway today at an even scale where one used textile product replaces one new textile product.

All in all, Norway already has good systems in place for the reusable fraction of used textiles. However, steps must be taken to capture the fraction of reusable textiles that end up in the residual waste, and Norwegians need to increasingly shift their consumption habits from new to used textiles if we are to make a transition towards a more circular economy.

6.1.8 Material recycling

When repairs and reuse are no longer options, material recycling is the best step to keep a textile product circling back into the economy. Due to a long line of barriers, particularly technological barriers, this is also the stage of the waste hierarchy for used textiles that is the most underdeveloped in Norway. There has not been much innovation to brag about since mechanical recycling took off, many years ago, though there are a handful of actors who have taken some leaps in regard to chemical recycling, such as Swedish RenewCell (FX). As RC stated, the market for recyclable textiles in Norway is immature with down-cycling as the only option, which does not present any value-adding that would incentivise further recycling.

Not only should there be investments made to improve material recycling technologies in Norway and elsewhere, but even with the little textile-to-textile recycling available today there is also the issue of a near non-existent market for the raw materials resulting from the recycling. In addition to this, RC also brings up the issue of the quality of the recycled fibres, which get shorter and more delicate each time the textiles are ripped apart to release the fibres.

The process of constructing recycling facilities and drifting them also comes with high costs, both monetary and resource-wise. As RC points out, both chemical and mechanical recycling technologies today require a resource input that rivals that of producing new textiles with virgin materials and which contradicts the aim of recycling.

What limited upcycling exists currently with material recycling is also exclusively reserved for textile input that has a very pure fibre content (FX). As SB stated, "*shit in is shit out*". This requirement of pure fibres is challenging in the face of the composition of a large fraction of the textiles on the market today that are a mix of natural and synthetic fibres. This makes the textile products more durable, with the unfortunate downside of making them more challenging to recycle, SB shared.

UF mentioned recently participating in a project called Satin on behalf of UFF Norway. One of the aims of the project was to examine the need for material recycling in the Nordic countries, and the countries' capacity to do this recycling. What they found is that, on the

Nordic level, needs and capacity are rather equal, though they are skewered within the countries. That is to say that e.g. Sweden has a high capacity for recycling cotton, a higher capacity than they need, while Denmark has next to no capacity for recycling cotton, but a high capacity for recycling synthetic fibres.

Given the somewhat mixed opinions on the role of material recycling in a future of more circular management of used textiles, the informants were asked for their views. The consensus was that material recycling is a vital part of the package solution, but should be a last resort for non-reusable textiles. As MX said, recycling should not be encouraged at the cost of reuse nor should it be used to legitimise our current consumption habits, though the latter can also be said for reuse.

Material recycling faces many challenges but is a necessary component of the waste hierarchy. If we wish to see the management of used textiles become more circular to preserve as many resources as possible, these challenges need to be addressed. Here, we see that producers need to design their textiles with recycling in mind and the technology needs to improve to be able to process mixed fibre textiles. Collaboration with countries with higher capacities we can utilise and learn from is also considered to be a valuable element that Norwegian actors should follow up on.

6.2 Interviews with municipal and inter-municipal waste companies

Through Follo Ren, I was tasked with getting in touch with the three waste companies that offer pick-up solutions for used textiles in the Watson et. al. 2018 report. Two of these are inter-municipal, NGIR and IATA, and one of them is municipal, Stavanger municipality. Our interviews with these waste companies included questions about what solutions for used textiles they offer their inhabitants, the practicalities of these solutions, costs associated with drifting these solutions, inhabitant satisfaction with the solutions, and whether or not the solutions have increased the share of used textiles separately collected. All information in this subchapter stems from these interviews. The interview guide can be found in the appendix.

All three companies offer both bring and pick-up solutions for used textiles. NGIR's pick-up solution runs on a 14-day schedule, with used textiles being picked up alongside cardboard

and paper waste in designated purple bags the inhabitants receive from the company. NGIR's waste collectors transport the used textiles at their waste sorting facilities, where humanitarian reuse organisation Fileks later picks it up for sorting and reuse. Initially, NGIR had a similar deal with Fretex. This arrangement was eventually ended, as the deal went from Fretex paying NGIR to collect and give them the textiles, to collecting them for free, to eventually NGIR having to pay Fretex to take the textiles off their hands. Our informant claimed this to be due to their means of collecting compromising the quality of the textiles, making this costly for Fretex, as the car collecting the textiles could leave a stench and destroy shoes. In 2020 they switched over to Filex, which does not charge NGIR.

Our informant said the volume of used textiles collected has decreased since they started in 2018. In the beginning, they promoted the solution heavily which led to a lot of engagement and awareness. Our informant claims the reduced volume collected over the years is due to a combination of little promotion, more bring-banks in the municipalities, and Fileks' demand for reusable textiles.

NGIR did not have any numbers to indicate the costs of running this pick-up solution. Our informant did however claim that the costs are marginal compared to other waste fractions, as the volumes are small and they utilise existing logistics for cardboard and paper. The solution does not demand extra payments from the inhabitants and is included in the waste collection fee.

NGIR does not have a running dialogue with Fileks regarding the volumes collected at the bring-banks or from pick-up so they could not say if the total volumes collected have increased since the introduction of the pick-up solution. They could also not say if it has had an impact on the fraction of textiles found in the residual waste, as they have not conducted a waste component analysis in a long time. There was, however, a lot of engagement in the beginning and they have not experienced any negative responses from their inhabitants. Our informant emphasises the importance of communicating with the inhabitants and promoting the solution if they want to see more people utilising it.

IATA offers pick-up of used textiles twice a year. The solution has been in place for at least 20 years, as far back as our informant could remember. The used textiles are collected along with hazardous waste, in regular plastic bags placed next to the outdoor waste bins. The

collected textiles are transported to IATA's own sorting station, to later be picked up by Fretex.

Same as NGIR, the solution is included in the waste collection fee the inhabitants already pay. Our informant could not provide any concrete numbers on what the solution costs the company but would calculate that it costs them around 150.000 NOK to cover the transportation, fuel, and wages for the six weeks of the year that two waste fractions are collected.

IATA did not have access to specific numbers regarding how much is collected through their different used textile collection solutions, but waste component analyses show that only a minuscule portion of textiles found in the residual waste was of reusable quality, 1.4% of the residual waste composition in 2017. As their collaboration partner is Fretex, it makes sense that the non-reusable fraction has to go into the residual waste, which made up 4.8% of the residual waste composition that same year.

The company has only received positive feedback from their inhabitants. As the municipalities of IATA cover vast distances, many inhabitants live far away from Fretex's bring-banks. The inhabitants who live the most remote are those who utilise the solution the most. Our informant does emphasise that Fretex's bring-banks are well used, and the success factor lies in the combination of the two solutions, as their inhabitants have different needs.

Lastly, Stavanger municipality offers an order-based pick-up solution for used textiles in addition to their traditional bring-banks since 2018. For both solutions, they collaborate with Fretex, Fileks, Norge Gir, and UFF Norway. Their collaboration with NML only extends to bring-banks.

Inhabitants in Stavanger municipality have the option to order home pick-up for used textiles for free through the website *hentavfall.no*. Here, the inhabitants can choose what day the textiles are to be picked up and which organisation is to receive them, only having to place the textiles in regular plastic bags outside of their homes, similar to NGIR and IATA.

This service is also free. It is not covered by the waste fee as the municipality is not responsible for the collection. Rather, the chosen organisation is the one responsible for the

collection. The municipality is responsible for administering the website, which is based on its existing systems. Our informants stated that this requires very few resources on their part to manage once the system was up and running, and they spend only about three hours a month managing the website and supporting inhabitants who have experienced issues with the service.

Due to their hands-off management of used textiles, our informants did not have information regarding how much the organisations collect. However, they did say that the pick-up solution has a lot of room for improvement, as it is not much used. They claimed this was due to both poor promotion of the option and the accessibility of bring-banks in the quite densely populated municipality. The inhabitants that do make use of the pick-up solution have expressed satisfaction with the system, and the municipality considers it a success as it is a good option for inhabitants who, for different reasons, cannot use the bring-banks.

All in all, the three waste companies have structured different systems to offer the same solution for collecting used textiles from people's homes. While they have gone about this in different ways, they do share some interesting similarities. For one, they have made these systems relatively cheap to operate. Either by picking up the used textile bags along with other waste fractions and keeping the same logistics, as NGIR and IATA did or by "outsourcing" the collection service to the humanitarian organisations receiving the textiles and only managing the website for ordering, like Stavanger municipality. Another similarity is that neither of these services are very popular among the inhabitants, which our informants blame on a general lack of consistent promotion of the service and the presence of bring-banks in the area that the inhabitants already utilise. Lastly, all our informants reported a general satisfaction among their inhabitants that use the service and deem it as a successful service themselves. When evaluating what solutions Follo Ren can offer its inhabitants in the future for improved collection rates and what policy measures and tools they can utilise, we can look to the experiences of these three companies and draw inspiration.

6.3 Survey of Follo region inhabitants

A survey of the inhabitants of the Follo region had the objective of mapping out how the population manage their used textiles for disposal, their opinion of how Follo Ren

communicates their solutions for used textiles, and what solutions the inhabitants would prefer in the future.

The demographics of our sample are presented in Figure 4 and 5 below. The distribution of socioeconomic variables resembles that of the rest of Norway and the Follo region.
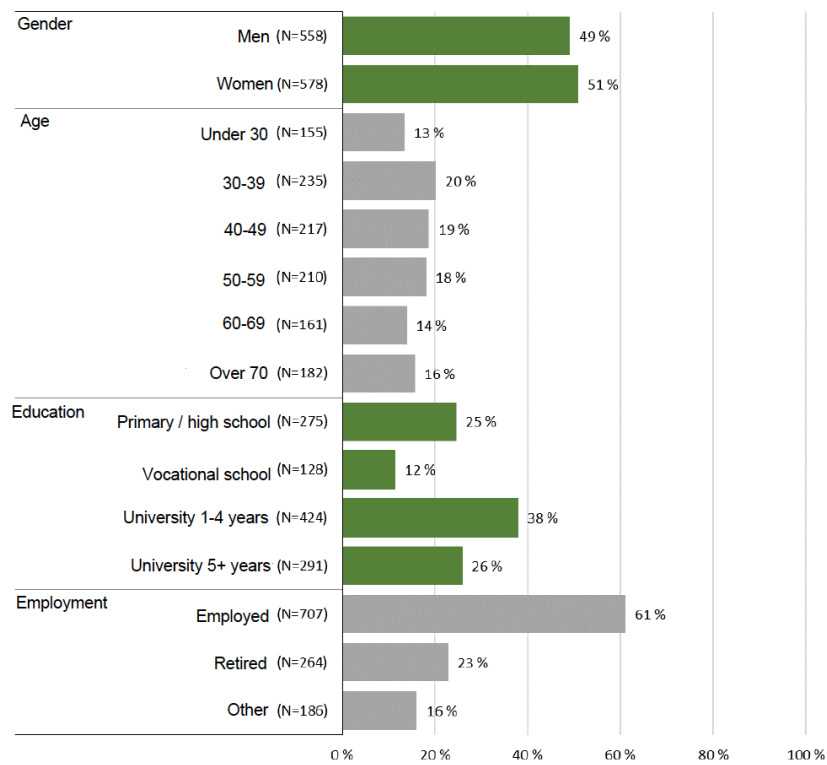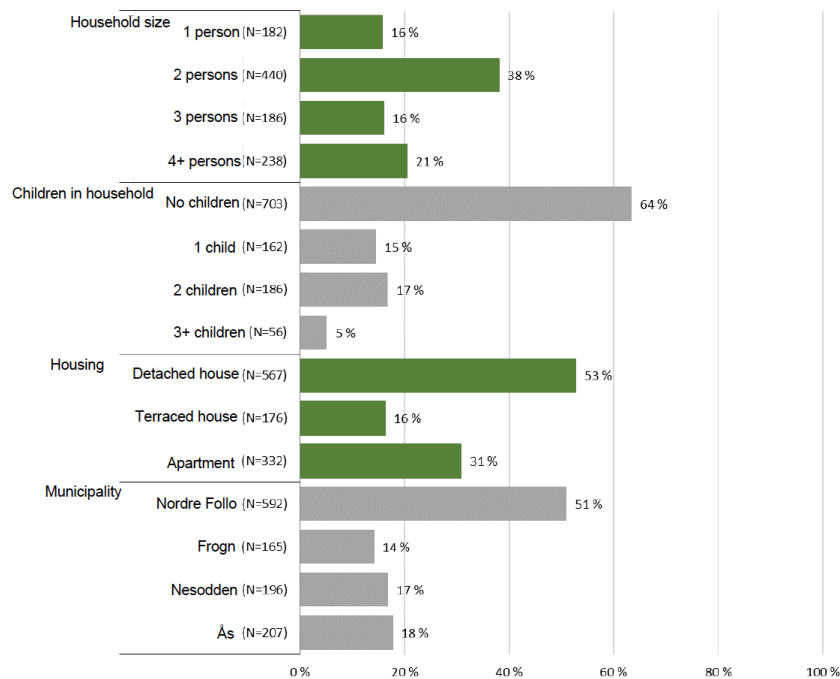

Figure 4: Demographics 1

Figure 5: Demographics 2

Sentio conducted an analysis of the findings as part of their assignment from Follo Ren. The results presented from the survey highlights where one or multiple socioeconomic variables scored significantly higher or lower than the rest of the subgroups, indicating significant differences in how these subgroups act and think. Now we will present the findings of the most significant differences between our variables based on the survey questions.

Our first survey question was concerning the frequency of used textile disposal from the households, framed as "*How often do you get rid of textiles (clothing, shoes, accessories, household items such as curtains, bedding, etc.)?*". 1157 of our respondents answered this question. The distribution of how often people dispose of textiles is quite even for three of our options, these being once every 3rd month, once every 6th month, and once a year or rarer. The distribution is illustrated in Figure 6 below. We used the term «dispose» to keep this open for both donations and waste. The analysis conducted by Sentio found that there is a positive correlation between the number of children in a household and how often they dispose of textiles, which was the most significant finding from this question. We assume this is largely due to children growing out of their clothes, in addition to other reasons such as frequent wear and tear and changing preferences.
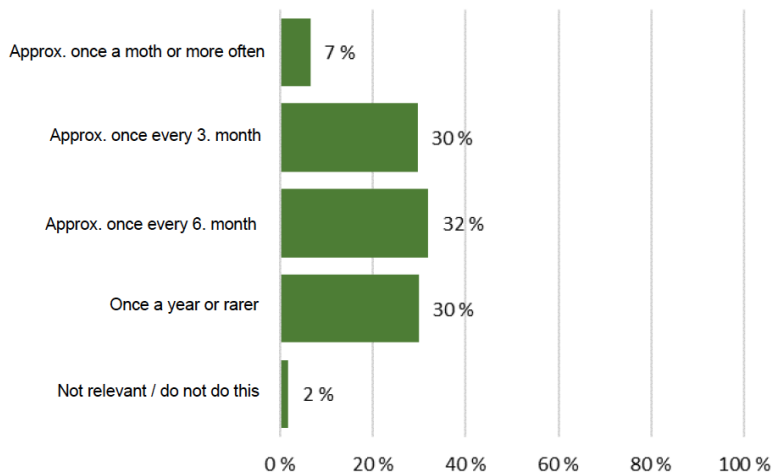
65

Figure 6: Frequency of disposal

Our second question inquired about how households go about disposing of their used textiles, "*How do you usually dispose of textiles?*", to which 1139 from our sample responded. Our respondents could choose multiple options. Here, we were most interested in the options of disposal through donations to humanitarian organisations and disposal through the residual waste. The most significant findings from these two options were that 95% of the inhabitants in the age range of 30-39 reported donating their textiles to humanitarian organisations, while those under 30 reported the lowest amount of donations, 81%. The overall response showed that most of our respondents, 9 out of 10, donate used textiles to humanitarian organisations. Those under 30 also reported the most disposal of textiles in the residual waste, at 39% of our 150 respondents. Our older respondents, 60-69 (23%) and over 70 (22%), and our retired respondents (24%) reported disposing textiles in the residual waste the least.

But donations and waste disposal were not the only options. We see for example that a significantly high share of our respondents under 40 report selling their textiles on reuse markets or online. That makes up 30% of those under 30 and 37% of those 30-39. The complete distribution of answers is show in the figure below.
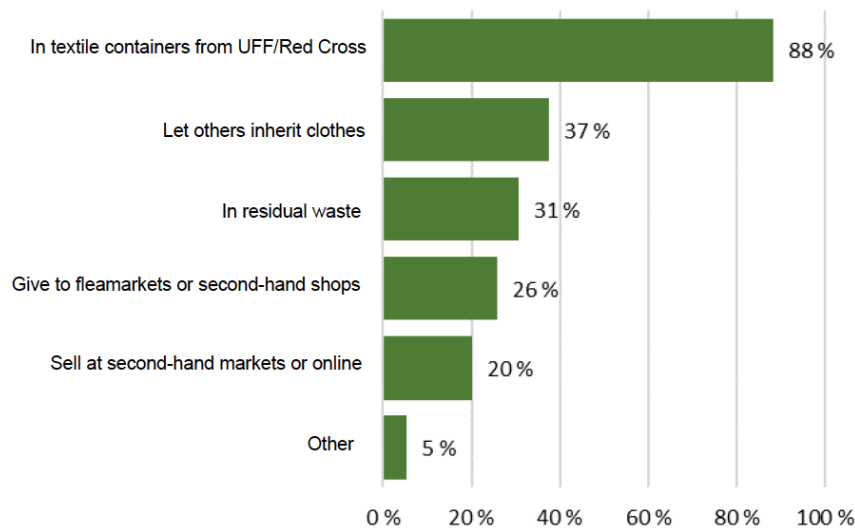
Figure 7: Means of disposal

Which groups report disposing of their used textiles in the residual waste is some of the key information we are interested in from this survey. In addition to making donating used textiles an easier alternative for those who already do so, we are interested in targeting those who do not when creating new solutions and implementing policy instruments. The table below shows the percentage of respondents with each socioeconomic variable that reports they dispose of used textiles in the residual waste. The red marking indicates a significantly lower response compared to the other variables, which includes respondents over 70 and retired respondents. Though none were marked to be significantly higher by Sentio, we can see some variation. There are more men than women, people under 30, single person households, people with higher education, those with one or no children in their household that respond positively to disposing of textiles in the residual waste. These are the socioeconomic groups Follo Ren should target when creating new solutions for used textile collection.

Table 5: Share of respondents who report disposing of used textiles in the residual waste

Group	Variable	Residual waste
Gender	Men	34%
	Women	28%
Age	Under 30	39%
	30-39	32%
	40-49	30%

	50-59	37%
	60-69	23%
	Over 70	22%
Education	Primary/high school	27%
	Vocational school	28%
	University, 1-4 years	32%
	University, 5+ years	36%
Employment	Working	32%
	Retired	24%
	Other	35%
Household size	1 person	35%
	2 persons	29%
	3 persons	36%
	4 persons	29%
	5+ persons	23%
Children in household	No children	31%
	1 child	36%
	2 children	28%
	3+ children	25%
Housing	Detached housing	30%
	Terraced housing	34%
	Apartment	30%
Municipality	Nordre Follo	28%
	Frogn	33%
	Nesodden	33%
	Ås	34%
Total		31%

Our third question inquired about which of the given options our respondents believed would increase the share of used textiles they donate for reuse, "*Which of these schemes would contribute to you donating more of your textile waste for reuse?*". Our respondents could only choose one of the options. 1142 respondents answered this question, and the answers are shown in Figure 8.

The majority, 4 out of 10, responded that a separate bag for textiles picked up at their house was the best of the given options. A significantly higher share of women prefer this option compared to men, with almost 50% of women opting for this. There is also a positive correlation between the desire for a separate bag for textiles and the number of children in the household. Around 30% of those over 60 chose this option as well, which is significantly lower than the other age groups. 1 out of 4 people would like more textile containers, bring-banks, in their proximity. The rest expressed satisfaction with the current system. Inhabitants in Frogn were the most satisfied with the current system and had the lowest share of respondents desiring more bring-banks. Men were also more satisfied with the current system than women.
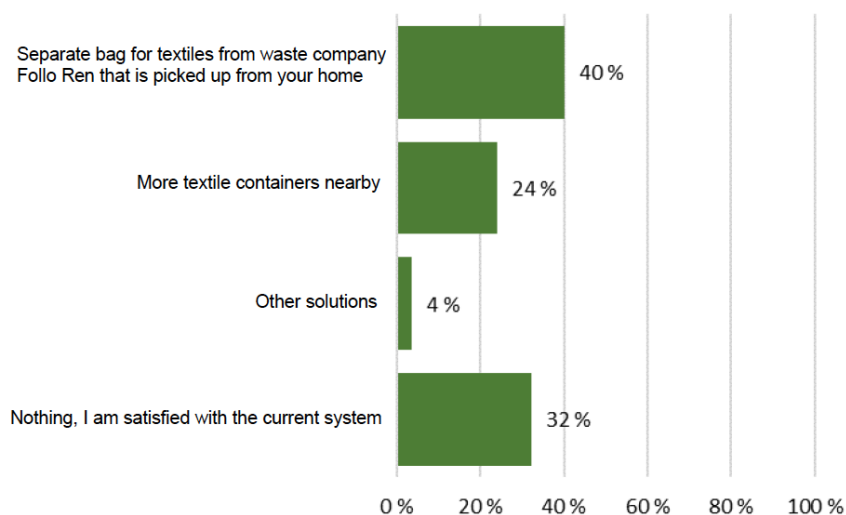
Figure 8: Increased share of textiles for reuse

Satisfaction with the information received from Follo Ren regarding used textiles and reuse was the fourth question. This was measured on a Likert scale, with 1 being very dissatisfied and 5 being very satisfied. The different categories of information we inquired about are given in the figure below. The results were coded to a standardised average ranging from 0 to 100, with 100 being complete satisfaction with the information received. As Figure 9 below shows, the inhabitants are decently satisfied with the information they receive from Follo Ren, with none of the categories dipping below 50.
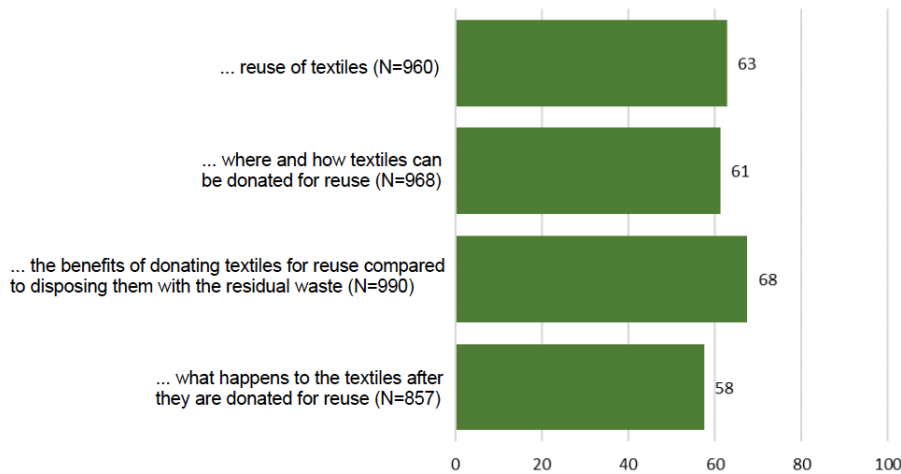
Figure 9: Satisfaction with information

In general, there is a positive correlation between age and satisfaction with the information received. Informants with higher education and informants whose households have children are less satisfied than informants without higher education and childless households.

Our fifth and final question was about how our respondents wish to receive information about donating used textiles in the future, "*How would you like to receive information about donating textiles?*". Multiple answers were possible, and all our 1160 respondents gave an answer. 44% and 38% wished to receive information over SMS and in the Follo Ren app, respectively. More women wished for SMS, while more men wished for information in the app. Respondents under 30 were less interested in receiving information about donations at all compared to other age groups but were more interested in finding information on the bring-banks as well. Figure 10 illustrates the distribution of answers.

70
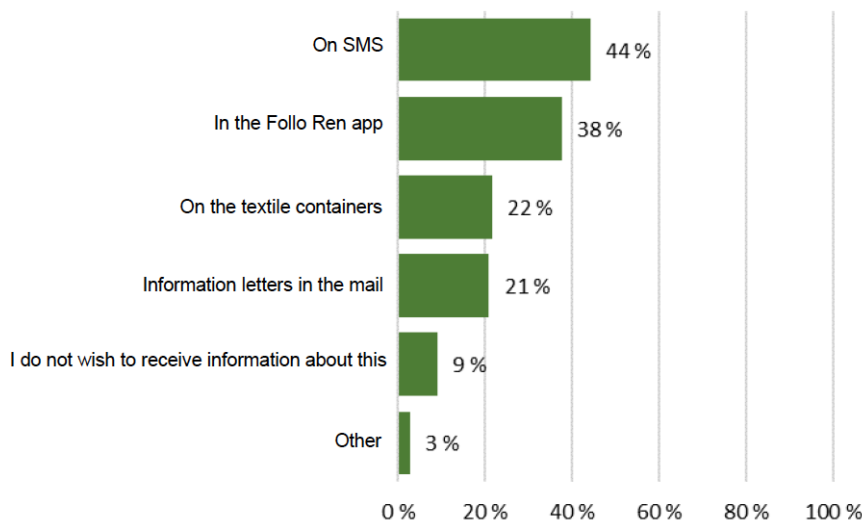
Figure 10: Means of receiving information regarding donating used textiles

To summarise the central findings from the survey, we managed to get a sample that shares a distribution of socioeconomic variables which closely resembles that of the rest of Norway and the Follo region. The inhabitants vary in how frequently they dispose of their textiles, but a strong majority report disposing of their textiles by donating them to humanitarian organisations. Still, 30% dispose of them in the residual waste, which is a concern for Follo Ren. Many of our respondents claim that introducing new solutions such as a pick-up solution for textiles would increase how much they donate. Finally, our respondents are decently satisfied with the information they receive from Follo Ren regarding how to handle used textiles and how to donate them. There is room for improvement, and they were positive to receive more information through a variety of different channels.

7. Discussion

7.1 Objective one

This research objective is concerned with how the management of used textiles in Norway is structured. We will address the objective by answering research questions one and two.

7.1.1 Research question one

What does the structure of used textiles management look like through the lens of the EGS framework?

Norway has a governance system for used textiles which is under stress. Around 50% of all used textiles from Norwegian households are not separately collected for reuse and recycling, and we struggle with managing the recyclable fraction which is collected. In some parts of our governance system for the resource, we are failing. Through our review of the available literature and our expert interviews, we have collected the tools to be able to put the management structure of used textiles in Norway into Vatn's (2015) EGS framework, which we will use to help us identify where the fault lies.

The resource regime encompasses institutions that govern and protect environmental resources and their processes, who is holding the rights to productive resources and how actors with rights interact. The economic actors are those operating within the resource regime. When we are looking at used textiles as a resource and who holds the rights to these, we need to look at what actors are responsible for textiles at the end of their life cycle. For the sake of this thesis, we can divide these actors into three categories: collectors, sorting/reuse, material recycling, and producers. One of the biggest groups of economic actors in the field of collecting and processing used textiles are the waste companies. For used textiles, we are interested in state-owned waste companies, managed at the municipal and inter-municipal level. In Norway, waste companies receive used textiles in the form of textile waste through residual waste. This includes all quality textiles, which around 50% of the total volume of Norwegian households dispose of. Once the waste companies are in possession of the textile waste, it is state property.

Another group of economic actors are the humanitarian organisations engaged in reuse. They are the ones mostly responsible for the job of sorting donated used textiles according to quality, selling what is reusable, and recycling or incinerating the non-reusable fraction. We can also argue that municipal waste companies, by making agreements with humanitarian organisations for them to collect used textiles via bring-banks or pick-up solutions, in some sense have the power to *command* these organisations, as an interaction rule. However, once

the textiles have been donated to the organisations, they become private property of the organisations.

Third, we have actors involved in material recycling, which are currently not established in Norway (NF&TA, 2023b). However, there are aspiring actors such as UFF Norway and Norwegian Re:Textile that hope to fill this role, and likely more to follow as the technologies and markets develop further. These actors will also have private property rights once the used textiles are in their possession. Most likely, they will receive used textiles from waste companies, humanitarian organisations, textile producers and other actors with return systems in the future, etc.

Finally, we have textile producers who are included as economic actors, as the future EPR on textiles will give them increased responsibilities for financing and/or organising end-of-life management for used textiles. As of now, their possible rights and responsibilities are not yet established. The economic actors will have all use rights once they are in possession of the resource, and so both use rights and property rights will change as the textiles move downstream, typically from collector to humanitarian organisation to recycling actor. How these actors interact with one another depends on the waste company and humanitarian organisation, as they typically have different arrangements with one another.

The political actors have the power to influence the resource regime, by defining the very rules of economic processes. The main political actors who determine how used textiles are to be managed in Norway are both national and international. At the international level, we have the EU, which through its various bodies creates the frameworks that also Norway is required to follow as a member of the EEC. At the national level, we have the Norwegian government, which also includes the Norwegian Environmental Agency and the Ministry of Climate and Environment. They create and are in turn shaped by the institutions which govern the political process, which are the various legal, economic and administrative frameworks that dictate how waste, textiles, and used textiles are to be managed. In this thesis, we have focused on legal frameworks, such as the European Green Deal, the EU Circular Economy Action Plan, the EU Waste Framework Directive, and the National Strategy for a Green, Circular Economy. These actors and institutions combined impact how they shape the resource regimes, by e.g. determining the existence and elements included in the future EPR on textiles and ecodesign directives. Economic actors will also try to

influence the resource regime and policy outcomes. Humanitarian organisations engaged in reuse, with help from civil society actors such as environmental organisations, do so by e.g. advocating to remove the VAT from second-hand textile sales, though they have yet to be successful in this particular endeavour (Hellstrand, 2021; Rustad, 2022). The civil society actors are the ones to legitimise the actions of both political and economic actors, so the support of actors such as environmental organisations is crucial

Many of the greatest challenges for optimising the management of used textiles in Norway lie in the technology available and the infrastructure that exists. The technologies we are dependent on in managing used textiles are those related to sorting and material recycling. Thus, they determine how our economic actors can manage the resource, at the same time as the economic actors are usually the ones to invest in and develop the technology. There are already automated sorting technologies in place, which use infrared light to determine fibre composition. There are other initiatives in development, such as a digital passport for textiles that read off their composition through e.g. a QR code (M. Haugland, personal communication, March 17, 2023). For material recycling, we have both mechanical and chemical recycling. Mechanical is the more established, while the chemical is still in its early stages, though both have a lot of room for improvement if we wish to produce durable textiles of recycled materials. The infrastructure is how these management systems are structured and how cohesive they are. Here, the management for the different stages of used textiles is quite fragmented, with many different actors doing their part of the management. Our informants stressed the importance of further collaboration and communication through e.g. company and industry networks.

Collaboration and communication are the key elements of how our economic actors interact with one another. How these actors interact is largely influenced by both the attributes of the used textiles and the state of the used textile resources. Used textiles vary greatly in both quality and composition, which has great implications for how they can be processed and used. Textiles have the attribute that they are inherently more difficult to recycle than some other waste fractions, such as plastics which can be melted down and reshaped without much loss of quality. Some textiles can be reused, others must be recycled, and some fractions of the recyclable textiles we are unable to recycle due to their composition and the available technology. The higher up in the waste hierarchy they can be processed, the more value they

maintain, and the different economic actors have an interest in possessing the used textiles during the different stages of the waste hierarchy.

The governance system of used textiles in Norway is made up of a variety of different actors and institutions. The attributes of the textiles, how the textiles are used, and what technologies and infrastructures we have to manage them have a great impact on how successfully they are managed. It is also in these aspects that we can find many of the reasons why used textiles are not properly governed and managed in Norway. The complete EGS framework for used textiles in Norway we have described is illustrated in the figure below.
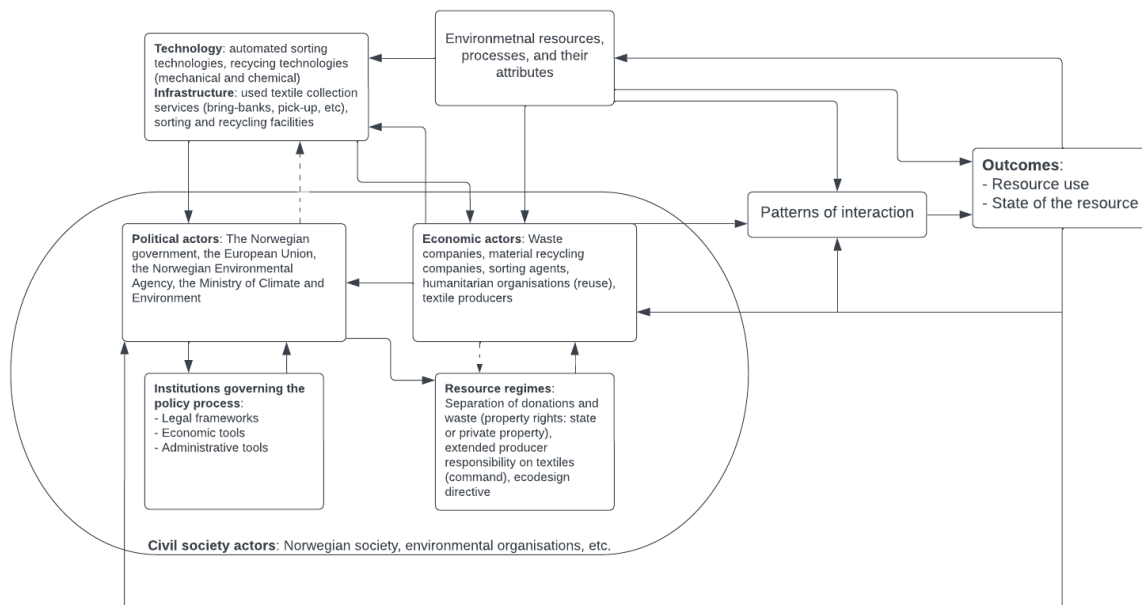
Figure 11: The EGS framework for used textiles in Norway

7.1.2 Research question two

What major challenges do the different actors that manage used textiles currently face, and what solutions can be introduced or improved upon to address these challenges and make used textiles management more circular and sustainable?

When discussing our previous research question, we found the main issues identified in the EGS framework of used textiles in Norway. These are identified to be in the technology used to process and manage the used textiles, especially material recycling, in the infrastructure of

the system of management, which relates to the patterns of interaction between the economic actors. To answer our second research question we will lean into the information collected in the literature review, the data collected from our expert interviews, and our findings from the last research question. We will look at the challenges relating to the technology and the infrastructure of used textile management and the economic actors involved in the management. We will address these elements by placing emphasis on collecting, sorting, reuse, material recycling and EPR.

The technologies we are concerned with when managing used textiles are sorting and recycling technology. At the moment, only Fretex is operating large-scale sorting of used textiles in Norway, with Norwegian Re:Textile and UFF Norway also planning to conduct sorting on a large scale in the country. According to our UFF informant, Norway has some potential advantages when it comes to sorting. These are largely due Norwegians having high standards when donating used textiles, with approximately 75% of all textiles donated being reusable and of high quality (K. Pihl, personal communication, March 27, 2023). Currently, most collected textiles leave the country to be sorted abroad, but as more actors engage in sorting and invest in developing these technologies further a larger share can be kept in Norway and be circled back into the Norwegian economy.

Much of the same applies for material recycling technologies. All our informants emphasised the importance of improving these technologies if the management is to become truly circular. As of now, most of the material recycling conducted abroad is mechanical, which is challenging as this process makes the fibres shorter and less durable. Chemical recycling is still in the early stages, with particular challenges in how energy and materially intensive this process is. As investments are made in sorting technologies and sorting facilities, a foundation may be created which will encourage further investments in both mechanical and chemical recycling technologies in Norway. But our informants were also adamant that while recycling is part of the solution, only a portion of the environmental impact of textile production comes from the production of fibre material. Thus, material recycling cannot make textile production and the management of used textiles sustainable on its own.

The infrastructure of used textile management is mostly tied to the collection services. These services are mostly conducted by the humanitarian organisation and their bring-bank collection system, with some municipalities conducting their own collection services or

collaborating with the humanitarian organisations to offer pick-up services. One of the biggest weaknesses of the infrastructure of collection is that around 50% of all used textiles from Norwegian households are not captured. The municipalities in particular have a lot of responsibility to address this, as they need to ensure a separate system for used textile collection by 2025. This can be done independently or, most likely, in collaboration with the humanitarian organisations. These economic agents are the most experienced and knowledgeable on this topic, and should be consulted when the municipalities create new solutions. As we will explore further in the next research question with Follo Ren as our case study, both our literature review and empirical experiences from some of our informants are positive to combining various different collection solutions to increase the share of textiles separately collected.

Then, we have the economic actors. As presented in research question one, we distinguish between textile producers, waste companies, humanitarian organisations engaged in reuse, used textile sorters, and material recycling actors. These are the actors who at various stages of the management hold the rights to the resource.

Collection is the first step of used textile management, and this is the responsibility of both waste companies and humanitarian organisations engaged in reuse. Ensuring separate collection of used textiles is high on the national agenda, following the EU demands of 2025, which places more responsibility onto the municipal waste companies. The biggest challenge of the separate collection is that only around 50% of used textiles from households are captured. Here, our informants emphasised the importance of even closer collaboration between these two actors. Waste companies can learn a lot from the experiences of humanitarian organisations when making their own systems for separate collection. Our Norwegian Red Cross informant stated:

> "*Textiles need to be separated from other things as early as possible to protect the value of the reusable fraction, so that we as non-profit actors with much experience with managing them can keep on managing it in a good way and get the values back into social and humanitarian causes.*" (K. Voll, interview, March 20, 2023)

Projects such as the one led by NF&TA and Mepex will help collect data that can be used to compare the results of different systems for separate collection, which can be used to inform

future solutions. This further shows the importance of building stronger networks between all the different economic actors.

The humanitarian organisations are also experiencing financial challenges, largely due to a combination of a large fraction collected being of non-reusable quality and the VAT they must pay for all their sales. As other actors, such as Norwegian Re:Textile and UFF, are expanding into the territory of sorting used textiles, this will hopefully have an impact on reducing the share of recyclable and destroyed textiles they receive. Removing the 25% VAT they pay on their sales would also help increase the financial viability of these organisations, which our Fretex informant claimed could incentivise more serious actors to get involved in the second-hand business.

> "*Reuse is the low-hanging fruit. The challenge lies in material recycling*" (A.-W. Hjelle, interview, March 23, 2023)

Material recycling was identified to be a massive challenge for the circular management of used textiles, and also an essential part of the solution. Recycling does not currently happen in Norway as there are no facilities for it, and recyclable textiles are exported to other countries. If the infrastructure of used textile management in Norway is strengthened, there is hope that this could incentivise the construction of recycling facilities in the country, especially following the construction of automatic sorting facilities. Before that time, there is potential to look towards Norway's neighbouring countries for collaboration. The Satin project proved the need for further collaboration with other Nordic countries, to make use of each country's advantages and capacities for recycling different used textile fractions while also building facilities and systems in Norway.

As economic actors, textile producers are going to be allocated responsibility for the end-of-life of their products in the future, following e.g. EPR on textiles and the ecodesign directive. The knowledge of upcoming implementations of such frameworks in the near future will make it so that textile producers selling in the Norwegian market will have it in their best interest to ensure some degree of circularity in their textiles. How these frameworks will end up is up to Norwegian political actors, but our NF&TA informant was adamant that textile producers should be engaged and help in forming an EPR on textiles to ensure it is something they can follow up on. Collaboration with political actors in the EU will be important to

ensure that the EPR schemes and ecodesign requirements are harmonised, making them easier for producers to adhere to in all European markets (NF&TA, 2020). Our informants widely agreed that an EPR on textile and ecodesign requirements will be some of the most efficient policies for ensuring increased circularity on textiles, as they target both the beginning and the end of the textiles' lifespans. Shifting responsibility onto textile producers can even the playing field in the market in favour of more circular textile products by making the textiles with large environmental footprints more expensive and textiles with small environmental footprints cheaper.

There is no shortage of challenges for the economic actors involved in the management of used textiles in Norway. Each step of the management process has the potential for improvement in a variety of different ways, but our informants have pointed out many potential solutions that can improve upon the system of management. In this chapter, we have highlighted the improvements believed to have the best potential effect of making the management more circular and sustainable, which are found in improvements in the infrastructure and technology, in increased collaboration between economic actors, and shifting more responsibility onto the textile producers.

7.2 Objective two

This chapter will address research objective two, on how Follo Ren can ensure a simple and effective separate collection system for used textiles for their inhabitants, which we will answer through research question three.

7.2.2 Research question three

How can Follo Ren structure a system for used textiles that ensures a higher degree of sorting, and what policy measures and instruments can be implemented to ensure compliance and that this system will be easy to use for Follo Ren's inhabitants?

While waste companies all over the EU are being increasingly incentivised to ensure separate collection for textiles, which needs to be in place by 2025, Follo Ren IKS has a particular interest in ensuring such a system. Follo Ren sends all its inhabitants' residual waste to the sorting facility, ROAF, which identifies and separates plastics from the other residual waste.

While this system is great for separating and categorising plastics while taking some of the burdens of sorting off the inhabitants of the Follo region, it does have some drawbacks. Specifically, the facility is not equipped to handle textiles. Textile products as small as nylon stockings or as tough as denim jeans can get tangled in the machinery and destroy parts, costing the facility both time and money (A. T. Ekroll, personal communication, February 6, 2023). In addition, there is also the risk that more humanitarian organisations, such as Norwegian Red Cross and UFF which Follo Ren collaborates with, might follow Fretex's decision to only accept reusable textiles. All these factors further underline the need for Follo Ren to establish their own system.

The policy measure and the goal of creating a new system for used textile collection is to get a larger fraction of used textiles donated and out of the residual waste. In this subchapter, we will discuss what infrastructure is necessary and what policy instruments that can be implemented in order to achieve this measure.

First, we need to look at which groups of the population in the Follo region should be targeted. These are the groups that share certain socioeconomic features, which indicate that they dispose of their used textiles in the residual waste more than the rest of the population. From our survey data, we have identified these groups to be: men, people under 30, single-person households, people with higher education (university level), and households with one or no children.

Secondly, we look at what new solutions for collecting used textiles these groups reported would make them increase their used textile sorting. Men are generally more satisfied with the current system. We can interpret this to indicate a lack of care for some of the men in our sample, but they are also decently interested in a pick-up solution and more bring-banks, though slightly less than women. A majority of those under 30 think more options would improve their sorting of used textiles, and were most interested in a pick-up solution. The same applies to single-person households, those with higher education, and 1 child households. Childless households are less interested in pick-up compared to the households with children, and slightly more interested in more bring-banks. This may be due to a less hectic lifestyle compared to households with children and thus more capacity to seek out bring-banks.

In all, the selected demographic groups are most interested in having the option of receiving separate bags for used textiles from Follo Ren. This builds upon the concept of customised facilities from the success factors for separate collection of textile waste presented in the literature review. One of the factors under customised facilities is that of utilising a range of collecting methods which complement one another. Completely overturning the existing system is not in the interest of either Follo Ren, Norwegian Red Cross, UFF, or the inhabitants. Adding pick-up to the already much-used option of bring-banks has the potential of capturing part of the fraction that ends up in the residual waste, as filling the bags for pick-up is a less demanding task than going to the bring-banks which can lower the threshold for even the least motivated inhabitants. Introducing new and improved solutions to donating used textiles is part of strengthening the infrastructure for used textile management in the Follo Region, which needs to be in place if any policy instruments are to be successful.

The practicalities of how to implement a pick-up solution are something Follo Ren must explore further. Here, they can take inspiration from the three waste companies we have interviewed. Their experiences stress the importance of communicating the solution to the inhabitants so that they know it exists and know how to use it. How to go about this will be explored in the next paragraph. Making the solution free to use is arguably one of the best ways to ensure that the perceived barrier for donating is lowered, making the inhabitants more likely to utilise the solution. It is also in Follo Ren's interest to keep the cost of running the pick-up solution low. The other waste companies utilise existing logistics to keep costs down. This will ideally prevent the service from increasing the waste fee for the inhabitants. If the bags for textiles are to be picked up alongside other waste fractions to keep existing logistics, they should take the preservation of the quality into account so as to not run into the same problems as NGIR. There is also the option of making new agreements with current partners, Norwegian Red Cross and UFF, to make them do an order-based pick-up in a similar fashion as Stavanger municipality, which is something Follo Ren can consider. The last aspect we bring up is whether Follo Ren should supply one or two bags, which has come up in personal communication with Follo Ren employees in the past. One bag entails that all textiles, both reusable and recyclable, go together. The after-sorting will then be conducted by either Follo Ren or the humanitarian organisations, which is the more costly option. The other option is to separate the textiles into two bags, one for reusable and one for recyclable. The downside is that empirical evidence, the Fretex pilot project, presented earlier shows that people struggle with evaluating the quality of a textile, which can discourage the inhabitants

from donating. As this research question, and Follo Ren themselves, emphasise ease of use for the inhabitants, we recommend implementing a one-bag pick-up solution.

After establishing what kind of infrastructure to build and solutions to offer to capture the groups that are less likely to donate their textiles, we have to figure out what policy instruments to utilise to impact their motivations and behaviour. An assumption of this thesis is that we assume people to have bounded rationality, as we cannot expect people to have full information at all times and the capability to constantly make the best possible choices. This assumption is further backed by our survey, as people are only decently satisfied with the information they receive. The policy measure we wish to achieve by changing Follo Ren's system for separate collection of used textiles is to get a larger fraction of used textiles donated and out of the residual waste. We emphasise the use of informational policy instruments to be able to achieve this goal. As mentioned in our theoretical framework, these instruments can have a cognitive effect and alter how a person perceives the issue, which can alter their motivations. Other policy instruments would be less ideal.

Economic instruments could potentially incentivise the least motivated inhabitants to sort their textiles, though this would be difficult to regulate as the sorting is typically done at home and there is a great variety of different downstream solutions to choose from, further complicating regulation. Introducing economic incentives also runs the risk of having the opposite effect on the inhabitants who are already engaging in correct sorting behaviour, which is the majority. This is referred to as "crowding out", as economic incentives disrupt the existing, often morally grounded, motivations (Vatn, 2015). Legal instruments would also be difficult to implement in practice for many of the same reasons, especially as sorting textiles is essentially a voluntary practice done at home without the ability to regulate. On the other hand, informational instruments would be easy and feasible for Follo Ren to implement further. Informational instruments are considered to be the most lenient tool of government which can strengthen waste sorting norms by appealing to people's social rationality and altering their preferences, as waste sorting is a necessary component to more circular management of our resources and key to help save the environment and allow people to thrive (Vedung & van der Doelen, 2007; Vatn, 2015). If done correctly, information instruments can thus emphasise the importance of separate sorting and donation of used textiles as good behaviour, leading to textile sorting norms being internalised at the personal level and corresponding behaviour practised.

That leaves us having to figure out how to best communicate with the Follo region inhabitants, with special attention to what channels these groups are most susceptible to, which question 5 of the survey sought to explore.

Men report being most interested in receiving information in the Follo Ren app, though an almost equal portion are interested in information on SMS. Those under 30 are the least interested in receiving information at all of all socioeconomic groups and are also the most interested in receiving passive information on the bring-banks. This group gives the impression of not wanting to be "bothered" with information from the waste company, which indicates that Follo Ren should be cautious of not bombarding the inhabitants with information in the future, though this is considered common knowledge in the industry. Those with higher education are the most interested in receiving more information compared to those without higher education. They are positive about receiving information both over SMS and in the app. Single-person households are in general interested in receiving more information, particularly over SMS. Childless and 1-child households are both positive to SMS, and 1-child households are a bit more positive to receive information in the app

With the exception of the portion of our respondents under 30, the other groups are positive about receiving information from Follo Ren regarding sorting and donating used textiles over SMS and in the Follo Ren app. We should also consider those uninterested in receiving information directly, such as those under 30, who prefer passive information. It may be that these inhabitants will not bother reading the information they receive directly, thus putting up information directly on the bring-banks could be the best option for communicating with them. As our respondents were only decently satisfied with the information they have gotten up till now, there are good reasons to communicate even more strongly in the future. Also looking back to the success factors for separate sorting of textile waste, engaging communication through transparency about what happens to the textiles downstream and clarifying what textiles are wanted as donations are crucial in establishing trust and ensuring that the inhabitants sort correctly. Another factor was to conduct citizen surveys before designing measures, which is part of what we have done in this thesis through the Sentio survey.

Information about donating and sorting textiles over SMS and in the Follo Ren app were the most popular channels overall and should be considered by Follo Ren in the future. The other options should also be included, as they are easy and likely cheap to implement. This includes information on the bring-banks and information letters, the latter of which can potentially be included in the information magazine Follo Ren publish three times a year.

Changing waste sorting habits is no easy job. However, this chapter provides a foundation from which Follo Ren can draw inspiration when developing a new system for separate collection of used textiles and how to best communicate this to their inhabitants. Emphasis has been placed on the demographic groups shown to least participate in the sorting of used textiles, as changing norms and behaviour amongst these groups would likely have the biggest impact on collection rates.

8. Conclusion

This thesis was on the topic of the environmental governance and management of used textiles in Norway. To tackle this massive topic, we divided it into two research objectives. The first objective addressed how the management of used textiles in Norway is structured. We addressed the objective by answering two research questions, the first being "*What does the structure of used textiles management look like through the lens of the EGS framework?*". Here, we used the environmental governance systems framework and the data collected from our expert interviews to get an overview of all the components that make up the governance and management of used textiles in Norway, and identified where the weaknesses lie, as this environmental resource is sub-optimally managed. The second research question was "*What major challenges do the different actors that manage used textiles currently face, and what solutions can be introduced or improved upon to address these challenges and make used textiles management more circular and sustainable?*". This question was addressed through continued usage of the EGS framework, but also heavily informed by both the literature review and the expert interviews. The main findings from this objective were that the management of used textiles is conducted by a wide array of economic actors with different expertise and interests and that the circularity of the management would benefit from stronger collaboration, more responsible producers, and improvements in both infrastructure and technology.

The second research objective focused on the local level, with a case study of inter-municipal waste company Follo Ren IKS. It addressed how Follo Ren could ensure a simple and effective separate collection system for used textiles for their inhabitants, answered through research question three: "*How can Follo Ren structure a system for used textiles that ensures a higher degree of sorting, and what policy measures and instruments can be implemented to ensure compliance and that this system will be easy to use for Follo Ren's inhabitants?*". We approached this question through a combination of the theories of human action, policy instruments and measures, a literature review, interviews with three municipal waste companies, and a survey of the inhabitants of the Follo region. Here, we found that implementing a pick-up service for used textiles may be the best course of action for Follo Ren, to capture a larger share of used textiles for reuse and recycling. To ensure compliance and make this system easy for the inhabitants to use and understand, Follo Ren should use informational policy instruments to promote the different solutions, explain how to sort, explain where the textiles end up as they move downstream, etc.

Future research could further explore how upcoming legal frameworks, such as an EPR on textiles and the ecodesign directive, will impact the rights and responsibilities of textile producers as they are finding their place among the established actors managing the textiles at the end of their life cycles. As they are currently in the early stages of being formulated, future research can delve into the practical implications of these once they are closer to being implemented. Future research could also delve deeper into the motivations of the demographic groups that tend to not separately sort their used textiles, as this could potentially give even better insight into how to best change sorting behaviour.

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10. Appendix

10.1 Interview guide for expert interviews

What are the major challenges for actors that manage used textiles in Norway today and what solutions can be introduced or improved upon to address these challenges and make used textile management more circular and sustainable?

1. Can you explain how your employer and yourself, in your position, work with used textiles?

2. What do you consider to be the greatest challenges for managing used textiles today?

3. What possible solutions and/or measures in the management process do you believe have the greatest potential to make the management more circular?

4. What distribution of responsibility between producers, the waste industry, and other actors do you consider to be necessary for Norway to meet EU demands of municipal, separate collection of textiles and Norway's goal of managing used textiles in a circular fashion?

5. What are your views on the role of material recycling in the management of used textiles?

6. Before we finish, do you have any final thoughts you want to add?

10.2 Interview guide for the waste companies

1. What role do you have in _?

2. What solutions do you offer for used textiles?

3. How long have you offered pick-up of textiles?

4. How does this service work, what activities are done?

5. How do you inhabitants receive the bag (if you offer bags)?
   a. Do the inhabitants order the bag?
   b. Where are they collected/distributed?
   c. Do you distribute the bags yourselves or through other services?
   d. Do you have a location for inhabitants to get the bags?

6. Where are the (filled) bags placed?
   a. Next to the bin?
   b. Are they attached to the bin?

7. Do you inhabitants have to pay for this service?

8. Do you have any numbers on what this service costs you annually?

9. What response has your inhabitants had to this service, is it being used, are they satisfied?

10. Do you know what fraction of the used textiles end up in the residual waste compared to what is being collected through donation?

11. Do you know what fraction of the donated textiles are collected through the different solutions, i.e. share collected through bring-banks vs. share collected through pick-

up?

12. Do you consider the pick-up solution to be a success in your municipality/municipalities?

13. *If yes*, what element(s) of the solution do you think are the most responsible for the success?

14. *If no*, what do you think are the main cause(s) for its failure?

10.3 Survey

1. **Age**

2. **Gender**
    a. Man
    b. Woman
    c. Other gender identity
    d. Do not wish to say

3. **Municipality**
    a. Nordre Follo
    b. Frogn
    c. Nesodden
    d. Ås
    e. Other municipality → End survey

4. **What is your employment status?**
    a. Work full time
    b. Work part time
    c. Student
    d. Retired
    e. Jobseeker
    f. Other social security
    g. Other

5. **What is your highest completed education?**
    a. Primary school
    b. High school
    c. Vocational school
    d. University, 1-4 years (e.g. a bachelor's degree)
    e. University, 5 years or more (e.g. a master's degree or PhD)

     f.   Other

6. **Housing**
   a. Detached housing
   b. Terraced housing
   c. Apartment
   d. Other

7. How many people make up your household?
   a) Total: _____1-10
   b) How many of these are under 18 years old: ____0-10

Textile waste and habits

1. **How often do you get rid of textiles (clothing, shoes, accessories, household items such as curtains, bedding, etc.)?**
   a. Approximately once a month or more often
   b. Approximately once every 3rd month
   c. Approximately once every 6 months
   d. Once a year or rarer
   e. Not relevant / do not do this

2. **How do you usually dispose of textiles? Multiple answers possible.**
   a. In textile containers from UFF/Red Cross
   b. Let others inherit the clothes
   c. In residual waste
   d. Give to flea markets or second-hand shops
   e. Sell at second-hand markets or online
   f. Other (open)

3. **Which of these schemes would contribute to you donating more of your textile waste for reuse? One answer possible**
   a. Separate bag for textiles from waste company Follo Ren that is picked up from your home
   b. More textile containers nearby

    c.   Other solutions, write:

    d.   Nothing, I am satisfied with the current system

4. How satisfied are you with the information you get from Follo Ren about...

    a.   ... reuse of textiles

    b.   ... where and how textiles can be donated for reuse

    c.   ... the benefits of donating textiles for reuse compared to disposing them with the residual waste

    d.   ... what happens to the textiles after they are donated for reuse

        A. Very satisfied

        B. Satisfied

        C. Neutral

        D. Unsatisfied

        E. Very unsatisfied

        F. Do not know

5. How would you like to receive information about donating textiles? Multiple answers possible.

    a) On SMS

    b) In the Follo Ren app

    c) On the textile containers

    d) Information letters in the mail

    e) Other

    f) I do not wish to receive information about this

10.4 Consent form

Vil du delta i forskningsprosjektet

"Textile waste in the circular economy"?

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å undersøke drivere og barrierer for å gjøre norsk tekstilavfallsforvaltning mer sirkulær og bærekraftig. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg. Forskningsprosjektet er en del av en mastergrad.

Formål

I dag går omtrent 50% av alle brukte tekstiler i landet i restavfallet. Norge har høye ambisjoner om å skape en sirkulær økonomi. I tillegg er Norge pålagt å ha et system for tekstilinnsamling i kommunal regi på plass innen 2025. Dette eksisterer ikke i dag, og formålet med dette forskningsprosjektet er å snakke med ulike representanter innen tekstilavfallsforvaltning i Norge og få innsyn i hva som står i veien for å utvikle mer sirkulære og bærekraftige løsninger for hvordan vi håndterer tekstilavfall i dag. I samarbeid med renovasjonsselskapet Follo Ren IKS vil denne datainnsamlingen kunne informere hvordan selskapet kan utvikle et system som håndterer lokalt tekstilavfall i tråd med nasjonale mål om økt sirkularitet.

Hvem er ansvarlig for forskningsprosjektet?

Norges miljø- og biovitenskapelige universitet, NMBU, er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?

Du er kontaktet for å stille til et dybdeintervju fordi din stilling og arbeidsgiver er en relevant aktør innen tekstilavfallsforvaltning. Vi ønsker å få et bredt spekter av de ulike utfordringene og mulige løsningene som kan bidra til å gjøre fremtidens systemer mer sirkulære og bærekraftige.

Hva innebærer det for deg å delta?

Du vil bli invitert til et personlig intervju, på ca. 30 minutter. Det vil være et semi-strukturert intervju, som kan gjennomføres digitalt eller på et avtalt møtested. Jeg tar lydopptak og notater fra intervjuet. Jeg vil be om noen opplysninger om deg, slik som arbeidsplass og stilling.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

Stilling og arbeidsgiver vil bli publisert i oppgaven, og navnet ditt kan bli publisert i oppgaven etter avtale.

Dataene fra intervjuet vil lagres lokalt på PC med passordbeskyttelse. Det er kun jeg (Hanna) og min veileder som vil ha tilgang til dataene dine.

Hva skjer med personopplysningene dine når forskningsprosjektet avsluttes?

Prosjektet vil etter planen avsluttes 15. mai. Etter prosjektslutt vil datamaterialet med dine personopplysninger anonymiseres og lydopptak slettes.

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra NMBU har Sikt – Kunnskapssektorens tjenesteleverandør vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke opplysninger vi behandler om deg, og å få utlevert en kopi av opplysningene
- å få rettet opplysninger om deg som er feil eller misvisende
- å få slettet personopplysninger om deg
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger

Hvis du har spørsmål til studien, eller ønsker å vite mer om eller benytte deg av dine rettigheter, ta kontakt med:

- · Masterstudent Hanna Gustad Gjendem 41347034/ hanna.gustad.gjendem@nmbu.no
- · Veileder ved NMBU Pål Vedeld: 90975257/ pal.vedeld@nmbu.no
- · NMBU personvernombud Hanne Pernille Gulbrandsen: 402 81 555/ personvernombud@nmbu.no

Hvis du har spørsmål knyttet til vurderingen som er gjort av personverntjenestene fra Sikt, kan du ta kontakt via:

- · Epost: personverntjenester@sikt.no eller telefon: 73 98 40 40.

Med vennlig hilsen,

Hanna Gustad Gjendem   Pål Vedeld

Student   *Veileder*

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet *Tekstilavfall i en sirkulær økonomi*, og har fått anledning til å stille spørsmål. Jeg samtykker til:

¨ å delta i personlig intervju

¨ at opplysninger om meg publiseres slik at jeg kan gjenkjennes, slik som stilling og arbeidsgiver

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

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(Signert av prosjektdeltaker, dato)