



Master's degree thesis

LOG950 Logistics

The collection of waste from the sea and coastal areas: How could the owners of fishing vessels contribute? A case study of the Fishing for Litter scheme in Norway

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Number of pages including this page: 181

Molde, 27.05.2022



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Preface

This master thesis has been a part of the logistic master's program at Molde University College, with a specialization in supply chain management. We started the thesis at the end of December 2021 and finished by the end of May 2022.

Our supervisor through this intense period was Professor Harald Martin Hjelle, which always was prepared to guide and supervise us when needed. He gave us a better understanding of relevant concepts and knowledgeable insights into the theory we have applied. We would like to gratitude him for the supervision and all the advice he gave us.

We would also like to thank all the participating vessels, ports, and the renovation companies who assign their valuable time to us and participated in our interviews. They have shared valuable information and answered questions that were needed to conduct this thesis. We are grateful for the dedication they have shown us and appreciate their cooperation. We would additionally like to thank Salt Lofoten A/S which provided us with valuable information about the Fishing for Litter project which we have applied in our thesis.

Finally, we would like to thank our families and friends who have shown patience and understanding through this 6-month period. We are thankful for the small motivational speeches and the general support.

Molde, May 2022.

Christine Øvereng Hals &
Jaroslav Heggdal

Abstract

Marine waste has become a global problem over the years where human activities are considered the main source of pollutants, where microplastics and other materials floating in the ocean may cause damage to humans and animals. Regulations and international agreements have been made and implemented globally, internationally, and nationally to tackle the increasing problem of marine waste. In Norway the concern for marine waste is present, where the government has taken steps to contribute to the reduction of pollutants in the sea by involving the main stakeholders and the fishing industry. The Fishing for Litter project was implemented to involve fishermen and the fishing industry to contribute the reduction of marine waste by delivering waste caught at sea at ports.

The purpose of this study is to uncover the motivations, drivers, and barriers the actors in the Fishing for Litter value chain are experiencing. By assessing the drivers and barriers in 11 value chains of the Fishing for Litter project, we have uncovered several drivers and barriers where our findings show that there is a high degree of sustainability focus and an awareness regarding marine waste among the actors. Further, we have uncovered barriers that are present among the actors such as the lack of port facilities and lack of advertisement and information.

We have assessed the future prospect of the Fishing for Litter project in regard to infrastructure, finances, regulations, and management where we found that increased economic support, advertisement, communication, and experience sharing are some of the factors among the participants that may be considered to be crucial to the future of the FFL project. Further, we have compared the Fishing for Litter project with the suggested port fee where we have identified the strengths, weaknesses, opportunities, and threats.

Keywords: Fishing for Litter, marine waste, regulations, reverse logistics, Circular Economy, green logistics, closed loop.

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List of abbreviations

CE- Circular Economy

CSR- Corporate Social Responsibility

EEA- European Economic Area

EFTA- European Free Trade Association

EU- European Union

FAO- Food and Agriculture organization

FFL- Fishing for Litter

GL- Green Logistics

IMO- International Maritime Organization

ISO- International Organization for Standardization

KIMO- Kommunernes International Miljøorganisasjon

MARPOL- International Convention For The Prevention of Pollution From Ships.

MPEC- Marine Environment Protection Committee

OSPAR- Oslo/Paris Convention

RL- Reversed Logistics

RQ- Research Question

SWOT- Strength, weaknesses, opportunities, and threats

UK- United Kingdom

UN- United Nation

1.0 Introduction

One of the concerns on a global scale is the increasing levels of marine litter where about 8-10 million tons end up in the oceans on a yearly basis, and it is estimated that 150 million tons already have ended up in the oceans (Regjeringen, 2021; European Commission, 2022). Human activities are the primary sources of marine litter, whereas the most significant source of marine debris stems from land-based activities such as fishing activities, shipbreaking yards, and waste disposal sites located close to the ocean. Waste can also end up in the sea due to the climate, such as storms or floods. Another central source of marine litter is fishing activities, either private or industrial where lost or discarded fishing gear ends up in the ocean. The lack of infrastructure, laws and enforcement, waste management practices, lack of awareness, and limited financial sources can also be significant sources of marine litter (UN environment programme (a)). It is estimated that around 10 percent of marine litter stems from discarded fishing gear that can trap fish for years known as ghost fishing. Marine litter causes damage to wildlife where animals such as birds and fish are being killed due to them swallowing marine litter (European Environment Agency, 2013). The degrading process of plastic is known to be slow compared to other materials such as wood, where the degrading process can take up to hundreds of years, and 450 years in the ocean. Due to harsh weather, plastic in the ocean can be fragmented into small pieces, known as microplastic. Microplastics are dangerous to both animal and human life since they can be ingested by animals and move up the food chain to humans (Miljøstatus, 2022; UN environment programme(a)).

Marine litter in Norway

The concern for marine waste and its consequences is also present in Norway. Most of the waste that ends up on shore along the Norwegian coast stems from Norway itself where one of the main sources of litter in form of plastic in Norway is the consumers and the fishing industry. Other sources of marine littering in Norway stems from sources such as agriculture and construction. Marine waste is also brought through the ocean currents. This results in waste being transported from areas such as the North Sea and the Baltic Sea, but also from other northern European countries. In 2020, an analysis of the waste and its place of origin was conducted at 50 Norwegian beaches. Through the analysis, they were

able to identify the place of origin of 5 percent of the waste where it was also concluded that 77 percent of the waste stemmed from Norway itself (Miljøstatus; Regjeringen, 2021).

The Sustainable Development goals

In 2015, the members of the United Nations (UN) adopted the Sustainable Development Goals containing 17 goals consisting of a unified plan for accomplishing peace and prosperity on earth by 2030. The sustainability goals aim at eliminating poverty, increasing equality and education among people, tackling climate change, and preserving the oceans and nature (United Nations).



Figure 1: The Sustainable Development Goals (Source: Regjeringen, 2016).

Norway considers the Sustainable Development Goals as an important contribution that all countries and other stakeholders need to follow and contribute towards. Norway aims at cooperating with other countries both nationally and internationally. The Norwegian government itself has taken important measures to align and integrate the Sustainable Development Goals as a part of Norwegian politics and budget. Norway is one of the countries that have reached the highest degree of implementation concerning the Sustainable Development Goals but there are still challenges Norway is facing to fulfil these goals where challenges such as ensuring sustainable infrastructure and reducing the amount of generated waste have been identified (Regjeringen, 2016).

IMO and marine litter

Responsible for the improvement of safety and security and the prevention of pollution from ships internationally is the International Maritime Organization known as IMO. IMO is a body within the UN that was ratified in 1948 and consists of 175 Member States (IMOa).

To tackle the increasing problem of marine littering, IMO adopted, in 2018 at the Marine Environment Protection Committee (MEPC) 73 meeting, an action plan that was designed to address the problem of marine littering from ships. Through the Action Plan, IMO aims at identifying and adopting measures to address and undertake efforts and identify outcomes towards the issue of marine littering from ships. The Action Plan is to be completed by 2025, aligning with the time frame of the Sustainable Development Goal 14 adopted by the 193 member countries of the UN in 2015 (IMO MEPC 73, 2018; IMO b; IMO c).

In 2021 at the MEPC meeting, as a result of the adopted Action Plan in 2018, the Strategy was developed on how to address marine littering from ships. The Strategy aims at reducing the plastic waste produced from ships, increasing public awareness and training towards marine littering, reinforcing cooperation between countries internationally, and improving the efficiency of port receiving facilities. Under regulation 8 in MARPOL Annex V, member countries are obligated to ensure sufficient port receiving facilities where ships and vessels can deliver fishing equipment and plastic waste at convenient locations (IMO b).

Norway is one of the participants of the GoLitter Partnership. The GoLitter Partnership is a project that aims to reduce marine litter by supporting Developing and Least Developed countries, Islands, and the Developing States. The partnership's ambition is to support developing countries to identify new ways to reduce marine waste within the fishing industry and maritime transport. Through the GoLitter project, Norway is in partnership with IMO and Food and Agriculture Organization of the United Nations (FAO) where Norway contributed 40 million NOK towards the realization and implementation of the project (IMO d; Norway in the United States).

Regulations globally concerning marine waste

Norway is bounded by several international laws, conventions, and agreements such as the London Convention, Law of the Sea, Basel Convention, and MARPOL that aspires to contribute to the reduction of waste and pollution in the ocean. In 2017, the members of

the United Nations Environment Assembly agreed on putting in place measures where the ambition is to reduce and prevent the amount of waste entering the ocean (Hold Norge Rent(b))

One of the first international conventions that aspired to protect the ocean and the marine environment against the human activity such as pollution and dumping of waste at sea, was the London Convention. The Convention entered into force for the first time in 1975 and has later been modernized. In 1996, the London Protocol was replaced by an updated version that made all dumping of waste in the ocean illegal, except for some exceptions (IMOe).

In 1982 at the United Nations Convention, a law that aims to regulate the resources and the use of the world's ocean was adopted, known as the Law of the Sea (IMOf). The convention is considered the "Constitution for the Oceans" and consists of IX Annexes and 320 Articles. Even though the Convention was adopted in 1982, it did not come into force until 1994 when 60 parties agreed on how it was to be implemented (Freestone, 2013). In Norway, the Law of the Sea was ratified in 1996 and it is considered one of the most important international agreements concerning the ocean (FN-Sambandet, 2020).

In 1973, The International Convention of the Prevention of Pollution from Ships, known as MARPOL, was adopted. The objective of the convention is to prevent and reduce pollution from ships, whereas Annex V is concerned with the pollution of waste from ships (IMOg). Annex V applies to all ships where the aim is to reduce and eliminate the amount of waste from ships going into the ocean. The Annex also regulates what types of waste can be discarded into the ocean and Governments are obligated through Annex V to ensure proper facilities for waste disposal at ports and terminals. It is optional for states and countries to adopt and implement Annex V, but today the Annex is signed by 150 countries (IMOh)

Norway is also a part of the Basel Convention. The Basel Convention was adopted in 1989 where 175 Parties signed and agreed, but it did not come into force until 1992. The Basel Convention regulates the movement of hazardous waste and for the waste to be disposed of in an environmental manner and handled accordingly (UN environment program (b)).

Regional regulations on marine litter

As a member of the European Economic Area (EEA)- agreement, there are several European Union directives that apply to Norway such as the Single-Use Plastic Directive which regulates the use of single-use products and fishing equipment containing plastic, and the EU Waste Framework Directive which aspires to reduce littering and increase the level of recycling (Hold Norge Rent(b)).

One of the most important regional agreements that aim to protect the marine environment is OSPAR convention, known as Oslo/Paris Convention. OSPAR is a legally binding agreement that entered into force in 1998. The Convention consists of several Annexes that aspire to prevent and eliminate pollution from discarded waste, offshore and land-based sources, and protection and evaluation of the marine ecosystem in the North-East Atlantic (OSPAR Commission(a); Miljødirektoratet,2020). As a result of the North-east Atlantic Environment Strategy and its obligation to develop measures where the objective is to reduce the amount of waste entering the ecosystems and ocean, OSAPR developed a Regional Action Plan containing several measures where the implementation of Fishing for Litter (FFL) project was one of them (OSPAR Commission(b); OSPAR Commission(c)).

Regulations nationally

In Norway littering is considered illegal and there are currently two laws that mention the restrictions concerning waste and littering: The Pollution Control Act and The Biodiversity Act. The Pollution Control Act came into force in 1983 and it aims to avoid pollution from taking place and to limit the consequences when the damage is already done. It also intends to conserve and protect the environment from pollution and encourage sufficient waste management practices (Forurensningsloven, § 1, 1981; Hold Norge Rent(c)).

The Biodiversity Act came into force for the first time in 2009 and it aims to conserve and protect nature and the ecological processes taking place through sustainable use. The law applies to everyone that can affect nature or make decisions that can have consequences for the environment, and it regulates all the Norwegian territory (Naturmangfoldloven, § 1, 2009; Hold Norge Rent(c)).

Fishing for Litter

In 2004, the FFL project was established as a measure to tackle the growing problem of marine waste. The project was initiated eighteen years ago by KIMO International as a test project which now has expanded to other European countries such as Ireland, Belgium, and Italy (Fishing for Litter (a); KIMOa). KIMO International was founded in Denmark in 1990 which today consists of local governments where the goal is to protect the sea and coastal aeries from pollution (KIMOb). KIMO consists of five international networks and independent members where the network is located in Sweden, the Netherlands, Norway, Denmark, Belgium, and the United Kingdom, and independent members in Germany, Lithuania, and Faroe Island (KIMOc).

The project began in the Netherlands, and it aspires to involve the fishing industry as the main stakeholder. Participating is voluntary, and free of charge where fishermen can deliver waste for free. The participating fishermen are provided with big bags by KIMO where the collected marine waste is placed in the big bags by the fishermen and then delivered to the port. The waste is retrieved during their fishing activities, where the costs connected to the collection and disposal of the waste is covered by the project (Borgersen, 2022; KIMOa).

The project is described as simple and effective that aims to raise awareness concerning the problem of marine litter and its impact. Further, the project's intents to change the behaviour among fishermen regarding how they handle waste (KIMOa; Borgersen, 2022; Fishing for Litter(a)). Today, the FFL project is receiving support from several international organizations that aim to preserve and protect the environment such as OSPAR and the European Commission, where the members of OSPAR are encouraged to implement and adopt the FFL program to tackle marine litter (Fishing for Litter(a); Fishing for Litter(b)).

Fishing for Litter in Norway

The FFL project has also been adopted in Norway. It was established as a test project in 2016-2017 where initially there where three ports and twenty vessels were participating. Today the number of participants has increased and there are currently 11 ports and 102 vessels participating in the project. The FFL project is operated by SALT Lofoten AS and has been since 2016, where SALT Lofoten AS is cooperating with local waste

management companies and Nofir concerning the recycling and treatment of marine waste. SALT Lofoten AS is managing the scheme on behalf of the Norwegian Environmental Agency that also funds the project. In 2021, 2,7 million NOK was granted for the FFL project by the Norwegian Environmental Agency for the recycling of marine waste, operation of receiving facilities, and obtainment of knowledge (Fishing for Litter(c); SALT; SALT, Unpublished report, 2022).

The amount of retrieved waste

Since 2016, 734-ton marine waste has been retrieved and removed from the Norwegian ocean through the FFL project where 182 ton was retrieved in 2021, and 62 ton was recycled through Nofir. In addition to the 182 ton, there are sack racks located in some ports where the amount of waste and number of deliveries are unregistered (Fishing for Litter(c); SALT, Unpublished report, 2022). The participating ports are spread along the Norwegian coast from Egersund in the south to Båtsfjord in the north. The amount of waste varies from port to port. As shown in the figure below, Tromsø and Ålesund are the receiving ports with the biggest activity when it comes to waste deliveries. In Tromsø and Stamsund there was an increase in delivered waste in 2021, but there was also a decline in some of the other ports. There was also a decline in the number of deliveries to a total of 134 as opposed to 208 in 2020. According to SALT (Unpublished report, 2022), there can be several factors causing this such as the fluctuation in fishing activities, the project has led to as positive change so there is less waste to be retrieved in some areas, and the uncertainty of the future of the project since it has been suggested to replace to project with a port fee (Martinussen, 2022).

Fartøy per havn	Tromsø	Ålesund	Egersund	Karmøy	Hvaler	Måløy	Båtsfjord	Austevoll	Stamsund	Myre	Havøysund
Antall leveranser per havn	83	25	2	8 ¹	N/A	Ikke levert	12	0	3	1 ²	N/A
Kvantum 2020 (kg)	59580	98300	11910	5300	N/A	19380	5660	0	928	7460	N/A
Kvantum 2021 (kg)	76880	64380	7520	N/A	N/A	10220	N/A	0	1020	21730	N/A

Figure 2: Waste volumes and deliveries by port (Source: SALT, Unpublished report, 2022).

The suggested port fee

On the 17th of April 2019, the Norwegian government accepted the new imposed EU waste regulation (EU 2019/883) which aims to protect the marine environment by facilitating accessibility and the use of waste receiving facilities for ships at port. A brief time later, the Norwegian Environmental Agency and the Norwegian Maritime Directorate proposed changes to the existing pollution control regulative chapter 20. These changes included more strict policies regarding the reporting systems for vessels and more strict policies towards waste receipt at ports. This was summarized in a consultation note, where they considered the impacts on the fishing vessels, the ports, and the government (Miljødirektoratet & Sjøfartsdirektoratet, 2021).

The new regulation aims to replace the FFL scheme with a general port fee, since the FFL project has estimated a great increase in administrative cost if continued. The new proposed port fee should not result in a significant increase in cost for the participants, and rather give a better overview of the cost associated with waste delivery. The new proposed port fee is expected to contribute to more reuse of materials, recycling, and reduction in resource consumption. It is expected that the new regulation would stimulate to implement CE (Miljødirektoratet & Sjøfartsdirektoratet, 2021).

The ports may experience some increase in their administrative cost because they are likely to become more involved in the administration processes. Processes such as the establishment of sorting facilities at the port, distributing the necessary information, and handle waste receipts. The ports which have the necessary facilities for proper waste management are likely not to experience any mentionable cost increase but the ports which does not have such facilities available, may have to invest in new equipment to adopt to the new regulation. The cost of adapting to the new regulation has not been estimated in the consultation note, since the different ports may have different investment needs based on the size of vessels and the activity in the area. The daily operations and the establishment of waste receipt facilities are expected to be covered through the port fee, and the ports should not experience any cost increase (Miljødirektoratet & Sjøfartsdirektoratet, 2021).

The suggested port fee should not result any major cost increase for the vessels since they are already under strict international and national regulation regarding waste management.

Most of the vessels have already implemented procedures for waste handling and have the necessary equipment onboard. The vessels are expected to have an annual cost between 1000 and 1400 NOK, if this port fee would be implemented (Miljødirektoratet & Sjøfartsdirektoratet, 2021).

The new suggested policy is likely to increase the need for more resources used by the government and it would likely increase their cost. Processes such as reporting, inspections, and transition to new digital systems can be some of the reasons. The new policy aims to improve the governmental access to valuable information, which could contribute to plan and execute specific inspections in ports and vessels. It is also expected that this would make the inspection and reporting system more transparent and increased information sharing between the actors. It is expected that the transition cost would increase the first period after the implementation process, because of various uncertainty factors, such as the choice of register system (Miljødirektoratet & Sjøfartsdirektoratet, 2021).

1.1 Problem statement

In literature, scholars have taken a closer look at the FFL project and evaluated several aspects of the scheme. In the UK, Wyles et.al (2019) took a closer look at the attitude, behavior, barriers, and opportunities among the participating fishers and stakeholders and non-participating fishers regarding the FFL project. In Adriatic- Ionian microregion, where several countries have implemented the FFL project, Ronchi et.al (2019) evaluated the strength, weaknesses, opportunities, and threats of the project by applying SWOT analysis.

The purpose of this thesis is to uncover the drivers and barriers the participating members of the value chain of the FFL project in Norway are facing. Further, we will take a closer look at the future opportunities for the FFL project and compare the scheme to the new suggested port fee. Based on this, our problem statements state as follows:

“What motivates and what challenges are the participating members of the FFL project in Norway facing in the value chain, and what alternative scheme can be implemented as an alternative to the FFL?”

1.2 Research questions

To answer our problem statement and to help us conduct our analysis we apply the following research questions:

- 1. What is the motivation and drivers for the actors in the FFL value chain and what barriers are they facing?*
- 2: What is the future prospect for the FFL project in regard to infrastructure, regulations, finances, and management?*
- 3. Which are the strengths, weaknesses, opportunities, and threats related to alternative return logistics systems for marine litter compared to the FFL-scheme?*

1.3 Structure of thesis

This thesis starts with an introductory chapter consisting of an overview of the current state of marine litter, regulations globally, regionally, and nationally in Norway. Further, we introduce the FFL project both internationally and in Norway, the new suggested port fee, our problem statement, and the applied research questions.

Chapter two consists of relevant theories which would be applied on our analysis. The theory chapter aim to build the foundation for the reasoning behind the analysis and connect the results to theory before making the conclusion.

Chapter three consist of the methodology applied in this thesis. It presents an overview of the research design we have used to conduct our case study, data collection method and ethical principles which we have considered.

Chapter four will present an overview of the value chains of the FFL project that we have analyzed to get a better understanding of the different processes taking place.

In chapter five we will discuss our findings based on the conducted interviews and compare them with the relevant theory before we present a conclusion of our findings.

2.0 Relevant theories

Since our case involves the marine industry and product return, we have chosen what we believe are the most central theories. We have chosen to apply closed-loop supply chain, green logistics and Circular Economy (CE) theory based on its relevance to reverse logistics (RL) based on the nature of our object of study. Corporate social responsibility (CSR), CE and green logistics focus on sustainable development, which are relevant topics in this case study that we believe will contribute to answer our research questions with accuracy and to the point.

2.1 Circular Economy

The concept of CE has received a great amount of attention worldwide in the last decades, and the concept has developed over the years. CE can be considered as an economy that aims to reuse and improve the life of products through repair, remanufacturing, upgrades and retrofits where the goal is to recycle old products and turn them in to raw materials that can be used to create new goods (Rizos et. al, 2017; Stahel, 2016). The CE concept may share similarities with RL, since they may have similar options for returned products.

The CE concept is expected to promote economic growth and generate new business opportunities for individuals while reducing material costs, dampening price volatility, and reducing environmental impact (Kalmykova et. al, 2018). The transition from a linear economy to a CE has been perceived among organizations and governments as the solution to economic growth and environmental sustainability. However, the linear economy has been well implemented into our societies since the industrial revolution. It is believed that the transition to the CE may require a great number of changes in people's consumption patterns and production processes. It might also have a great impact on the economy, the environment, and society (Rizos et. al, 2017).

According to Rizos et.al (2017), the first formally used term for CE appeared in an economic model created by Perce et.al (1990). They analyzed the linear economic system and developed a new system which is known today as CE (Pearce et. al, 1990).

Pearce et.al (1990) emphasized that *"everything is an input to everything else"* in the new economic model. The model included three economical functions of the environment which was waste assimilator, resource supplier, and source of utility (Rizos et. al, 2017). However, since the definition of CE by Perce et.al (1990) was created, serval authors have defined the concept differently and emphasized the need to create a closed loop of material flow to reduce the consumption of virgin materials.

Sauve et. al (2016) described CE as followed: *"Production and consumption of goods through closed loop material flows that internalize environmental externalities linked to virgin resource extraction and the generation of waste, including pollution"* According to Rizos et. al, (2017), Sauve et. al (2016) emphasizes on the reduction of resource consumption, waste, and pollution in every cycle of a product.

Preston (2012) defined CE as *"Circular economy is an approach that would transform the function of resources in the economy. Waste from factories would become a valuable input to another process - and products could be repaired, reused or upgraded instead of thrown away"*. It seems like this author focuses on the reduction of resource consumption to use them as an input in other processes by reuse or upgrade.

The concept of Circular Economy

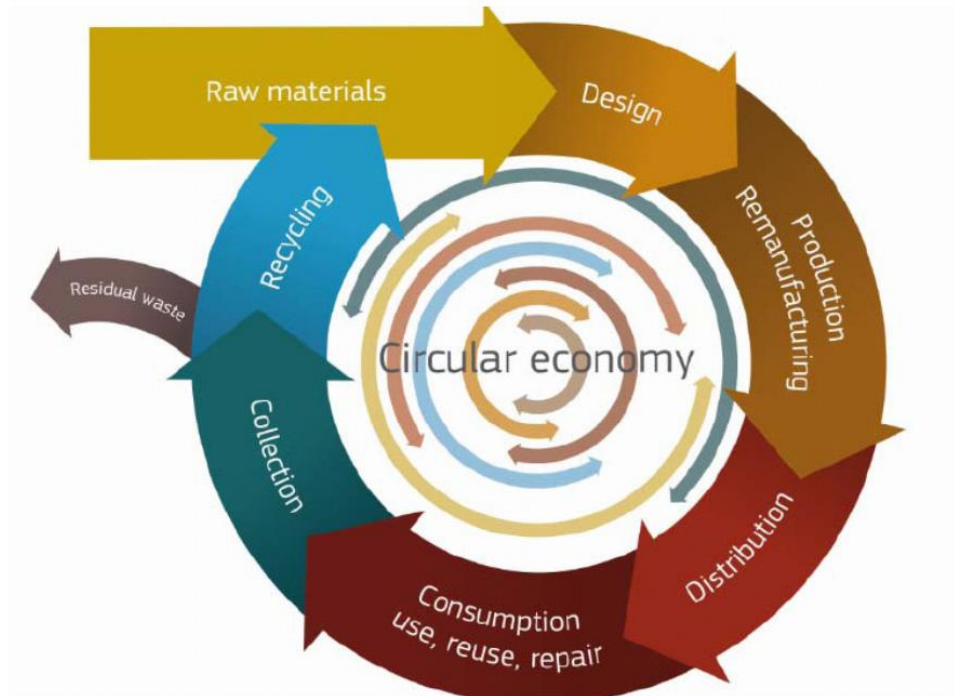


Figure 3: Model of Circular Economy (Source: Bonviu, 2014).

The concept of CE is that instead of acquiring materials for new products in the traditional linear way, the materials which is needed are extracted from obsolete products through recycling. This would minimize the need for raw materials where the existing materials on the market can be reused to close the CE-loop (Bonviu, 2014). By reusing existing materials for new products, the consumption may be reduced resulting in less waste generation and minimalizing the need for raw materials for new products, as illustrated in Figure 3.

Although the concept of CE may look appealing, there has been some criticism of the concept. In a study conducted by Kircherr et. al (2017) where they reviewed 114 articles on CE definitions, they argue that the concept might have been seen as too vague to be implemented, and the concept of CE is not clear due to how the stakeholder interpreter the concept.

Implementing Circular Economy

A study by Govindan & Hasanagic (2018), shows that there are several drivers to implement CE. Sometimes it's not easy to know why a business should incorporate circular CE, and the reasons may not be clear (Barros et. al, 2021). However, we have found some reasons for implementing the CE concept which will be described below.

Adopting CE principles as a part of the corporate strategy may enable companies to identify different sources of revenue. At the same time the firm may also reduce its operational cost through recycling and the reuse of products. When a product is recycled it may generate raw materials for new products and allow companies to save raw materials. This may result in cost savings for the firm by use existing materials and reduction of generated waste. CE can provide the necessary resources to integrate the concept with the existing management foundation. Circular supply chain management is about the setup of circularization functions within and across the organization to close, reduce, slow or narrow material and energy flows (Barros et. al, 2021).

Management of processes may affect how products are engendered to extend their product life, reduction of environmental impacts, or increase financial results. This may also facilitate better product and resource recovery for the facility. Implementing RL to CE may result in great benefits such as share transport mode, reduction in unnecessary transportation, an increased load factor, and sharing services with others (Barros et. al, 2021).

Service companies are in a strategic place between the manufacturers and the customers, and they might be an enabler of the CE. Product service systems may sell services and performance instead of products, which can help organizations to adopt CE and economic growth while decoupling from resource consumption (Kjaer et. al, 2019; Barros et. al, 2021).

Barriers for implementing Circular Economy

The involvement within CE may require various high up-front cost such as new machines, facilitate training for staff, relocation of facilities, and logistical solutions. This process can be time consuming and complex, therefore it may require a great amount of planning and clear strategies from the organization. The supply chains in CE can become complex since the production of products may involve several companies from all over the world. It may be important to ensure information and material flow through the supply chain, so companies consider the use of sustainable materials and features such as reparability as the core of their product strategy (Preston, 2012).

As a transition to CE may require changes to business processes, the cooperation between the firms may also be challenged. Renegotiating contracts about different terms and conditions, choice of business models, market knowledge and brand positioning. The consumers may not be able to understand the concepts of CE, and therefore not value the benefits it can give. It may be a challenge to pass the information and some product promotion may require a certification or labeling systems but there might be a lack of standardization of methodologies in various countries and an absence of recognized award certifications on resource efficiency. Regarding political barriers, the promotion of excessive use of resources should be removed, and the externalities should be incorporated into the price of energy and resources (Preston, 2012).

2.2 Closed-loop supply chain

Recently there has been an increase in environmental concern due to pollution, carbon emission, and toxic waste. Another reason is that the products are produced at a faster rate causing a reduction in available natural resources, and the lifecycle of products is reduced because of the advancement in technology. To be able to handle those challenges, many organizations have implemented a closed-loop supply chain as a part of their activities (Bhatia et. al, 2020). A closed-loop supply chain may help businesses to realize their goals within a CE and sustainability by reducing unnecessary resource input, waste emissions, and such (Peng et. al, 2020).

A traditional supply chain may be referred to as the forward supply chain that aims to fulfill the end-customer needs by a set of activities. The business entities involved is

typically manufacturers, transporters, warehouses, retailers, and end customers (Govindan et. al, 2015). The forward supply chain is responsible for the initial flow of material and parts, the movement of finished products to central warehouses, and distribution channels before reaching the end customer (Blumberg, 2005).

A traditional forward supply chain can be defined as followed; *“a group of firms, linked in the movement of products, services, finances, and information from raw material extraction to the distribution to a final customer”* (Braz et.al, 2018). Govindan and Soleimani (2017) state that the traditional supply chain does not facilitate any responsibility for end-of-life products. RL on the other hand, involves the activities of return of goods in the supply chain where a product is sent back from the end customer for further processing or disposal. By combining those two supply chains, you will get what is called a closed-loop supply chain. According to Kazemi et. al (2019), it is assumed that RL activities are the nucleus of a closed-loop supply chain. This integration of RL into the traditional forward supply chain accounts for the forward and the reverse flow of products. According to Govindan et, al (2017), the main objective of a closed-loop supply chain is to cover the customer’s demand and the value-added processes. The second objective is to collect the returned or the end-of-life products from the customers and determine the best decision for them. A common definition of a closed-loop supply chain is defined by Guide et. al, (2003): *“Supply chain that are designed to consider the process for returns of product, in addition to the traditional forward processes”*.

According to Guide & Wassenhove (2009) a closed-loop supply chain, can be described as: *“As the design, control, and operation of a system to maximize value creation over the entire life cycle of a product with dynamic recovery of value from different types and volumes of returns over time”*. The traditional supply chain aims to lower the cost, maximize economic benefits, and improve efficiency. While the closed-loop supply chain aims to maximize economic benefits, it also considers how to reduce the consumption of resources and energy. A closed-loop supply chain aims to reduce its pollutants and create a socially responsible business by balancing the environmental and economic effects (Kumar & Kumar, 2013).

Closed-loop supply chain model and explanations

In previous literature, Blumberg (2005) emphasizes that classifying RL and closed-loop supply chains are depended on various factors such as the characteristics of the sellers and the manufacturers, the buyers, the distribution channels being used, the use of third- or fourth-party logistics providers, the value of material in the process, and the degree of interest. Bloomberg presents four different models of RL and closed-loop supply chain where one of the models is separated from the traditional forward flow and is not categorized as a closed-loop. In the other three models, the reverse flow is integrated into the forward flow, which makes it a closed loop. However, there are several different models available in the literature which emphasize different criteria. Kadambala et. al, (2017) purposed an integer linear programming model that determines the optimal number of product flows at each step of the network. The model has some similarities to the basic model, which is shown below, but it is different when comparing it to our illustrated model. There might be several other examples of different closed-loop models available in the literature, and it's fair to believe that closed-loop models can be specified to various factors mentioned above and others.

To illustrate how a closed-loop supply chain may look like we have adapted a generic model which shows the forward supply chain and a variety of processes. In figure 4, it starts with the input of raw materials. Then the materials are processed and assembled before being distributed to the end customer. At the point of consumption, the return flow starts, where the product is collected and taken back for proper disposal or options such as repair, recondition, remanufacture, or recycling (Govindan & Soleimani, 2017).

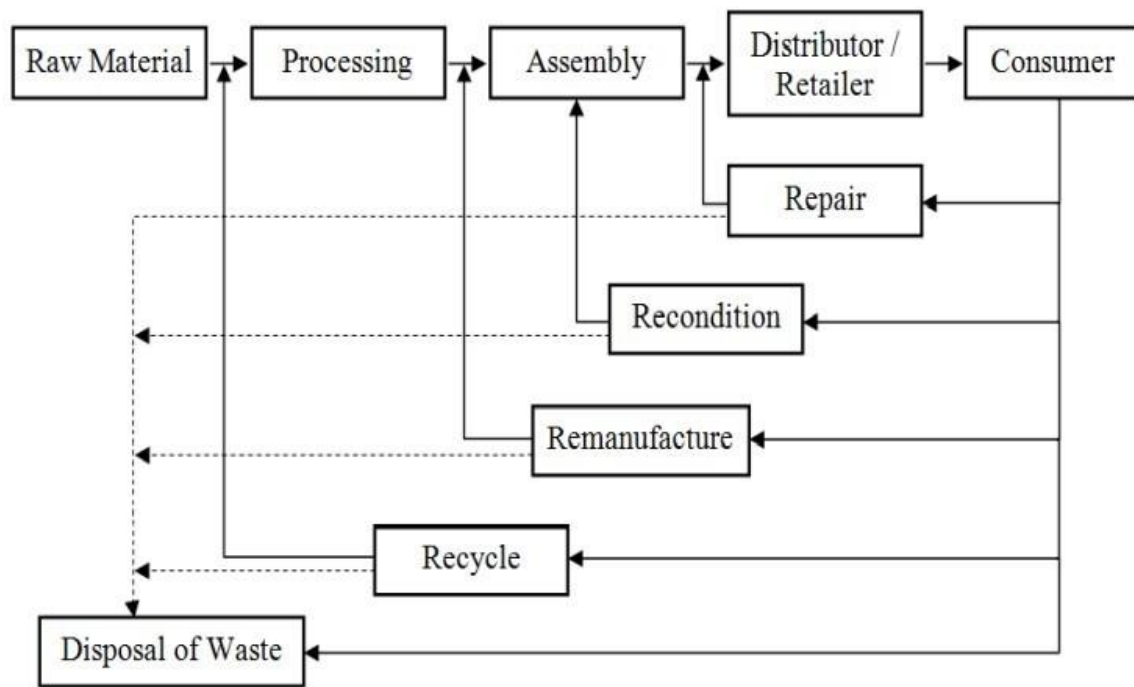


Figure 4: Product disposition options in Closed Loop supply chain processes (Source: Khor & Udin, 2012).

2.3 Green Logistics

The concern for the damaging effects from freight transport, became a topic in the 1950`s where the number of studies on this topic started to increase substantive towards the 1960`s. Since that time the concept green logistics have emerged. The concept has evolved for more than 40 years and according to McKinnon et. al, (2015), green logistics initially focused on the outbound movement of finish goods to its customers. Further, McKinnon et.al (2015) describes green logistics as the following:

" Reducing freight transport externalities, city logistics, reverse logistics, corporate environmental strategies toward logistics, and green supply chain management."

According to El- Berishy et. al, (2013), the logistics activities were mainly concerned with the economic aspect, which was to maximize its profit and minimalize the cost. Today green logistics considers factors such as transport storage, handling systems, and the interaction between the upstream and downstream supply chains. At the same time, environmental awareness has increased in parallel with the increasing number of

environmental regulations, and standards for environmental reporting and management systems (McKinnon et. al, 2015).

The aspects of Green Logistics

Green logistics have become a concept which balances the environmental, social, and economic aspect. It aims to minimize the harmful effects on the environment through its activities and improve the society and its economic level (El- Berishy et. al, 2013).

According to El -Berishy et. al, (2013) there has been pressure among organizations to meet new international standards which are arising, and the cost associated with those actions has likely increased. However, to meet those new standards, the three aspects mentioned may need to be balanced since they most likely will be affected by each other. Balancing these aspects can become a challenge since they may conflict with each other when meeting their standards. For example, if a society does not have an established economy, it may not be able to focus on the social or environmental aspect because it lacks the finance or such

Green Logistics, CE, and sustainable development

The dimensions within green logistics does have similar features with other concepts such as CE and sustainable development. The implementation of green logistics may contribute to the improvement of sustainable development (Kumar, 2015). According to Kumar, (2015), green logistics may help organizations to reduce several environmental issues such as climate change, pollution, and noise which may assist in the transition to sustainable development. Figure 5 shows the economic, social, and environmental aspects in green logistics, which have similar elements as other concepts such as sustainable development and CE (Kumar, 2015).

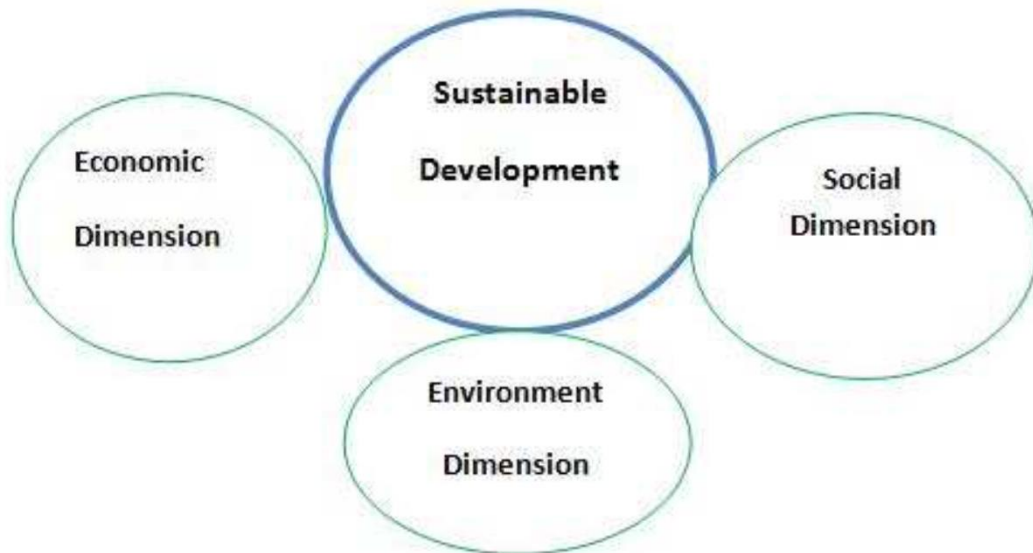


Figure 5: Sustainable development (Source: Kumar, 2015).

The concept of green logistics and reverse logistics

To clarify any confusion, it is important that we explain the difference between the two concepts RL and green logistics. Although they have some similarities, they are different. RL is concerned with the increase of value through resell, reuse, material recovery, recycle (Seroka - Stolka, 2014), where the goods must be returned by the end-costumer to take part in the RL value chain (Rajagopal et. al, 2015). While green logistics concerns how to reduce sources of waste and resource consumption (Seroka - Stolka, 2014), such as using material-friendly options for transportation, packaging reduction, and the concern of the environmental aspect (Rajagopal et. al, 2015).

COMPARISON OF REVERSE LOGISTICS AND GREEN LOGISTICS

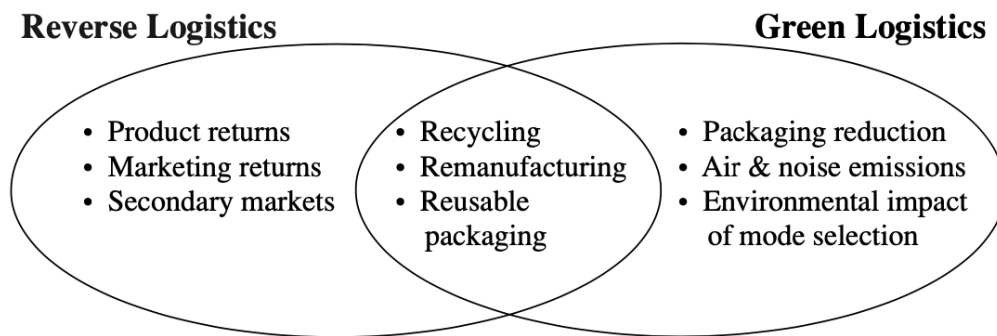


Figure 6: Comparison of reverse logistics and green logistics. (Rogers & Tibben - Lembke, 2001).

Reasons to implement Green Logistics

According to El-Berishy et. al, (2013) green logistics can be crucial for the development of a sustainable company. By balancing the environmental, economic, and social aspects, implementing green logistics may lead to sustainable organizations. According to Seroka - Stolka & Ocepia - Kubicka (2019), green logistics may be seen as a key element when shifting to CE because it shares some of the key elements to develop CE.

Through the concept of CE, which is mentioned earlier in this thesis, the firms can become more sustainable by closing the loop, which is shown in our model and using most of the resources within the circle. According to Seroka - Stolka & Ocepia - Kubicka (2019) green logistics may be seen as a key element when shifting to CE because it shares some of the similar key elements when developing CE.

Another reason to implement green logistics is that the concept may provide several benefits to organizations. McKinnon et. al, (2015) presented a table with an overview of different driving forces for implementing green logistics in their book. The reasons to implement green logistics could be that the concept could reduce cost and improve efficiency, and it may also improve the organization's green image, and its activities and ensure compliance with various regulations.

2.4 Corporate Social Responsibility

Over the years the attention towards Corporate Social Responsibility (CSR) has increased where corporations are implementing CSR as a tool to achieve competitive advantage but to also signalize that they are taking responsibility by operating responsibly socially (Zhang et. al, 2019). Issues connected to CSR such as environmental, economic, and social sustainability has increased where corporates are choosing to implement CSR as a part of their strategy since not doing so can damage their reputation and the brand itself. The concept of CSR is based on an ethical view where corporates take responsibility for the impact they have on society, and it can lead to more openness and transparency (Faisal, 2010).

In recent years, many companies have been forced to address CSR due to an increase in the development of an ethical focus on consumerism and pressure from stakeholders to be more environmental and socially sustainable (Asgary & Li, 2016; Wiengarten, Lo & Lam, 2017).

In Europa, a network consisting of 60 organizations as members has been established, known as CSR Europe. Its mission is to assist organizations to integrate CSR as a part of their operation, and in 2003 CSR Europe published a guide containing goals and strategies on how companies can implement CSR (Maon et. al, 2009).

In 1994, Elkington proposed a framework where companies could evaluate their environmental, social and economic impact, known as the Triple Bottom Line (TBL) (Tamvada, 2020). The idea surrounding the TBL, was originally introduced by the Brundtland Commission in 1987 and it builds on the foundation that companies are responsible for the three pillars of profit, planet, and people, known as the 3Ps, which again stands for the economic, environmental, and social responsibility. A company can be considered sustainable if it fulfils its responsibility concerning the three pillars (Książak & Fischbach, 2017).

To improve their environmental performance, it is encouraged that companies access the level of compliance with regulations and certifications (Muñoz-Villamizar et.al, 2018). The International Organization for Standardization (ISO) certifies companies that are operating sustainably. Through the ISO 26000:2010 corporations are provided with guidance on how to operate socially responsible on such as terms and concepts, trends, issues related to social responsibility, and how to implement, integrate socially responsible behavior at their organization (ISO, 2010).

Drivers for implementing Corporate Social Responsibility

In an article by Zhang et. al, (2019), where they took a closer look at practices for drivers, motivation, and barriers for implementing CSR at construction enterprises, they identified the three following main drivers for implementing CSR: Policy pressure, market pressure, and innovation- and technology. As mentioned, implementing CSR is based on the voluntariness of the company, but it also can be a requirement through regulations and policies put in place by the government. Governments put in place regulations and policies as measure to preserve the environment, employees, and the communities (Zhang et. al, 2019). Regulations can also clarify what obligations the companies have and lead to companies fulfilling them. Where moral and legal responsibilities have a weak foundation, regulations can contribute to companies fulfilling their obligations effectively (Tamvada, 2020).

Another driver for companies to implement CSR is due to market pressure from such as customers, stakeholders, shareholders, and other interests. For companies to be able to compete and survive in the market it is important to meet customer needs and their requirements. Many companies implement CSR to attract new customers or to meet their needs since CSR can be incorporated in contracts. Due to market pressure, many companies have also implemented code of ethics concerning working, environmental, and human rights as a part of their daily operations. Another factor for implementing CRS can be requirements from shareholders or business they are in joint venture with (Zhang et. al, 2019).

The third driver according to Zhang et. al, (2019) is innovation and technology. Many companies choose to participate in innovating developments or research as a part of their CSR practices that can contribute to preservation of the environment. This can lead to among other things, better efficiency in their operations and allow them to take part in developments that concern them. By participating in innovation and technology developments, it can reduce costs by using new methods, materials, and technologies to improve their operations.

The implementation of CSR could be considered a process where the goal is to align the company strategy with its environment and demands by identifying and managing the expectations of stakeholders. The implementation of CSR can be considered a time-consuming learning process that can change the sourcing environment for companies and

ensure that the implementation is beneficial to the company where it is important that the company fully understand stakeholders' expectations (Maon et.al, 2009).

2.5 The Value Chain

Hellin & Meijer (2006), describe the value chain as a chain where the product moves from one actor to the next, where the organization's success depends on its ability to manage the processes taking place effectively (Kumar & Rajeev, 2016)

In 1985, Michael E. Porter introduced the concept of the value chain. He described the value chain as a tool to analyse the activities that are taking place, how they interact with each other, and to identify sources that can lead to a competitive advantage for the firm. Further, he states that the firm can achieve a competitive advantage by dividing the activities that are taking place and understanding the cost drivers and potential opportunities. If doing so, the firm can make strategic decisions cheaper and better than its competition (Porter, 1985).

According to Porter (1985), the value chain can be divided into two main activities; primary and support activities where the primary contributes directly to the production of the product and delivery to the customer, while support activities are inputs that contribute to the creation of the products such as procurement, human resources, and technology as seen in Figure 7.

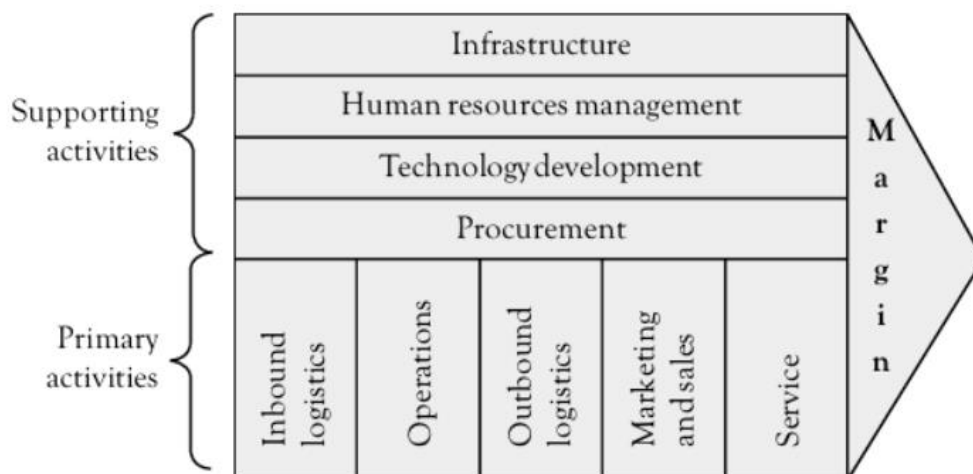


Figure 7: Michael Porter's value chain (Source: Presutti & Mawhinney, 2013).

Analyzing the value chain

Value chain analysis (VCA) has been used as a tool to examine and evaluate organizations since the concept of the value chain was introduced by Porter in 1985. The VCA has also been applied to explore the activities that take place within a firm globally, known as the “global value chain” (Zamora, 2016). Further, VCA can assist the firm in discovering future opportunities for improvement and uncover opportunities for reduction in activities creating waste. By conducting a VCA, the firm can explore the improvement of quality and service taking place in the VC (Fearne et. al, 2012; Taylor, 2005).

Hellin & Meijer (2006), states that a VCA can be applied by using qualitative or quantitative tools such as semi-structured interviews, focus groups, and questionnaires, where the first step is to outline the chain and the activities. de Souza & D’Agosto (2013) developed in their paper a method for conducting a VCA through 9 steps. The first step is to define the purpose of the value chain analysis and consider the extent of the study. To develop a model of the value chain, the second step is to identify the activities in the value chain and wherein the chain takes place by using the relevant informants participating in the RL chain, whereas the third step is to identify the main activities that create value for the firm, especially those affecting the costs. The fourth step de Souza & D’Agosto (2013) developed, is to identify the resources connected to the main activities that create value for the firm. The costs related to the activities are mapped and determined in step 5, and in step 6 the relationship between the firm and other organizations, and the activities taking place are mapped with the aim to save costs or differentiation.

In step 7, the drivers behind the costs drivers are mapped, and in step 8 the costs are assigned to their relevance of activity in the value chain. In the final step, which is step 9, the potential for cost reduction and differentiation of the product or service is evaluated

2.6 Reverse logistics

Reverse logistics vs. forward supply chain

To be able to understand RL and the processes taking place in an RL supply chain, it is necessary to understand the differences between an RL supply chain and a forward supply chain. Gupta (2013) lists several differences between RL and forward supply, where it is pointed out that the main driver for a forward supply chain is the maximization of profit and minimization of cost, whereas for RL the environment and the laws are the main drivers as

well as profit and cost minimization. Forecasting is relatively an uncomplicated and easy process within a forward supply chain, where it is for instance forecasted how many products or goods a firm can expect to sell. Within RL, it is relatively different. Since RL relies on product returns, forecasting tends to be more difficult since there is more uncertainty connected to product returns.

Forward supply chains are often characterized by products produced being shipped to several locations, the customer can change suppliers if the products don't arrive in time, and the products are often sealed in packages and been subjected to quality checks before sent to the customer. In the RL supply chain, the products are shipped from several locations to the producers or product recovery facility, the products are rarely sealed in packages and the collection of products is not time or customer sensitive. On the other hand, the products returned require more resources when it comes to sorting since parts might be missing or damaged. This can make it challenging to predict the expected time spent sorting and what parts might be reusable (Gupta, 2013).

In RL supply chains, information systems and inventory models are often not applied since such systems are rarely accessible or applicable due to uncertainty and often RL receives less attention from manufacturing companies than the forward supply chain since their revenue often stems from the product that is produced and sold contrary to the remanufacturing companies where RL is of high importance since their operation is to repair used products (Gupta, 2013).

Blumberg (2005) describes six factors that characterized an RL supply chain that the organization needs to manage if RL is to be economically sustainable. First, the organization needs to be aware and understand their customer base since the frequency of returns might vary depending on the customers, and secondly, they need to be aware of the uncertainty connected to the frequency of returns. Bloomberg also points out that the organization needs to develop efficient repair processes and make the products available for disposal or reuse quickly, and four maximize the value of the products returned. It is also important for the organization to be flexible due to the frequency of return, and last, cooperation through communication with stakeholders involved to make the processes efficient.

Defining reverse logistics

According to Stock (1998), RL can be defined as; *“from a business logistics perspective, the term refers to the role of logistics in product returns, source reduction, recycling, materials substitution, reuse of materials, waste disposal, and refurbishing, repair, and remanufacturing; from an engineering logistics perspective, it is referred to as reverse logistics management (RLM) and is a systematic business model that applies best logistics engineering and management methodologies across the enterprise in order to profitably close the loop on the supply chain”*. Stock’s definition mention two perspectives of RL which is business and engineering logistics. It is fair to believe that by comparing those two aspects, the author emphasises that the concept of RL is of importance to different departments within a business. And that the concept can be a contributor to closing the loop in a supply chain, which can be seen as the main goal of CE.

Carter & Ellram (1998) defined the concept as *“Reverse logistics is a process whereby companies can become more environmental efficient through recycling, reusing, and reducing the amount of materials used”*. Carter & Ellram’s definition emphasized facilitating recycling and reuse which would contribute to a decrease in needed materials in the forward material flow, which is from the manufacturer to the end customer. And as a result, that would contribute to fewer products being sent back in the reverse flow.

Rogers and Tibben-Lembke (1999) defined reverse logistics as *“The process of planning, implementing and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal”*. Rogers and Tibben-Lembke’s definition seems to highlight planning and controlling the flow of materials across the entire value chain to be great of importance. This would help to recapture the value of resources or assure proper disposal. Moreover, the author stated that the returned goods were sent back to the point of origin, and it’s reasonable to believe that element could have changed as the concept developed further.

Dekker et al, (2004) defined reverse logistics as *“The process of planning, implementing and controlling the efficient, effective inbound flow and storage of secondary goods and related information opposite to the traditional supply chain direction for the purpose of recovering value and proper disposal.”* Dekker’s definition is somehow similar to Rogers

and Tibben-Lembke definition. However, Dekker did not mention anything about the product being sent back to the point of origin. This shows that the concept of RL has developed over the years, whereas newer definitions do not emphasize that the returned product must be sent back to the point of origin.

Reverse logistics processes

To understand how value is recovered from RL processes, we need to understand how RL works in practice. Several authors, such as Dekker et. al, (2004) and Bonev (2012) have presented a model and described the RL process in the value chain. However, the models can be different regarding the disposition options for the RL process. We have adopted a closed loop model from Agrawal et. al, (2015) containing different steps which show the forward logistics, and the RL process. We would like to focus on the RL flow and the processes, which starts after the product is returned from the customer and goes back in the value chain in a set of activities.

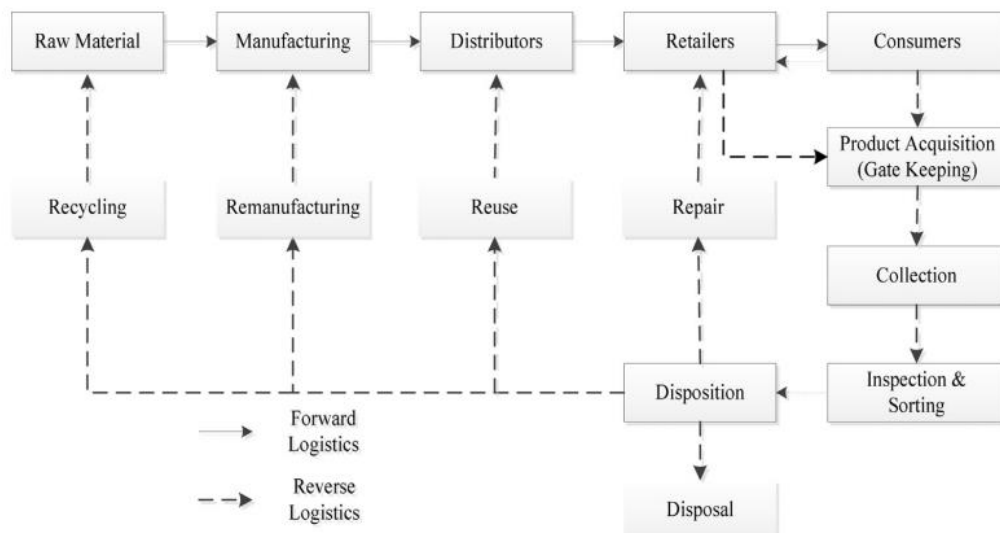


Figure 8: Closed-loop supply chain (Source: Agrawal et.al, 2015).

Product acquisition / gate keeping.

The first step identified by Agrawal et. al, (2015) is the product acquisitions also known as gatekeeping. This is where the product from the end customer enters the RL supply chain and is considered as a critical process for establishing a profitable reverse process. In this step the decision is made if the product is allowed into the reverse flow or given back to the customer. This may be seemed as an acceptance

process where the product is either accepted in to the reverse flow or not, based on the decision made by the retailer or where the product is delivered.

Collection

The next step is collection. This is where the product is collected from the previous acquisition stage, and are delivered to facilities for inspection, sorting, and processing (Agrawal et. al, 2015). The collection process may include activities such as locating the products, purchasing, transporting, and sorting at the collection points (Bonev, 2012). The collection process involves some alternatives. It may be collected from the customers by the manufacturers, manufacturers collect products via retailers, or the manufacturers outsource the collection process to third-party logistics providers (Agrawal et. al, 2015). The collection process may be complicated due to the uncertainty of the quantity and their time of arrival (Bonev, 2012).

Inspection and sorting

After the collection phase the products is sent for further processing and examination, to determine the optimal solution for them. The product in this stage comes in various quality and conditions which can determine what happens next. This inspection and sorting processing may require a lot of work at the plant, such as shredding, testing, sorting, and storing (Bonev, 2012).

Decision making

After the products have been collected, inspected, and sorted, it's time to decide what will happen to them based on the previous evaluation. It is fairly to anticipate that the collected products may enter different disposition options, based on their condition and their usage in the future (Agrawal et. al, 2015)

Remanufacturing

Remanufacturing can be a demanding process which involves serval activities such as restoring the goods in their original condition. The product is likely completely disassembled and the usable parts are cleaned, refurbished, and used at some point. Remanufacturing consists of disassembly, cleaning, overhauling and replacement. The finished product may have some new parts and could perform better than the original product. The success of remanufacturing may depend on the condition of

the product, as the condition is known only after being tested. Since much of the processes may be conducted simultaneously, it could lead to capacity issues because many products may require the same processes and same handling equipment simultaneously (Bonev, 2012).

Reuse

Reusing products is an option, where the product usually does not require any repair processes and could be utilized in the original market or the second-hand market. Example of such items could be bottles, containers and leased equipment but may relate to other products as well (Bonev, 2012).

Recycling

The recycle option, is where a product is being disassembled and grinded, before sorted into homogeneous components. The material is treated in various processes to archive the required quality. Although this option has seen success in the car industry and some other fields, there is an uncertainty regarding the number of products being returned. This may lead to complexity to the planning and optimalization of the recycle plant (Bonev, 2012).

Disposal

Disposal is the least preferred option, but it might be the only remaining if the condition of the product is poor and other available options are not feasible due to technical or economic reasons. Technical reason may be that the condition of the products is so severe that it's not possible to repair or recycle properly, it may also be outdated and have no secondary market potential. The economical reason may be that the cost of the other alternatives is far greater than disposal or energy incineration (Bonev, 2012).

Repair

This option may be used when a returned product is damaged and brought back and can be repaired. By replacing components or modules the product is brought back into working condition again (Amezquita et al, 1995; Khor & Udin, 2012).

Benefits of implementing reverse logistics

During the last two decades, businesses have experienced an increase in pressure on adopting more suitable practices as a measure to reduce the impact on the environment. Businesses are encouraged to implement practices that consider people, the planet, and health, by adopting more green practices and operations (Kleindorfer et. al, 2005). Implementing RL can benefit organizations of all sizes regardless of the industry or product they offer, or where they are located (Stock, 1998).

Although there might be several reasons to participate and incorporate RL into an organization, Dekker et. al, (2004) stated that there are mainly three reasons to do so. The first is that the business can make a profit from implementing RL, and the second reason is that they are obliged to. The third reason is that the organization feels socially motivated to do so. RL may generate benefits to different industries and organizations in form of a reduction in cost and raw materials and an increased green image.

Adopting and implementing RL can lead to processes connected to RL interfacing with other activities in the supply chain such as procurement and manufacturing since the decisions connected to these activities will affect the organization's sustainability goals (Stock, 1998). Adopting product recovery and reuse through RL practices, can reduce the environmental impact the products have on the environment such as reduction in waste and emissions, and reduce the need for new raw material. It can also have a positive effect on employment since RL can demand additional resources. Further, it can generate an increase in profit for the organization, reduce the risk and increase the value connected to the purchase of the product for the customer (Kleindorfer et.al, 2005; Turrisi et.al, 2012).

Developing an efficient reverse logistics supply chain

According to Stock (1998), resources and tools of measurement, management and control, and finance are factors that need to be considered when developing a successful RL program. Measurements such as life cycle analysis costing, and systems accessing the organizations RL performance need to be adopted to assess the costs and the revenues related to the products. By doing so, the revenue the operations generate can lead to support for further operations and important decisions can be made by assessing the cost the product generates from cradle to grave. It is of importance that the processes taking place are understood by the management. This can be done by mapping the activities and how they interact, educational programs need to be established to educate stakeholders on the cultural changes an RL program can bring. The organization should also establish

partnerships with other parties involved and ensure economies of scale so the resources allocated to the RL program can be justified. Further, RL needs to be assigned sufficient funding that can contribute to the success of the RL program.

Developing a successful RL supply chain, resources such as personnel and facilities need to be in place which needs to be assessed to establish the resources needed, if not its RL system will not generate the result needed or expected (Stock,1998).

According to Richey et. al, (2005), adopting and developing information systems is an important part of developing an efficient RL supply chain. In their article, where they examined RL practices in the automobile industry, they concluded that buying or outsourcing RL software can generate positive results for the organization.

2.6.1 Drivers for implementing reverse logistics

The drivers for RL activities have been examined by several authors over the years, with different perspectives and factors which must be considered if a company wants to implement the concept (Govindan & Bouzon, 2018). Despite the different drivers explored by other authors, Dekker et al (2004) categorized the main driving forces for RL as economic, legislation, and corporate citizenship. Furthermore, Dekker et. al, (2004) presented a model which they refer to as “The driving triangle for reverse logistics” to illustrate the relationship between the drivers.

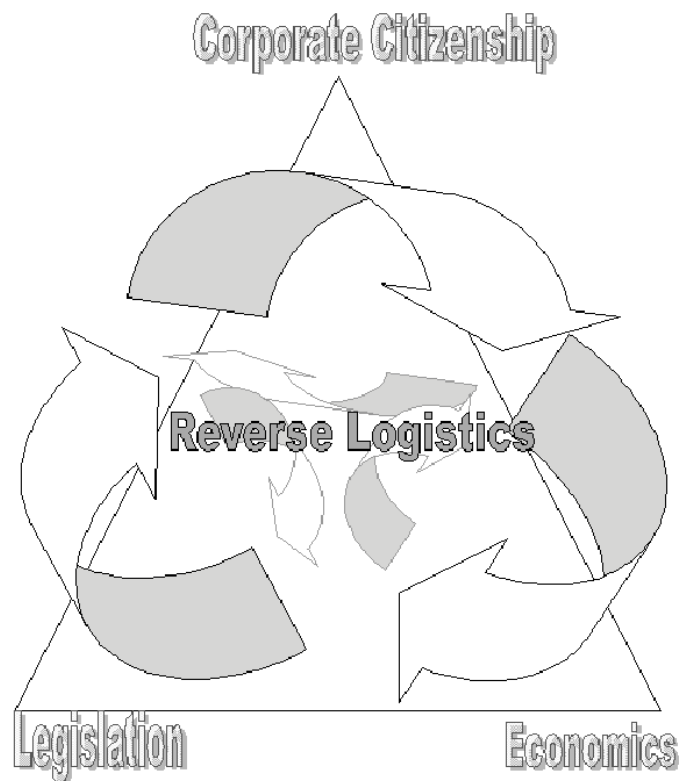


Figure 9: The driving triangle for reverse logistics (Source: Dekker et. al, 2004).

The model describes how the concept of RL is driven by economics, legislation, and corporate citizenship. The model also shows how one factor can affect the other, for example, if there is new legislation on the horizon that may affect corporate citizenship it is likely to affect the economy somehow.

Management and internal drivers

According to Ho et. al (2012), one of the enablers to facilitate the implementation of RL is to have a well-trained staff available. The employees may be considered among the most important resources a company have at their disposal to conduct their business. If the company have such resources available, they are likely to utilize their strength and opportunities within RL and are more likely willing to implement the concept into their organization. However, this should also be supported by the top management within a firm. If the top management is aware of the complexity and risk associated with the different types of product returns and the RL concept, it is more likely that they will commit (Janse et. al, 2010; Govindan & Bouzon, 2018).

Carter & Ellram et. al, (1998) also mentioned the importance of top management commitment but suggested that the middle management should also be involved since they

are the ones who likely have political knowledge, communication and needed skills to ensure commitment among other stakeholders.

Another management driver could be the willingness to contribute to the local community. By making donations to local community groups, events, and other socially responsible actions, the moral and good feelings may increase among the employees. This may also give the employees a feeling of satisfaction (Andiç et. al, 2012; Govindan & Bouzon, 2018).

Corporate Citizenship

In this setting corporate citizenship are a set of organizational values and principles on how to become responsible engaged with RL. Many companies implement a set of boundaries and principles on responsible citizenship where social and environmental aspect are concerned. Sometimes it is hard to set these values, because in many countries the costumer has the right to return the purchased item to the company because of obligations. However, the company may use this as a benefit based on the return obligations, the firm may archive more costumers and sales potential (Dekker et. al, 2004).

Technology drivers

According to Huscroft et.al (2013), adopting and implementing information systems can play an important role for an organization operating in an RL chain, since many depend on accurate and up-to-date information sharing. Information systems has been viewed and recognized as a tool for achieving competitive advantage and is important for the development and attaining effective RL activities (Daugherty et.al, 2002). For organizations participating in a reverse supply chain, adopting an information system can contribute to the optimization of the tasks in the chain and a reduction of costs in every step in the reverse supply chain. It can also contribute to a reduction in costs for collaborative partners (Jayaraman et.al, 2008). For organizations operating in RL chains, it is crucial that the information system is tailored to fit their needs and responsive to provide and foresee a change in demand and operations. Further, it should provide features such as sharing of information among stakeholders and be easy to use (Daugherty et.al, 2002).

Incentives

In their paper “Intrinsic and Extrinsic Motivation: Classic Definitions and New Directions, Ryan and Deci (2000) describe being motivated as being *moved* by something. Further, they state that people often possess different levels and types of motivation which depends on a person’s attitude and goal towards the action. Ryan and Deci (2000) divide motivation into two following categories: intrinsic motivation and extrinsic motivation. Intrinsic motivation is when a person executes an action based on interests and fun, while extrinsic motivation is when an action leads to another outcome. A theory that is based on extrinsic and intrinsic motivation is the motivation crowding theory (Rode et. al, 2015). According to Bowles (2008), since the intrinsic moral values often result in positive actions, imposing extrinsic motivation that appeals to a person’s self-interest, can result in moral values being undermined, known as “crowding out”, but they can also some cases increase intrinsic motivations known as “crowding in” (Rode et. al, 2015).

Extrinsic incentives have become more common in recent years where organizations and executives have used incentives as a tool to motivate their employees (Gneezt et.al, 2011). Incentives can be described as something that motivates a certain behavior but within economics, financial incentives are described as monetary benefits that motivate people or organizations to conduct certain actions (MasterClass, 2021). According to Read (2005), financial monetary incentives can influence how the individual perceives the task by changing the attitude, goal, and the response toward the task.

Five common economical types of incentives are financial incentives, tax incentives, tax rebates, subsidies, and negative economic incentives (MasterClass, 2021). However, this thesis would only emphasise on subsidies and tax incentives, due to the scope and relevance of this research.

Subsidies as financial incentives are often put in place by the government where organizations can receive governmental funds contributing to their growth (MasterClass, 2021). According to Pakdeechoho, N & Sukhotu (2018) governmental incentives aim create policy instruments such as subsidies, tax exemptions, credits, certifications and technical assistance to support firms to implement corporate sustainability particles. And Wang et al (2020) stated that the government should actively facilitate various reasonable guidance and supervision for the participants of waste collectors and recyclers.

Tax incentives can be put in place to incentivize organizations to procure certain products or to locate their business at a specific location or two in exchange for tax reduction. Tax incentives can also lead to economic development. Another form of tax incentive is tax rebates. Tax rebates are an incentive that can encourage organizations or individuals to purchase specific goods, such as solar energy, where they get an amount of money for doing so (MasterClass, 2021).

Economic drivers

The concept of RL may give companies direct gains in form of minimizing the use of raw materials, recovery of products, or reducing their disposal cost. More actors are getting involved in RL because there are financial opportunities. Discarded or products which there is no use for may be collected by the scrap brokers and sold to steelworks with profit. This has also been an opportunity for the steelworks where they can use some of the recovered materials in new products instead of using virgin materials. However, there are more reasons to get involved in RL activities which do not give immediately profit. Factors such as marketing, competition, or other strategy are good reasons for getting involved as they might give a company indirect gain. From a competition point of view, a firm may start recovery activities to prevent others from getting their technology or entering the market. Or as a strategic step, the company may want to get involved with recovery to get prepared for future legislation. Recovery can also be a part of an image-building process where firms have a take-back program incorporated. Recovery may also be used to improve customer or supplier relationships by offering a recovered product and reducing customers' costs. The economical drivers can be divided into direct and indirect gains. Direct gains refer to the reduction of input materials, cost reduction, and value-added recovery, and indirect gains refer to anticipating legislation, market protection, green image, and improved customer service or supplier relationships (Dekker et. al, 2004).

Policy drivers

Many countries have seen an increase in legislation where companies are obliged to recover their products or accept take-back, and the customer is allowed to return ordered products. In Europe, there has been an increase in such legislations, and they are affecting recycling quotas, packaging regulations and manufacturing take-back policies. Many

industries such as the electronics and automobiles are under legal pressure and must prepare or deal with legislation (Dekker et. al, 2004).

Collaboration drivers

With the growing concern of sustainable development, businesses need to consider their cooperation with their partners to archive economic, social, and environmental goals (Touboulic et al, 2014; de Paula et al, 2019). Firms may face challenges regarding their cooperation with partners and if the activities are not conducted in a sustainable way, the firms may face operational and reputational risk. Previous studies shows that collaborative operations may lead to improved performance across the entire supply chain, and that trust, knowledge sharing, and communication may have become a critical component in sustainable supply chain (Touboulic et al, 2014).

Simatupang & Sridharan (2002) defines cooperation as *"Two or more independent companies work jointly to plan and execute supply chain operations with greater success than when acting in isolation"*.

A study conducted by de Paula et. al, (2019) argue that the fundament for collaboration between partners in a supply chain may be trust, shared visions, principles, and sharing of information between them. They also stated that collaboration and trust have become mandatory in a sustainable supply chain and that there is a great focus on the topic in the literature towards the development of collaboration strategies. Trust can be one of the key governing elements which can make the supply partners focusing on the long-term benefits of the relationship, which may lead to the improvement of competitiveness and the reduction of transaction costs (de Paula et. al, 2019).

A study conducted by Zhang & Sun (2004) on cooperation in RL concluded that cooperation between partners is a key competence for success in modern supply chains. There can be several motivational factors for a company to enter collaborative relationships. Banomyong (2018) mentioned trust, commitment, decision synchronization, incentives and information sharing as driver for entering such relationship.

- Trust is considerate as a key parameter that support supply chain collaboration. If the supply chain partners trust each other's, they may work together in a long-term relationship between the organizations and archive

improved performance in the supply chain. These benefits may be archived in upstream relationships and downstream as well (Banomyong, 2018).

- Commitment is one element which is required from the focal firm, because they are found to have more bargaining power in the supply chain. Therefore, it is of high of importance that partners are committed to each other and does not take advantage from a weaker partner in the collaboration relationship (Banomyong, 2018).
- Decision synchronization can be a powerful tool to utilize the capacity and resources for the supply chain partners. The mutual planning can help to prioritise the objectives in the value chain and be embedded in the strategic planning. Synchronization may have a great impact on the collaboration level and the operational performance (Banomyong, 2018).
- The purpose with incentives can be rewarding and encourage the supply chain partners, but although reward can be a great motivation to reach a specific target in a collaborative relationship there is more to it. Other incentive alignment can be pay for performance and sharing the benefits and cost as well as sharing the risk and reward among the supply chain partners (Banomyong, 2018).
- Information sharing is another element in a collaboration relationship that may be of importance. It can be conducted in different ways such as marketing promotion plans, inventory level partnering and more. Sharing information among the supply chain members can improve the overall performance and be used for taking strategic, operational, and tactical decisions between partners (Banomyong, 2018).

2.6.2 Barriers for implementing reverse logistics

According to Govindan & Bouzon (2018) there are several barriers that might arise when a company want to implement the concept of RL. Some authors may categorize them into internal and external barriers (Meyer et. al, 2017), while others have done it differently.

However, in our thesis we have identified what we believe are the most relevant barriers for our case study which are explained further below followed by a short description.

Management and internal barriers

RL activities are often conducted with a lack of communication and cooperation between the departments. The idea behind functional integration, is that every department should work together as one entity with mutual goals to achieve the success of RL. If the shared views are not mutual the integration is not likely to become optimal and the goals and objectives are likely to be set across departments (Meyer et. al, 2017).

Many managers are not aware of the benefits RL can provide to the firm. This may result in lack of commitment to the concept. To successfully implement and conduct RL activities, the top management should be supportive and dedicated. The concept may require additional resources and dedication to become successful (Meyer et. al, 2017).

Technology barriers

Information systems may be used to share information among the participants of the RL value chain. The participants may face some challenges regarding connectivity and the technology being used by the firm (Govindan & Bouzon, 2018) such as the lack of or incapability of the information technology used to communicate between the actors. This may affect responsiveness and lack of necessary information to the partners (Meyer et. al, 2017).

The lack of most recent technology may also be a barrier to a firm because it might be needed to perform various processes such as product and material recycling (Govindan & Bouzon, 2018). We assume that this can be different tools which is used to perform various processes, such as disassembly, or shredding materials.

The lack of infrastructure to make a firm able to conduct their RL activities in terms of storage, handling equipment, and machines can also be a barrier (Govindan & Bouzon, 2018; Shaharudin et. al, 2015). As showed in the RL process map, it is fairly ta assume that the different processes may require some sort of infrastructure such as warehouses to be performed.

RL operations may be more complex than traditional forward supply chains. This is because the available recovery options and processes may have a great variation depending on the product life cycle, resources required, and the capabilities of the facilities (Govindan & Bouzon, 2018)

Barriers for implementing incentives

According to Garbers & Konradt (2014), financial incentives are often used in organizations to improve performance, and the main reason for positive relationship between the incentives and increased performance are the monetary motivation. They concluded that such incentives had positive affect on a firm's performance.

However, a study by Camerer & Hogarth (1999), stated that such incentives have less average impact on performance where the return of such incentives are lower than the cost itself. Camerer & Hogarth (1999) also concluded that financial incentives did not always improved performance, and the improvements depended on the nature of the task.

Incentives improved performance in effort responsive tasks such as judgment, problem solving and clerical task. Moreover, incentives could decrease performance when the problems are too difficult to solve, or when the optimal solution is simple, and thinking harder about the problem makes it worse. This shows that the effects of economic incentives are mixed and complicated and is not a universal solution to problems a firm may have (Camerer & Hogarth, 1999).

A study conducted by Cho (2009) where the incentives program for fishermen in Korea was assessed. In this program, the fishermen receive money from the government to when bringing waste to shore. Cho (2009) stated that the incentives program does not necessary change the fishermen's behaviour toward marine waste and recycling behaviour, but by ending the program, the amount of discarded fishing gear might increase.

According to Wang et. al (2020), the government should be involved in economic incentives by providing reasonable guidance and supervision among the actors to promote participation. A study conducted by Schuyler et al (2018) suggested that such incentives should be combined with sharing of best practices, cooperation, and innovation. Therefore, it's fair to believe that there may be several factors to consider when imposing economic incentives on an organization. Ling et. al, (2021) also mentions in their paper that social contextual factors are something that should be considered in the design of incentive

programs. Giving a company economic incentive alone does not necessarily change the behavior among the participants (Cho, 2009).

Financial barriers

A study about the Chinese manufacturing industry conducted by Abdulrahman et. al (2014) shows that one of the economic barriers can be the lack of capital for investments in return monitoring systems as well as the lack of finance for storage and in house handling of returns systems. According to Govindan & Bouzon (2018), RL might require a great amount of investment and restructuring when implemented.

Another financial barrier can be the costs related to the initial investments in information systems, and the resources needed to implement and maintain them. That could be different systems which is used for track and trace product returns, which can be crucial for the success of RL operational performance (Meyer et. al, 2017).

The establishment of certain RL activities such as product recovery may seem as a highly uncertain investment among the stakeholders. And if the economic benefits are hard to see, it could decrease the will to invest among the stakeholders (Govindan & Bouzon, 2018).

The concept of RL may generate new complex flow of products and services which add complexity to the company's existing tax structure. This may lead to an increase in costs and unpredicted tax for the business entity. The concept may also have uncertain demand for returned goods compared with the forwarding supply chain. This may result in difficulties to attain economy of scale within the reverse flow (Govindan & Bouzon, 2018).

Policy barriers

One policy barrier to the concept can be the lack of supportive laws for RL activities, or there might be legislations which are seen as a barrier for those involved. The lack of clear return policy or not regulated waste management processes, can be considered a barrier to implement waste management practices in the firm as well (Govindan & Bouzon, 2018).

Lack of regulations or directives to motivate manufacturers to strive to obtain a green image, conduct RL activities, and motivate customers to buy green products can also be a barrier. And as the globalization and the complexity of the supply chain, it may be more difficult to implement extended producer responsibility (Govindan & Bouzon, 2018).

Cooperation barriers

One of the cooperation barriers is the lack of support and poor coordination in the supply chain for RL management and implementation (Govindan & Bouzon). According to (Sharma et. al, 2011) it is important that the supply chain members share information among themselves where one of the barriers they could be facing is the unwillingness of members to share information among the actors participating in RL.

For many firms it is hard to forecast the number of goods and the nature of the product which is expected to enter the reverse flow (Govindan & Bouzon, 2018) which is according to Sharma et. al (2011) a barrier which affects a company's strategic and operational planning activities because of the diversity and flow of goods.

Measuring the RL performance are not always easy, and according to Sharma et. al (2011), the necessary metrics to measure end to end performance are rarely used or not always available. To succeed in RL, it is necessary to link the performance measurement system to RL activities (Govindan & Bouzon, 2018).

Barriers for implementing corporate social responsibility

It has been identified several barriers that could lead to difficulties when implementing CSR (Faisal, 2010) and in order to implement CSR, it is important that companies overcome these barriers. The barriers can be divided into the following two categories; internal barriers and external barriers where internal barriers are related to the business itself and external barriers are related to the environment surrounding the business which the business has no control over. If the business manages to identify these barriers when implementing CSR, it can lead to the elimination of barriers (Leoński, 2019).

In his paper, Faisal (2010) analysed thirteen barriers that could lead to the staggering of the implementation of CSR supply chain (SC), but in this thesis, we will only cover the barriers that we believe are applicable to our case. One of the barriers Faisal analyzed was lack of commitment from top management where commitment and introduction to CSR must be from the top management itself, where the most effective way to ensure change would be to inspire managers that don't have an interest beyond financial performance.

Another barrier Faisal (2010) analyzed is financial constraints. CSR can have a positive effect on a company's performance, but since there is a failure to identify empirical evidence of such, some executives believe that there is no correlation between a company's performance and investments, and no evidence of such can lead to constraints in the implementation of CSR.

The fourth barrier is if a company has no concern about their reputation. Normally, a company's reputation is a driving force for implementing CSR, but in cases where companies have no concern about CSR, they believe that the decisions that they are making are not going to influence them directly (Faisal, 2010).

Faisal (2010) also identified barriers such as lack of strategic planning, lack of awareness concerning CSR, and reluctance among partners. Many companies have integrated CSR as a part of their strategy and as a part of their decision-making process, but if companies don't plan strategically for CSR, it can have a negative impact on their competitive performance and supply chain. There are many definitions defining CSR and because of this, it can be difficult for companies to grasp and understand the boundaries of CSR since there can be a lack of awareness from company owners. Since many companies are operating with SC partners across borders, it can be challenging to unify partners under the same CSR philosophy. This can lead to a reluctance towards the implementation of CSR as a part of their agenda, especially within companies experiencing touch competition internationally. Regulations are often a key driver for companies when implementing CSR (Faisal, 2010), but it has been claimed by authors that inefficient regulations might hinder the company's CSR performance. Another factor is recused attention towards an update of the current regulation (Zhang et.al, 2019).

3.0 Methodology

3.1 Research Design

Research design can be described as a recipe that connects the collected data to the research questions that result in a conclusion. In other words, it is a plan on how the research will get from *here* to *there* where the main purpose of the design is to avoid that the collected evidence does not align or address the research questions (Yin, 2018). Creswell (2014) examines three approaches when conducting research: qualitative, quantitative, and mixed methods. A qualitative approach is applicable when the researcher studies a research problem that can be understood by individuals and their perceptions of the problem. To study this problem Creswell (2007) describes the qualitative research process as follows:

“Qualitative researchers use an emerging qualitative approach to inquiry, the collection of data in a natural setting sensitive to the people and places under study, and data analysis that is inductive and established patterns and themes”.

The purpose of this study is to identify the drivers and barriers the participating members of the FFL project are facing during their daily operations and how these barriers can be overcome if the project is to be continued. We intend to explore these by applying a qualitative research design since we believe based on Creswell’s (2007) description, a qualitative approach is most appropriate to answer our problem statement and research question.

This thesis builds theoretical explanation and is written in an inductive manner where we have applied relevant theories based on our findings. We have analyzed our data and compared our finding to relevant theories (Saunders, Lewis & Thornhill, 2012).

3.2 Research Method

Yin (2018) lists five different research methods when conducting research; experiment, survey, archival analysis, history, and case study. Deciding on which one is the most suitable depends on the three following conditions; the design of the research questions, the researcher’s control over behavioural events, and if the research focuses on historical or contemporary events.

According to Yin (2018), a case study approach examines a phenomenon thoroughly within its real-life context where the distinction between the studied phenomenon and the context may not be obvious. Further Yin (2018) states that the research method can have an exploratory, explanatory, or descriptive purpose. During an exploratory study, the researcher is gathering information or trying to understand and clarify a topic or problem. It is also adaptive if changes need to be made and it gives the researchers ability to ask open-ended questions to understand a problem or to gain insight (Saunders, Lewis & Thornhill, 2012).

Yin (2018) distinguishes between four types of case study research design; an embedded single-case study, holistic single-case study, embedded multiple-case study, and holistic multiple case study. A holistic approach is applied when the nature of a program or an organization is investigated, and an embedded approach is applied when an analysis is done at one or several levels by using a subunit or subunits. A single-case study is adopted when a single experiment is examined, while a multiple-case study is adopted when more than one case is examined. According to Yin (2018), a single-case study is applied if the case is of a common, revelatory, unusual, critical, or longitude nature.

For our thesis, we have adopted an exploratory case-study approach, based on the nature of our research questions, the phenomenon examined by using respondents as primary sources participating in current events that we as researchers cannot influence. We also applied a holistic single-case study since we are examining the nature of a single program and our case is *common* in nature where we are aiming to capture the circumstances of the FFL project.

Defining our case

In our thesis, we have chosen the FFL project in Norway as our case. We decided on this case due to the lack of research of the drivers, barriers, and future opportunities of the project in Norway. As explained in the introductory chapter, similar research has been conducted in England and the Mediterranean Sea. We have chosen to take a closer look at the challenges and the motivation for participating actors in the value chain are facing and the future opportunities. Further, we will compare the FFL project with the new suggested port fee. Further, we will take a closer look at the strength, weaknesses, opportunities, and threats of each of these solutions.

Data collection

During the data collection, the researcher set the limits for the study, the data collection procedures, documents, and a protocol for how the information is recorded (Creswell, 2017). Further, Creswell points out that it is important in qualitative research that the researcher select sources of information that will provide the researcher with an understanding of the problem and the selected research questions. Creswell (2007) identifies seven activities taking place during data collection: choice of site and informants, gaining access, sampling, data collection, recording information, recording procedures, file issues, and storing of data.

In our thesis, we took a closer look at the FFL project in Norway. The participant in the projects was identified by using an annual report of the FFL project in Norway provided to us and an overview of the participating vessels. The initial contact was established through the phone where the activities taking place in the value chain were mapped to get a better understanding of the processes taking place.

The sample was selected based on the value chain maps where we selected four value chains consisting of twelve stakeholders total. The selection aimed at interviewing all the stakeholders in each value chain that differed from others to get a better understanding of the processes and experiences taking place. We also chose the value chains based on their geographical location which was spread. We applied a single-stage sampling method since the respondents was selected based on the four value chains we wished to access, where we had access to the respondents through contact information (Creswell, 2014)

1-2 weeks prior to the interview, the respondent received an email containing a request for participation, an information letter containing information about their rights, the purpose of the interview, and the longitude of storing data. Before recording was carried out, the respondent was asked if they consented to participate in this interview and if they had received sufficient information concerning this interview.

The themes in our interview guide were developed based on the theory review of the drivers and barriers in RL by Govindan & Bouzon (2018), and incentives theory due to the incentives program among fishermen in Korea assessed by Cho (2009).

The interviews were scheduled at a time best suited to the respondents. The interviews were conducted during the period of March and lasted between 25 minutes to 50 minutes.

The data collected in this thesis is based on primary data provided by the respondents and secondary data gathered from academic articles, books, reports, and internet sources. This allowed us to triangulate data since using different sources of data is one of the strengths of a case study which can increase the quality of the research and allows us to go beyond the scope (Yin, 2018).

An important source of data in case studies are interviews that can help the researcher retrieve information about important events and answer the research questions (Yin, 2018). According to Saunders, Lewis & Thornhill, 2012, there are several levels of interview methods that can be applied, where structured interviews, semi-structured interviews, and in-depth or unstructured interviews are some of them. Semi-structured interviews are characterized by a set of themes and questions that might vary between the interviews, depending on who you are interviewing and the nature of the interview (Saunders, Lewis & Thornhill, 2012). To collect primary data, we conducted semi-structured interviews containing open-ended questions that aim at collecting the opinions and views of the respondent (Creswell, 2014). The respondents were in some cases not asked all the questions in the interview guide since a semi-structured interview are characterized as informal where the interviewer can adapt the questions to the respondent and does not necessarily follow the order of the questions (Johannessen, Tufte & Christoffersen, 2021). The interviews were conducted on Teams and Zoom and recorded since that can give us accurate retention of the interview with the respondents (Yin, 2018) and a proper presentation during transcription. At the beginning of the interview, the respondents were asked to consent to the video recording of the interview, where all consented. The interviews were stored separately from the respondent's contact information where the transcribed interview was assigned a random number to ensure anonymity. The transcribed interviews were returned to the respondents for approval and alterations.

Initially, we intended to interview twelve respondents to uncover and get a better understanding of the drivers, barriers, and future opportunities in four value chains, but due to the time schedule, only ten informants were interviewed that resulting in two completed value chains. Hence the fact that not all the value chains were completed, we have chosen to add all the conducted interviews to our analysis since they can provide valuable information in our analysis.

Analysis of data

Data analysis within case studies is an underdeveloped area within case study methodology (Yin, 2018). The analysis allows the researcher to make sense of the collected data where the researcher examines, categorizes, and summarizes the results (Creswell, 2014; Ebneyamini et.al, 2018).

Yin (2018) recommends four strategies to conduct an analysis in case studies; theoretical proposition, development of data from the “ground up”, development of case description, and examining plausible rival explanations.

To conduct our analysis, we are applying a theoretical proposition strategy (Yin, 2018). By doing so, the developed theories in our case study can lay the groundwork for organizing and analysing the data. The theoretical framework in our case study will work as a road map by organizing and highlighting themes in our analysis that might need further description (Yin, 2018).

Validity

Validity during qualitative research can be ensured by executing procedures to ensure that the research is accurate (Creswell, 2014). There are four tests that can be applied to ensure the quality of a study. These tests are commonly used when conducting empirical social research but can also be applied during a case study. There are four tests that can be applied to ensure validity: construct, internal, and external, but also reliability. Since internal validity is applied during explanatory cases studies (Yin, 2018), which is not relevant in our case since we are conducting exploratory case studies, we will be applying construct and external validity in our thesis.

Construct validity can be challenging when conducting case study research and has received criticism for the lack of operational measures applied. The method can be applied when the researcher uses several sources of evidence and when the key sources of information review the draft of the case study report (Yin, 2018).

External validity concerns if the researcher can generalize based on the findings in the case study. The form of the research questions and the theoretical proposition are essential to ensure external validity in the case study (Yin, 2018).

To ensure construct validity we have in our study conducted ten interviews with key stakeholders as primary sources. We have allowed the respondents to read the transcribed interviews to ensure that the information collected is accurate and credible. We have also used published theories, reports, and governmental publications as secondary sources of information. To secure that the gathered information from the interviews was correct, we also asked the respondents to confirm the transcript from their interviews before we conducted the analysis. By using primary data and secondary data, we were able to triangulate our sources to ensure that the data collected is accurate (Saunders, Lewis & Thornhill, 2012). By applying theoretical propositions and outlying most of the research questions using “why” and “how”, we were able to ensure external validity.

Reliability

Reliability refers to how reliable our finding is where the goal is to ensure that other researchers conducting the same study using the same procedures will end up with the same findings and results (Johannessen, Tufte & Christoffersen, 2021; Yin, 2018). To ensure reliability and that the research can be duplicated, documentation of the procedures is crucial (Yin, 2018). Another factor to secure reliability is a thorough description of the case and the conducted procedures (Johannessen, Tufte & Christoffersen, 2021). According to Saunders, Lewis & Thornhill (2012), there are four aspects that can threaten the reliability of research, participant error, participant bias, researcher error, and researcher bias.

To secure the reliability of our case study we presented a review of our case study and the methodology used during the research. We also conducted 10 interviews using a semi-structured interview with open-ended questions. To reduce biases and errors from the participants and the interviews, we made sure that the interviews were conducted at a time best suited for the informants. Further, to create a safe space, we conducted the recorded interviews using Teams where only the informants and the interviewers were present, and we informed the informants that the findings would be kept anonymously since ensuring anonymity of the data collected can strengthen the reliability (Saunders, Lewis & Thornhill, 2012). We also made sure that the interviewers did not influence the informants prior to or during the interview by letting the informants respond to the questions uninterrupted and asking only follow-up questions if responses needed clarification. To secure documentation we transcribed the interviews which we returned to the respondents to have

them confirm the accuracy or ad modifications. The interview guide and transcribed interviews are left as appendixes as documentation in case of duplication.

Ethical principles

To be able to gather information from our participants it is important to obtain the necessary approval for the study (Creswell & Creswell, 2018) To ensure this, we obtained the necessary approval from NSD before we sent out invitations for interviews to the respondents. It is important that the participation in the study should be voluntary and that the informants have been informed about the purpose of the study and that they should be able to redraw from the study at any point without giving a reason and receiving repercussions (Johannesen, Tufte & Christoffersen, 2021). According to Saunders, Lewis & Thornhill (2012) it is important that the informants are informed and understand the implications of participating in the study so that they can give an informed and voluntary consent of participation in the research. In line with this, the participant received a request to participate in the research where we presented the interview guide and a form containing information about the purpose of the study. The informants were informed that they could redraw from the study at any point and that participating was voluntary. To ensure the consent of participation we asked our participants at the beginning of the interview as a part of our questionnaire if they were willing to participate in this study and that the information provided might be disclosed if necessary.

Unless there is another agreement, individuals participating in research and the information they provide should remain anonymous and untraceable where the privacy and anonymity of the participants are respected (Saunders, Levis & Thornhill, 2012; Creswell & Creswell, 2018). To secure the anonymity of our informants we assign the informants aliases in form of numbers that were stored separately from other information containing their names. We also informed them that they *could* be identified during publication. Since data normally need to be kept for a period after completing the analysis (Creswell, 2014), the informants were informed that the data would be eliminated at the end of the project. To avoid exploitation of participants we offered them to read the final report at the end of our thesis.

4.0 The Value Chains of the FFL project in Norway

Based on the 9 steps developed by de Souza & D'Agosto (2013) and applying a qualitative method, the value chains in the FFL project were mapped. Not all the step developed by Souza & D'Agosto (2013) was applied due to the scope of our study, relevance, and schedule.

To give a better understanding of the structure we have included an overview of the value chains, of each port participating in the project. The purpose of the overview is to give an insight into the different processes, practices, and the participating actors at the current locations. Information about the value chains and the processes has been collected through interviews, phone, and e-mail. There might be some inaccuracy regarding the internal processes due to the interpretation of the information that was given.

Ålesund

The city of Aalesund is in the coastal area of the county Møre and Romsdal, where the port of Gangstovika is participating in the FFL project. The participating fishing vessels collect bags which are provided by the FFL project at the port, before sailing to sea and conducting their fishing activities. When the vessels catch waste from the sea, it is taken onboard and stuffed in the provided bags. The bags are then stored until the vessel sail to port.

When arriving at the port the next actor by the name of Longvagroup AS, receives the waste from the fishing vessel at the port and prepares the waste for further transport by loading the waste into transport containers. No sorting is executed at the port regarding the FFL waste.

When the container is fully loaded, the next actor, a renovation company named Sunn-Trans collects the containers at the port and drives them to their processing facility. At their location, the waste is processed and sorted into recyclable and non-recyclable categories. The non-recyclable waste is then transported by Sunn-Trans themselves to the landfill or to the local energy recovery plant. The amount of waste that is transported to the different locations may have some variations. The recyclable waste is prepared for collection and transported by a company called Nofir AS to a recycling facility which is in Lithuania.

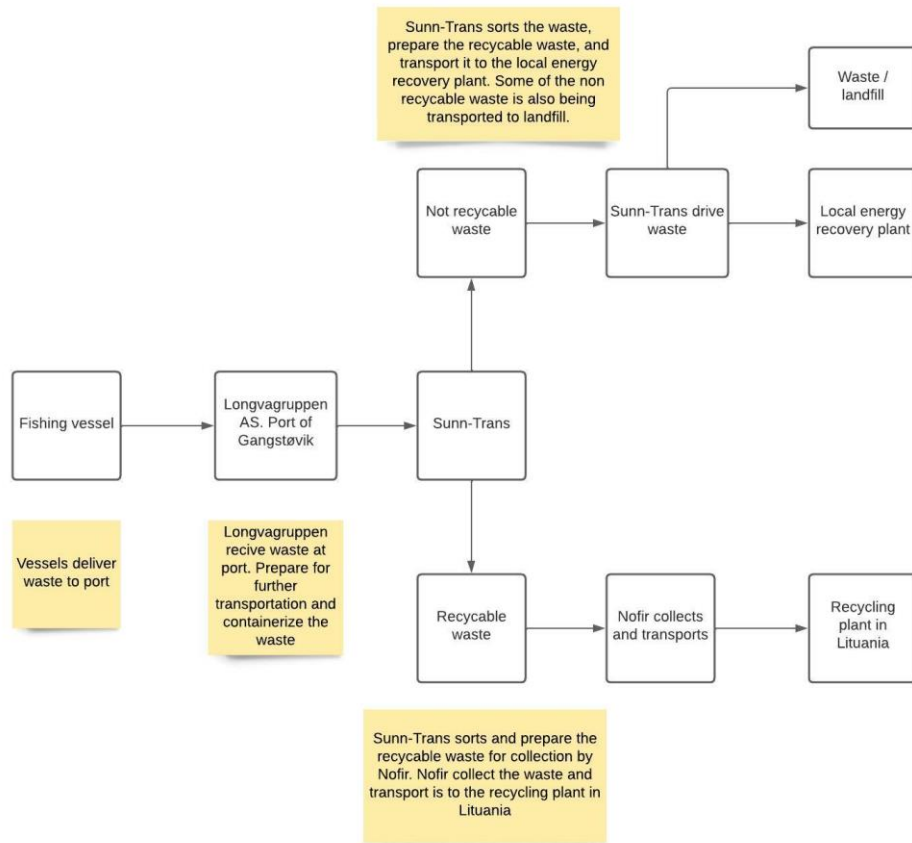


Figure 10: The Fishing for Litter value chain of Ålesund (Source: Own).

Tromsø

The city of Tromsø is in the coastal area of the county Troms and Finnmark. At the port located at Tromsø, a freezer terminal is participating in the FFL project. The participating fishing vessels collect big bags which are provided by the FFL project at the port, before sailing to sea and conducting their fishing activities. When the vessels catch waste from the sea, the waste is taken onboard and stuffed in the provided bags. The bags are then stored until the vessel sail to port. When arriving at the port, the next actor receives the waste from the fishing vessel. The facility sorts the waste roughly into recyclable and non-recyclable categories, before packing it into transport containers, prepared for collection by the next actor when full. The next actor is a renovation company called Remiks. They collect the loaded containers and take them to their processing facility. At their location, the waste is sorted more attentively into recyclable and non-recyclable categories. The recyclable waste is then transported by the next actor called Nofir, to a local energy recovery plant in Norway or a recycling plant located in Latvia. The non-recyclable waste

is transported by Remiks themselves to a landfill and composting facility plant called Origo located in Skibotn.

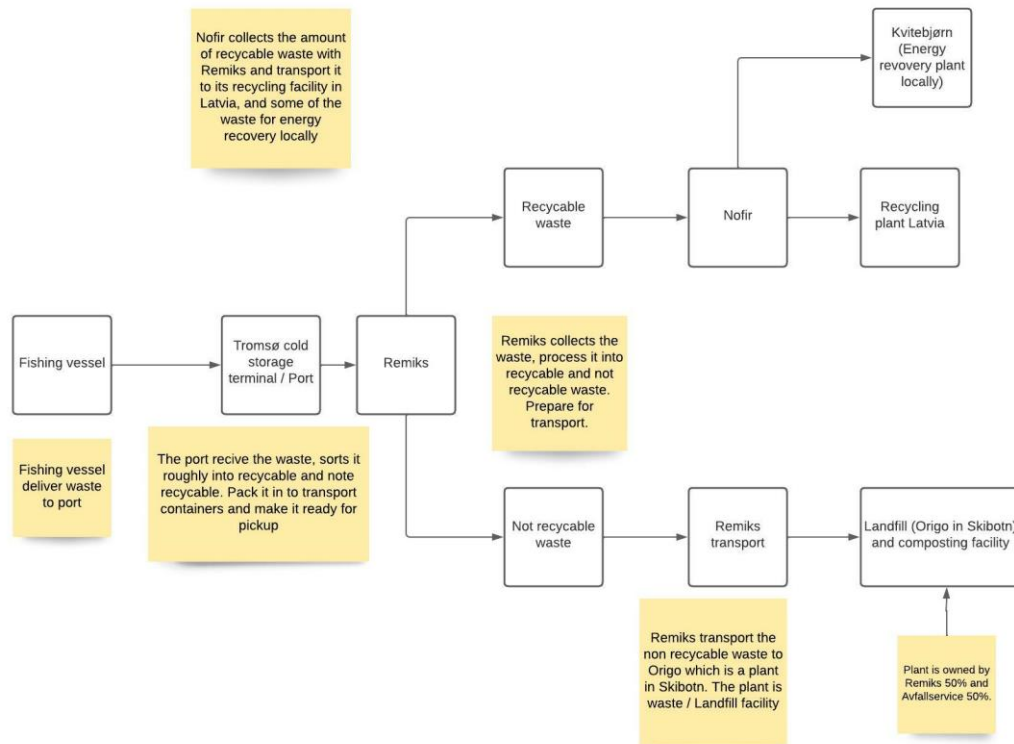


Figure 11: The Fishing for Litter value chain of Tromsø (Source: Own).

Stamsund

The location of Stamsund is in the coastal area of Nordland County, where Lerøy and Jangaard unloading facilities are participating in the FFL project. The receiving facilities are located close to each other but are two separate entities. The participating fishing vessels collect big bags which are provided by the FFL project at the port, before sailing to sea and conducting their fishing activities. When the vessels catch waste from the sea it is taken onboard and stuffed in the provided bags. The bags are then stored until the vessel sail to port. When arriving at port, the two unloading facilities at Lerøy and Jangaard receive the waste, sort it, and report the waste to the FFL project before preparation for further transport.

A transport company named Østebo Transport collects the waste from the two unloading facilities and brings it to Lofoten Recycling Company, which is the local renovation company for processing. At the renovation company, the waste is categorized into

recyclable and non-recyclable waste, but it is already sorted at the port. If the waste is within the accepted specifications and waste type, Nofir transport the waste to the recycling plant. If the waste is not collected by Nofir, the recycling company transport the waste to the recycling plant. The non-recyclable waste is transported by a local transport company to either an energy recovery facility or a landfill.

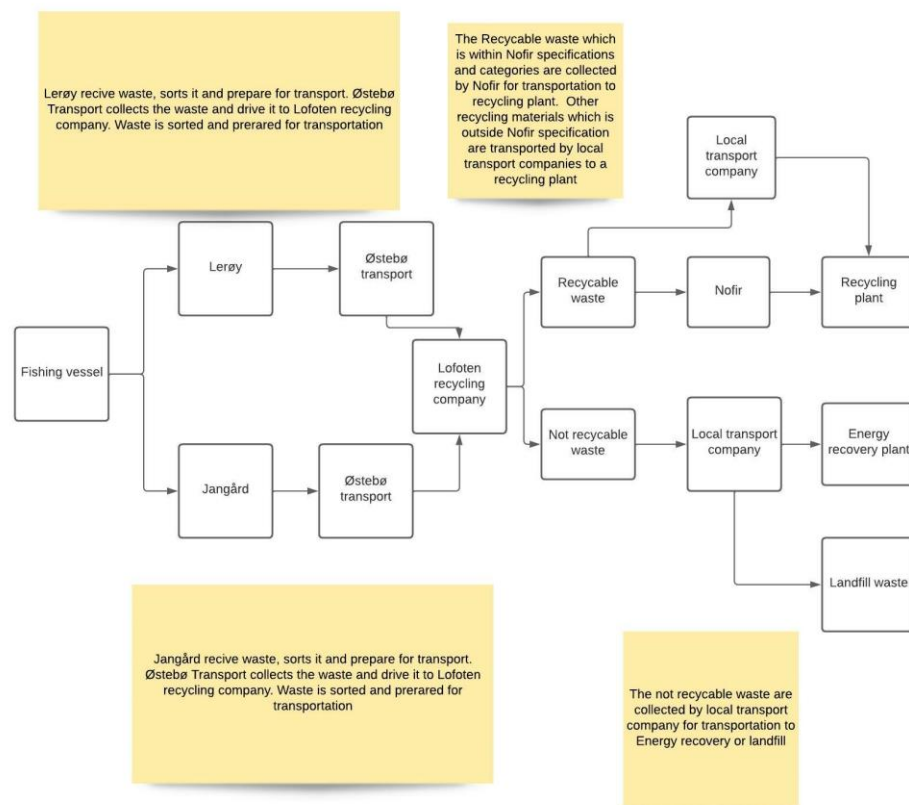


Figure 12: The Fishing for Litter value chain of Stamsund (Source: Own.).

Måløy

The city of Måløy is located in the coastal area of Vestland county, where the port of Nordfjord is participating in FFL project. The participating fishing vessels collect big bags which are provided by the FFL project at the port. When the vessels catch waste from the sea it is taken onboard and stuffed in the provided bags. The bags are then stored until the vessel sail to port. When arriving at the port, the waste is unloaded and stuffed into containers and prepared for further transportation when full. This is administrated by the local port authorities. The next actor, Retura Nomil AS, the local renovation company, collects the containers from the port and transports them to their facility. Then the full

containers are replaced with new empty ones. At the facility, the waste is processed and sorted into recyclable and non-recyclable waste. Then the recyclable waste is transported by Retura Nomil AS to the local recycling company called Matmortua AS. The non-recyclable waste is transported to an energy recovery facility.

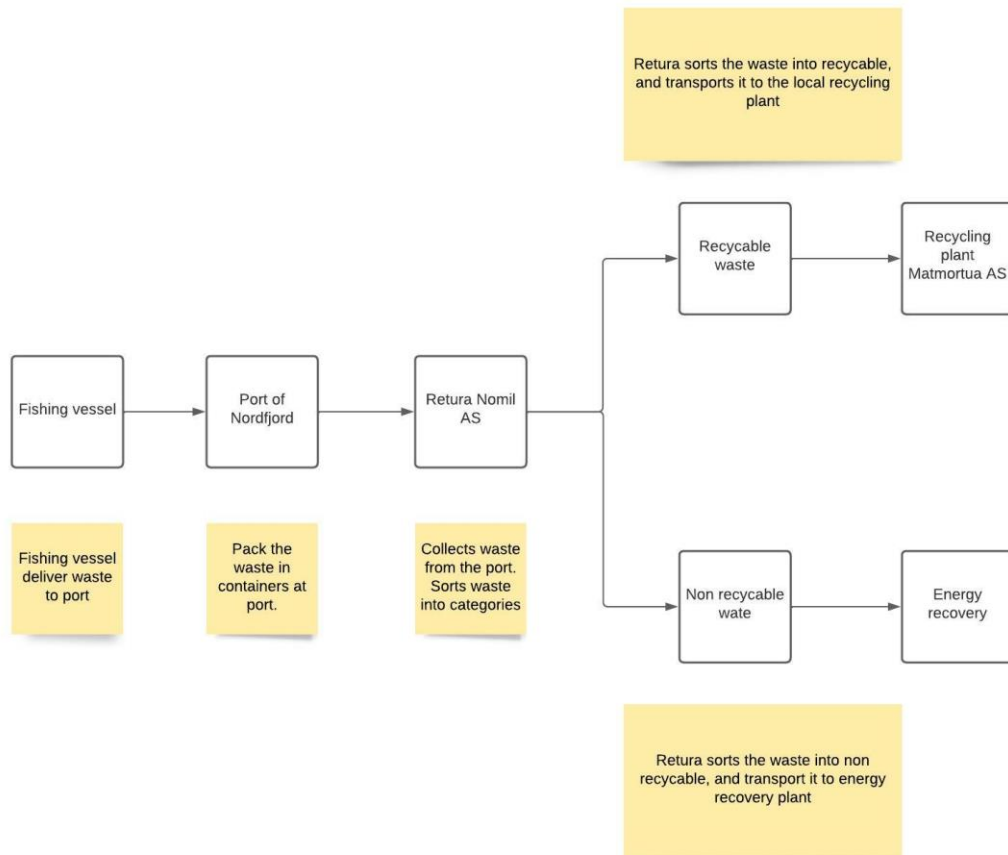


Figure 13: The FFL Value chain of Måløy. (Source: Own).

Myre

The town of Myre is in the coastal area of the Nordland County, where the port of Myre is participating in the FFL project. The participating fishing vessels collect bags which is provided by the FFL project at the port. When the vessels catch waste from the sea it is taken onboard and stuffed in the provided bags. The bags are then stored until the vessel sail to port. When arriving at the port, the waste is first light sorted and then stuffed into containers and prepared for further transportation.

The next actor by the name of Reno Vest is the local renovation company that collects the full containers from the port and replaces it with empty ones, before transporting the waste to their facility. The waste is then processed and sorted into recyclable waste and non-

recyclable waste at the facility and prepared for transport. Some of the recyclable waste is collected by Nofir and driven to a recycling plant abroad. Reno Vest has an arrangement with another company called Matmortua. They arrive at Reno Vest facility with portable machinery, where they extract granules from the recyclable waste. The granule is then transported together with other recyclable waste to Matmortua`s facility for further processing. The granule is sold to various Norwegian customers, while the other waste is recycled. The non-recyclable waste is transported by Reno vest to a local energy recovery facility.

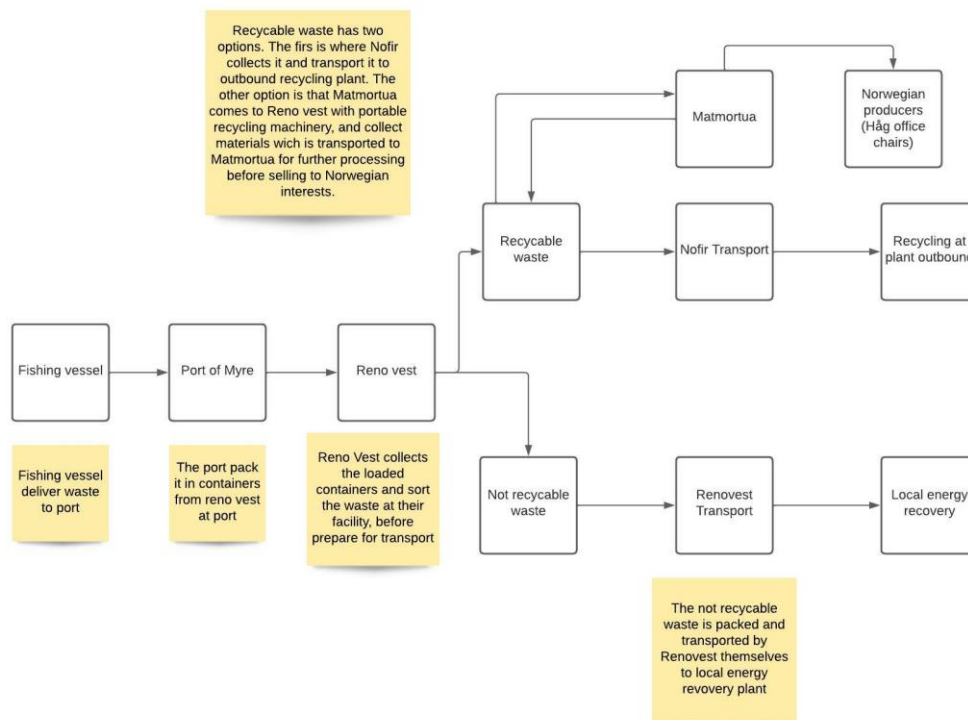


Figure 14: The Fishing for Litter value chain of Myre (Source Own).

Hvaler

The Municipality of Hvaler is in the coastal area of the Viken county, where the port of Hvaler is participating in FFL project. The participating fishing vessels collect big bags which is provided by the FFL project at port, before sailing to sea and conduct their fishing activities. When the vessels catch waste from the sea it is taken onboard and stuffed in the provided bags. The bags are then being stored until the vessel sail to port. When arriving port, the waste is stuffed into containers and prepared for further transportation. The next actor by the name of Egersund Trål is the local renovation company which collect the full containers from port and replace it with empty ones, before transporting the waste to their facility. The waste is then processed and sorted into recyclable waste and non-recyclable

waste at the facility and prepared for transport. The non-recyclable waste is transported by the local municipality to landfill. And the recyclable waste is collected by Nofir which transports it to recycling facility abroad.

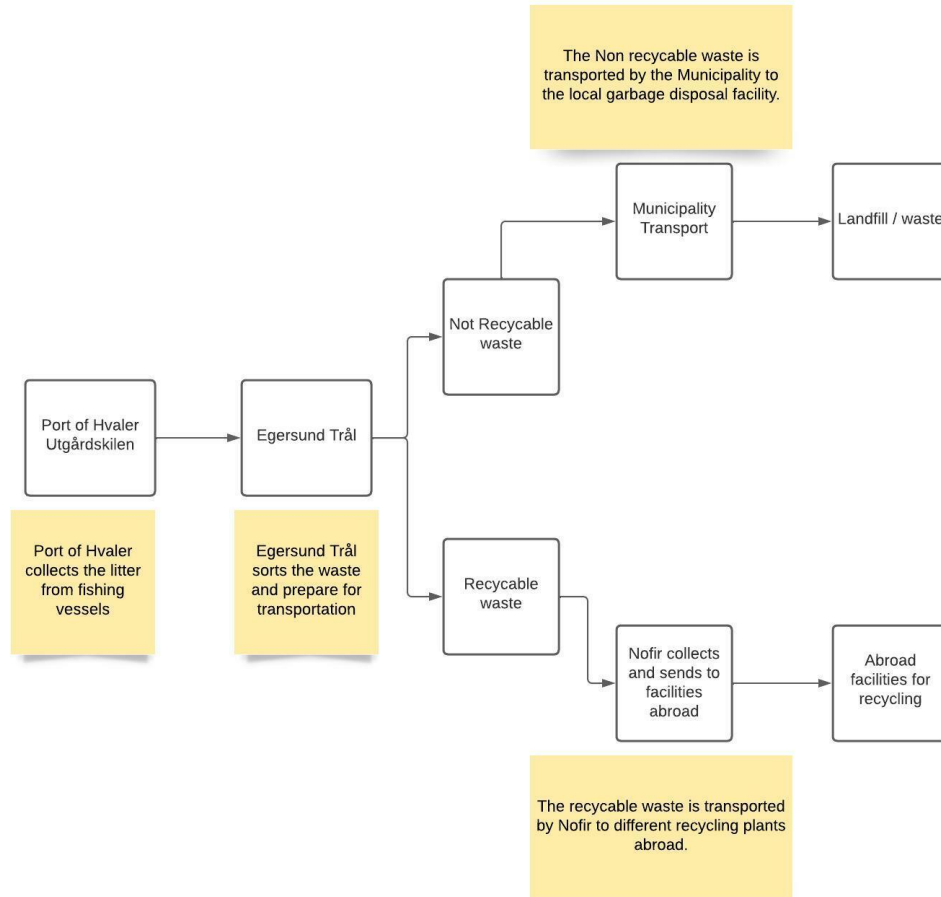


Figure 15: The Fishing for Litter value chain of Hvaler (Source: Own).

Havøysund

The town of Havøysund is located in the coastal area of the Troms and Finnmark county, where the port of Havøysund is participating in the FFL project. The participating fishing vessels collect big bags which are provided by the FFL project at the port. When the vessels catch waste from the sea it is taken onboard and stuffed in the provided bags. The bags are then stored until the vessel sail to port. When arriving at the port, the waste is first light sorted and then stuffed into containers and prepared for further transportation. The next actor by the name of Masternes Recycling, the local renovation company, collects the full containers from the port and replaces them with empty ones, before transporting the waste to their facility. The waste is then processed and sorted into recyclable waste and

non-recyclable waste at the facility and prepared for transport. The recyclable waste is collected by different actors such as Nofir, Ocean Ice, and Ivo Prec, based on the nature of the materials and the cost for Masternes. The recycling company also cooperates with a company called Golden Circle which exports some of the materials to Denmark. The non-recyclable waste is collected by a company called Gemi Nord which transports it to Sweden for energy recovery.

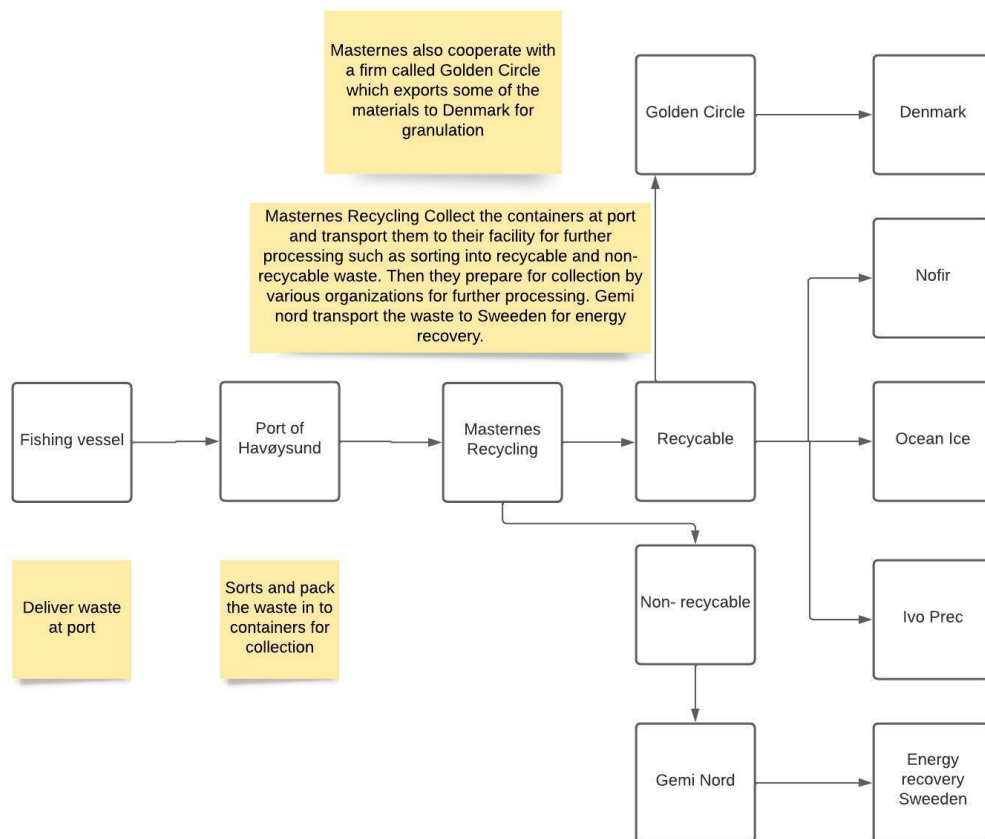


Figure 16: The Fishing for Litter value chain Havøysund (Source: Own).

Egersund

The city of Egersund is located in the coastal area of the Rogaland County where the port of Egersund is participating in FFL project. The participating fishing vessels collect big bags which are provided by the FFL project at the port. When the vessels catch waste from the sea it is taken onboard and stuffed in the provided bags. The bags are then stored until the vessel sail to port.

When arriving at the port, the waste is first light sorted and then stuffed into containers and prepared for further transportation. The next actor by the name of Miljø Container, the local renovation company, collects the full containers at the port and replaces them with

empty ones, before transporting the waste to their facility. The waste is then processed and sorted into recyclable waste and non-recyclable waste at the facility and prepared for transport. The recyclable waste is collected by various transport companies for transportation to recycling facilities in Norway and abroad. The non-recyclable waste is transported by Miljø Container for energy recovery facilities abroad.

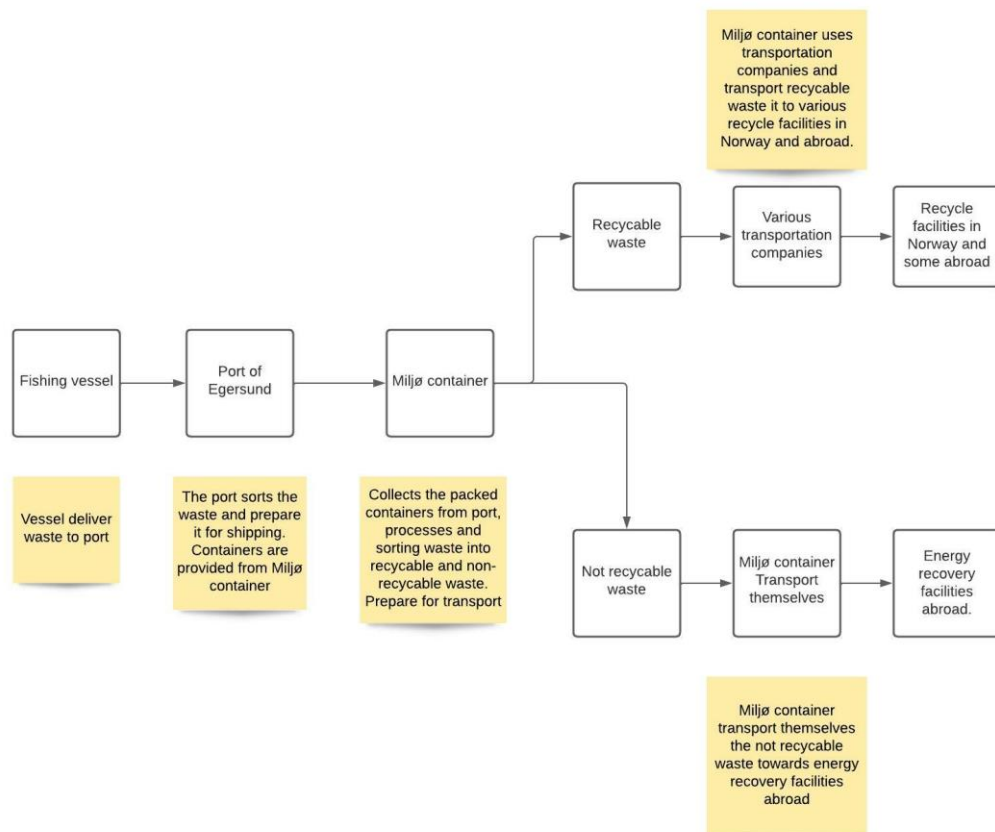


Figure 17: The Fishing for Litter value chain Egersund (Source: Own).

Båtsfjord

The town of Båtsfjord is in the coastal area of the Troms and Finnmark County, where the port of Båtsfjord is participating in FFL project. The participating fishing vessels collect big bags which are provided by the FFL project at the port. When the vessels catch waste from the sea it is taken onboard and stuffed in the provided bags. The bags are then stored until the vessel sail to port. When arriving at the port, the waste is stuffed into containers and prepared for further transportation where no sorting is executed at the port. The next actor by the name of Jan Nylund & Sønner, the local renovation company, collects the full

containers from the port and replaces them with empty ones, before transporting the waste to their facility. The waste is then processed and sorted into recyclable waste and non-recyclable waste at the facility and prepared for transport. The recyclable waste is collected by Nofir and transported to a recycling facility abroad. The non-recyclable waste is transported by Jan Nylund & Sønner AS for further processing and energy recovery at East Finnmark Renovation Company.

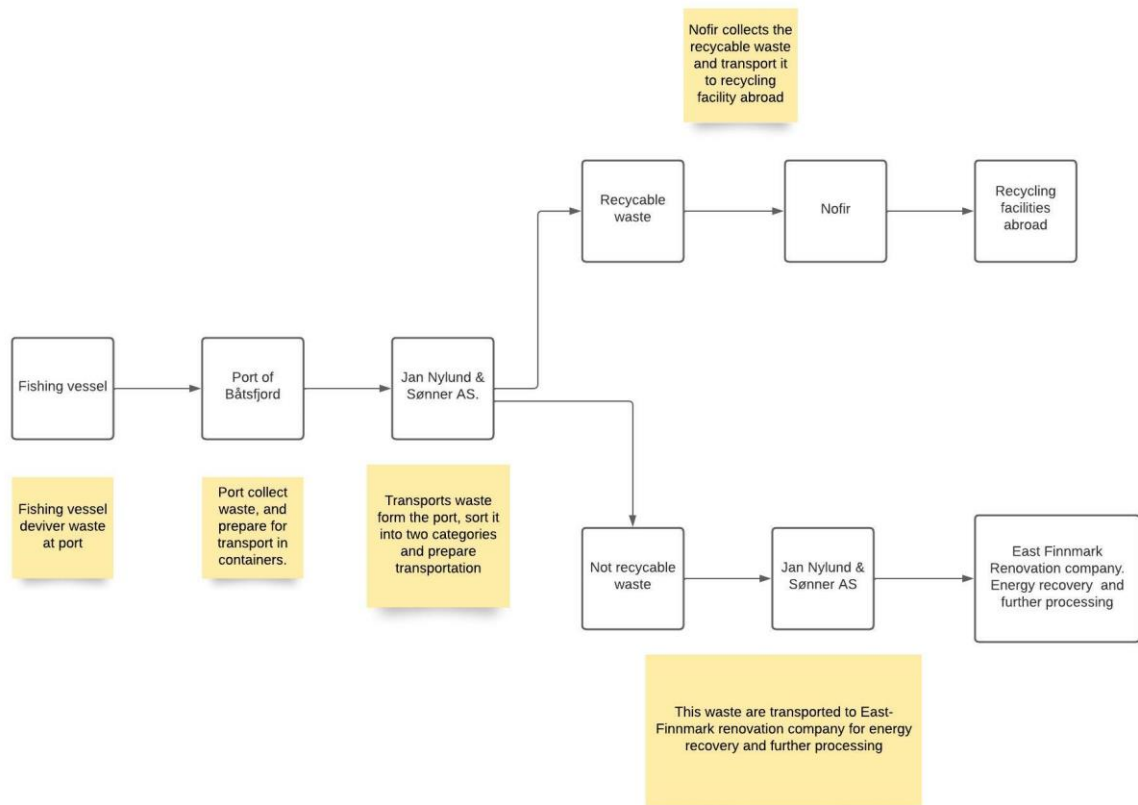


Figure 18: The Fishing for Litter value chain Båtsfjord (Source: Own).

Austevoll

Austevoll is a Norwegian island municipality in the coastal area of Vestland county where the port of Austevoll is participating in FFL project. The participating fishing vessels collect big bags which are provided by the FFL project at the port. When the vessels catch waste from the sea it is taken onboard and stuffed in the provided bags. The bags are then stored until the vessel sail to port.

When arriving at port, the waste is stuffed into containers that are provided by a local company and owned by Nofir. The waste is then prepared to be collected. The next actor by the name of Ragn Sells, the local renovation company, collects the full containers at the

port and transport them to their facility where the waste gets processed and sorted into recyclable waste, and non-recyclable waste. The recyclable waste is then transported by local companies and Ragn Sells to recycling facilities in Norway. Foreign transport companies drive some of the waste to recyclable facilities in Europe. The non-recyclable waste is transported by local companies to an energy recovery facility in Norway.

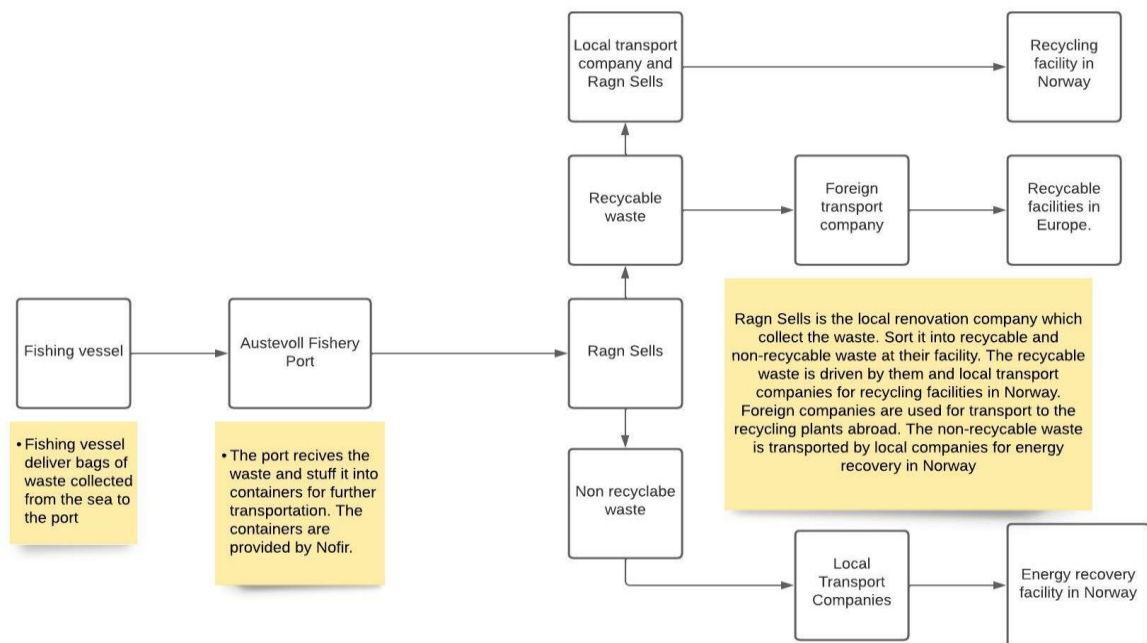


Figure 19: The Fishing for Litter value chain of Austevoll (Source: Own).

Karmøy

Karmøy is an island located in the coastal area of North-Rogaland County where the port at Akrehavn Trålboteri is participating in FFL project. The participating fishing vessels collect big bags which are provided by the FFL project at the port. When the vessels catch waste, it is taken onboard and stuffed in the provided bags. The bags are then stored until the vessel sails to port. When arriving at port, the waste is stuffed into containers and prepared for further transportation. The next actor by the name of Franzefoss, the local renovation company, collects the full containers from the port and replaces them with empty containers. Then the renovation company transports the waste to their facility for processing and sorting. Waste is sorted into recyclable waste and non-recyclable waste and is prepared for pickup. The non-recyclable waste is driven by the local company Haugeland Container Service for energy recycling. And the recyclable waste is transported by a company called OMR for

recycling.

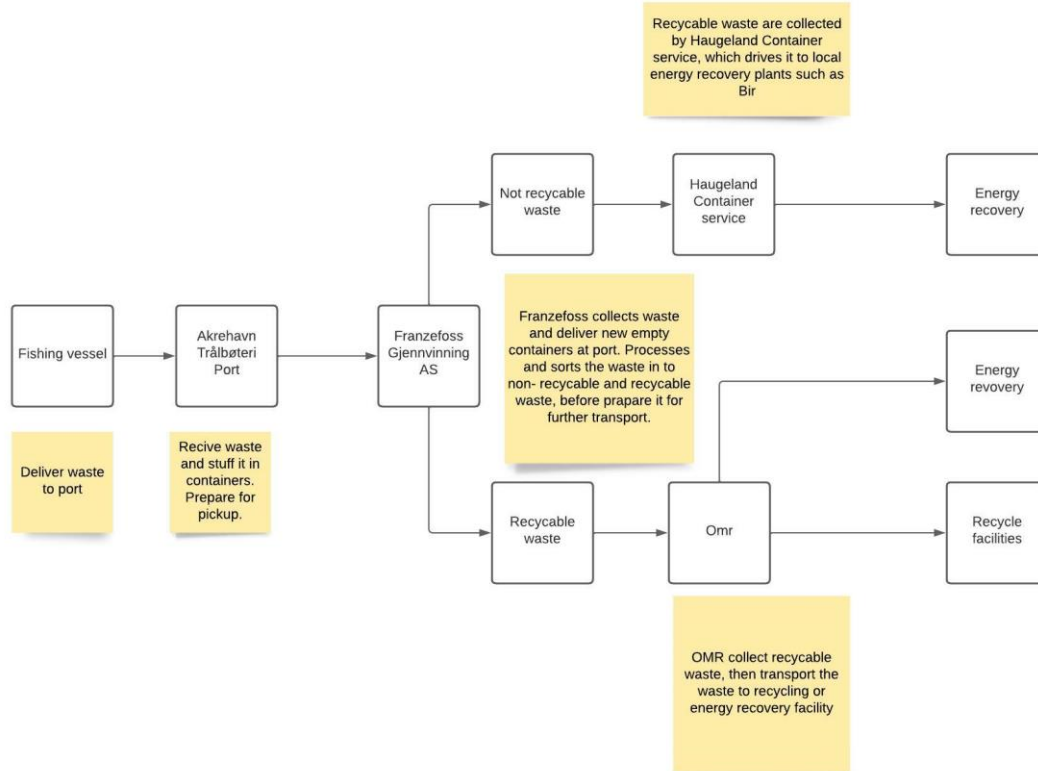


Figure 20: The Fishing for Litter value chain of Karmøy (Source: Own).

A summary of the value chains

Our value chains illustrate what happens to the collected waste at sea through various processes, which include several different actors which are affected by the activities. Although many of the value chains have the same processes and look very similar, there are some differences that we would like to highlight.

The waste is collected by the vessels and brought to port. Then the waste is transported to a renovation company which sorts the waste into categories and prepares it for further transportation. Then the waste is transported for recycling, energy recovery or landfill. This is the overall process that is similar in all the value chains. Several value chains had one specific actor participating. It seems that Nofir is involved with much of the transportation among the participants.

The mentionable differences we noticed in the value chains was that some of them had collaboration between national and foreign transport companies. And in some value chains, the renovation company did all the needed transportation themselves.

There were also other mentionable differences in some of the value chains, where the renovation companies sold their waste to other actors. The waste was then collected or transported for further processing and sold to companies such as the company which produces HÅG office chairs. One other value chain cooperated with a firm that sold the waste to Denmark. We also noticed that one of the value chains had two ports which the FFL waste was collected from. This is what we consider to be the greatest differences in our value chains, although the main processes are the same.

5.0 Analysis

This chapter contains an overview of our findings from the conducted interviews from the respondents. We conducted ten semi-structured interviews with actors from different parts of the value chain. We have identified the drivers and barriers the actors are facing based on the information provided by the respondents.

In the discussion part, we will our problem statements based on our findings and relevant theories. We will take a closer look at the driver and barriers we uncovered, and future opportunities for the FFL project in Norway. We will also take a closer look at some of the driver and barriers to the continuance of the projects and compare our findings of the FFL project to the new suggested port fee.

5.1 Findings

Drivers for participating in the FFL

When we asked about the motivation for participating in the project, several motivational factors were stated as reasons, where some of which were mutual. The respondents stated reasons such as the concern for the environment, contribution to the reduction of waste in the ocean, and sustainability. R9 also stated that participating in the FFL project also aligns with their company policy. Another motivation factor was the reduction of costs. R6 stated:

“Our motivation for participation is to reduce some of our waste disposal costs, as well as our interest in environmental concerns and show that we care for the environment in the ocean.”

R7 stated that participating gives them a competitive advantage and R4 stated that participating allows them to attract new customers. Implementing FFL practices have according to the respondents, not required any additional processes on their part. Our findings show that some of the respondents already had implemented and established the processes of waste management before joining FFL and that others have not gone through any radical changes in implementing FFL activities. R5 describes the processes of implementation as standard and uncomplicated as FFL is a regular customer of theirs. R3 states that by implementing FFL, their results have been positive since they have saved costs by delivering waste for free.

There also seems to be a high degree of alignment between the respondent's objectives and values and their participation in the FFL project where the concern for the environment and operating sustainability is of importance when conducting their operations.

There is also an overall positive attitude towards their participation in the FFL among the employees whereas R7 also stated that their employees see the value of their participation.

There is also a high focus among the respondents on CSR. All the respondents stated that their focus on CSR is a driver to some degree for participating in FFL, where it was also stated as a motivational factor by several. How they exercise CSR varies among our respondents, but there seems to be a common interest concerning the wish to contribute to their CSR.

Our finding shows that sustainability is one of the main motivations among the respondents for participating in the FFL project. It also shows that there is a positive attitude towards the project and that participants have not required any additional or allocation of resources and that the respondents' objectives and values seem to be a motivation for participating in the FFL project. Further, other drivers such as reduction in costs and competitive advantage were stated as one of the motivations for participating.

Barriers of the participation

According to some of the respondents they are also facing a few barriers. R6 stated that the attitude amongst the employees are positive, but further stated that: "*.....we miss more facilities that handle FFL waste, it's too few of them. All the ports should be able to facilitate FFL and receive the FFL-big bags, even if they are not participating in the program, which would lead to a reduction in the need for transportation. There is much unnecessary transportation because when we deliver waste our company often needs to rent a truck and drive separately FFL waste to another facility that receives FFL waste.*" Further, R4 stated that the FFL containers tend to be stored for a longer time at their location before they are collected by the next FFL actor. R5 replied that in their facility there could also be a lack of storage space, but that overall, the attitude is positive.

Technology drivers

Implementing the technology system used for reporting waste has been, described by those applying it as easy to use and unproblematic. R5 states that they use their own reporting

system and describes it as very standardized. When asked if the registration system can be improved in any way R7 states that probably, but not likely for their department. R9 states that the current system works just fine from their point of view verse several of the respondents stated that the current system works well from their point of view, but it was mentioned by some that it had the potential for improvements, whereas R1 mentioned a more integrated system between them and Salt that store and share the information between them.

Technology barriers

Our findings show that most of the respondents did not use the same system for reporting, where eight of our respondents conducted some sort of reporting. R2 and R8 replied when asked, that they did not do any waste reporting and the respondents did use different report systems. R11, R1, and R9 stated that they use e-mails, and R7 stated that they include the information as a voucher with an invoice and sent it to FFL. Of all the respondents six report the amount of waste to FFL. R3 and R6 register the waste using SeafeSeaNet or a “Garbage Record Book”. Reporting is not necessarily conducted on a regular basis which can be to the variation of the fishing season among the respondents according to R4 conducted when it is requested by Salt, except

Even though the respondents described the current registration system as user-friendly, some still believed that the system had the potential for improvements. R3 mentioned that the system has some potential for improvements by facilitating better sorting activities since the waste is sorted at the vessels but then placed in the same container when arriving at the port.

R4 states that the current report functions should be improved to make it easier to share information between the FFL actors and the government. There seems to be a need for technological systems that can simplify the sorting process among some of or respondents.

R5 describes the waste analysis as challenging due to the condition of the waste upon arrival since it is all tangled up and that some improvements could be done in that process.

Incentives to participate in the FFL project

Incentives that motivate the respondents to participate in the FFL project, our findings shows that there are several incentives that contribute to this fact. R1 stated that previously the vessels had to pay money when they delivered waste at the port which resulted in high costs for the vessels, but by participating in FFL, the vessels saw an opportunity to make a reduction in these costs.

Another motivation expressed by R8 is that everyone has an interest to contribute to the environmental aspects. Another incentive to participate R8 mentioned is the wish to remove fishing waste in the sea since it can result in problems for further fishing activities by damaging their own and others fishing gear. R11 states that the main incentive, in their point of view, is that their fishing activities are their livelihood, and they, therefore, should not contribute to the littering of the ocean. There seems to be an overall motivation and understanding of the importance of bringing the waste to the port in a proper manner among the respondents. As R9 states, *“We think most of the vessels are motivated to bring marine waste to port and dispose of it properly, because the alternative, to dispose of it at sea is not beneficial to anyone. I think an impression that there is a focus among fishermen to bring the waste to port, but there are costs related to the delivery to waste. As long as you have an arrangement such as FFL, it encourages boats to deliver waste at ports”*. R6 stated that the awareness among the fishermen has increased regarding marine waste.

Incentives for participation barriers

As a measure to contribute to more people participating in the FFL the respondents were asked to what extent incentives could contribute to this fact. R3 mentioned incentives such as free participation and allowing more actors to participate as incentives. Keeping the participation and the delivery of waste-free seems to be an important incentive that could encourage participants to keep participating and new participants that wish, as R7 stated motivation for them was the ability to deliver waste for free

Another factor that was highlighted by some of the respondents was information. By analysing the statements of the respondents there was highlighted that information about the project could be a contributor to encouraging more actors to participate in FFL. As R2 stated: *“We think much could be done if the word about FFL got through to more potential participants through their channels such as forums and other channels.”* R9 also stated that information to the right actors and increased marketing about the project could motivate more people to participate in the project. Based on these statements there seems

to be a lack of information and advertising about the project to potentially recruit more members. R11 mentions more available information about the project as one factor that could motivate people to participate.

Another aspect that was mentioned by several respondents was the need for more receiving facilities. R5 stated that “.....*Some of our customers wish to participate in FFL so believe there is a need for more waste facilities where they can deliver retrieved waste.*” R6 mentions building more receiving facilities, or that more of the existing facilities accept FFL waste, regardless of if they are participants in the project, as factors that could incentivize more participants to participate in the project. R7 pointed out that the project should facilitate better for smaller vessels, so they could deliver waste within a short distance from where they deliver fish.

Further R6 said that by facilitating waste delivery in a convenient way could be an incentive for more people to bring waste they catch at sea. R8 stated that the most important thing to motivate such, is that vessels can deliver waste they the port regardless of their they are and that all ports accepts all kind of waste.

Another barrier that was highlighted by some of the respondents was the issue of becoming a member. R6 stated “*I think the issue here is to be accepted as a member and many of the vessels want to be a member of FFL, but it is not easy to become one. Our vessel spent time in a queue before it was accepted for the FFL project.*” As mentioned earlier, R3 mentions allowing more participants i to the project as one incentive that could contribute to more participants. R7 on the other hand stated that they believe that there is currently no more room for the bigger vessels to participate. Based on these statements’ barriers such as lack of available information and advertisement about the project, lack of receiving facilities, and the process of becoming a member seem to be present.

Financial drivers

The majority of the respondents replied that implementing FFL has not had a negative impact on their costs whereas R3 stated that their participation has rather affected their cost in a positive way since they can by participating, deliver waste for free, which they earlier had to pay for. R6 also stated that their costs have been reduced since they now can deliver some of their waste for free. R7 and R5 stated that they don’t have any costs connected to FFL since they are compensated or sent as an invoice. One of the respondents expressed that they had some negative costs in the beginning, but as R4 further stated after

being assisted by FFL, new partnerships were created with firms they could cooperate with, which led to their storage capabilities improved and transport costs were reduced. Implementation of RL has not based on the respondents' statements affected other factors than their cost. R1 states that it has affected them positively since some of the participating vessels choose to deliver fish at their location since they also can deliver FFL. R11 stated that they have not been affected either negatively or positively, only positively since they now are able to retrieve and bring some of the waste to port.

When asked what they believe is the biggest cost driver connected to their participation in FFL four of the respondents stated that they don't have any additional cost linked to their participation whereas R11 mentioned that they have enough space on deck to store the waste and they have no additional expenses if it do not damage to their fishing gear. According to R1, the current workflow is optimal since they are able to transport the waste to the next actor that has the capacity to sort the waste. R7 says that the activities that take place with them are optimal and that they cannot be done any better.

Financial barriers

Concerning the financial challenges, there are not many of the respondents that are currently facing such. R1 stated that they have experienced some increase in the cost of fuel and handling cost, but they get those costs covered so they have no other expenses related to their participation in FFL. Further, R1 identified expenses regarding forklifts as their biggest cost driver. R5 and R6 identified transportation as their biggest cost driver associated with their participation. R6 stated; *"The cost of transport. We must drive one hour and take a ferry to reach the FFL facility. If the quantity of FFL waste is small, we deliver the waste to a closer facility."* For R9 the time they spend weighing and receiving the waste before packaging and preparing containers was considered the greatest cost driver.

Based on these statements it is reasonable to believe that some of the respondents are facing expenses regarding their participation in FFL. We have identified transportation costs and operational costs such as receiving and sorting of the waste as the barriers some of them are facing.

Legislative drivers

The majority of the respondents stated that they are subjected to regulations regarding marine litter and handling of waste. Several of the respondents, except one, stated that the regulations affect them positively or not negatively. As R1 stated *“It’s a framework that we must adapt to. It’s neither negative or positive, it’s just our ordinary day at work.....”* Further, R4 stated that the regulations have affected them positively since they have been given a framework under which they can conduct their business within. Regulations were also not identified as an obstacle to them conducting their work by the respondents. According to R3, waste is more regulated regarding what is allowed to throw overboard than previously. And this has increased the awareness about the consequences of littering. Based on the statements from the respondents, regulations can lead to a change in awareness and present the organizations with clear guidelines under which they can operate within.

Legislative barriers

According to R5, they have had some costs in connection to the regulations that apply to them, but they are integrated into their price. Some of the respondents believe that no more regulations should be implemented to encourage more people to participate in FFL or deliver waste they catch at sea. On the other hand, other solutions were suggested that could contribute to this as R1 stated; *“The fishery is already regulated, and we don’t think that it’s necessary to oppose more regulations. Rather think about which incentives could promote participation.”* R4 believes that more information about FFL is needed, and R7 believed that a campaign that aims to change the attitude and information toward fishermen could lead to more waste brought to port. R5 said that economic incentives, and a guide stating that you are obliged to bring collected waste is possible. Further, R11 pointed out that a return policy on fishing gear could be a part of the solution.

Drivers: processes in the value chain

The current processes that take part at the respondent’s facilities or vessels are according to the respondents a well-function system where the processes of receiving, sorting and delivering waste work well. Most of the respondents replied that the processes as they are today work well for their part. R2 stated that the vessels can deliver FFL waste at the same port they unload fish, and if they only wish to deliver FFL, they are not charged with any port fee which R2 further describes as an incentive to deliver marine waste. R3 stated that the project also considers the storage limitation on deck some the vessels may have.

Many of the respondents also stated that they have access to the resources to carry out their work with FFL. R1 stated that they have a high degree of access to resources to carry out their work with FFL. R2 also stated that they have all the available resources, and if they need help, FFL has always assisted them. 7 of the 11 respondents replied that the current infrastructure works well in carrying out their work. R4 stated that the current infrastructure is in place, but it is always improving, and more improved solutions will come in the future. R9 said that the vessels save time since they can repair their equipment and deliver waste at the same facility, rather than do that in separate locations

Processes: Barriers

The respondents are facing some barriers in the current processes such as the lack of storage. R4 stated that the processes regarding delivery and sorting work well, but there are challenges when it comes to the storing of the waste. R5 also mentioned that they have limited storage at their facility. Further, R4 states that they are also facing some challenges transporting the waste. As R6 states, “..... *the transportation part could be improved since it's too few waste facilities that are a part of FFL.*”

There also seems to be a lack of ports receiving waste from FFL. As R8 stated; “..... *Yes, but I wish there were more port locations available that could receive FFL.*” R11 suggests that the ports could be better geographically located so it will be more convenient to facilitate waste delivery for smaller vessels. R11 also believes that an extension of the project, with more participating ports, could be beneficial to smaller vessels with limited storing on deck. Further, R11 have an impression that since many vessels choose to deliver at the same port, some ports have reached their capacity.

Based on this information and statements we have identified the following barriers: lack of storage, lack of port facilities, limited storing on deck for smaller vessels, some ports have reached their capacity, and transportation challenges.

Interaction drivers

When it comes to interaction and communication with other actors in the value chain, the degree of communication seems to vary among the respondents and who communicate with. R2 states that they communicate with the port receiving facility and Salt, and R3 states that their only interaction is with the port. R5, on the other hand, states that in addition to communicating with Salt, they also communicate with other partners which is operating in the same industry where they share their experiences and how things could be

done. This was also the case for R6 which stated, *“Many vessels that participate in FFL communicate with each other. In our area, we have a group consisting of several vessels where we meet a few times annually and discuss subjects such as environmental aspects and other operational topics and we also share experiences with each other. It was at those meetings I became aware of the FFL project.”* R6 also stated that they do share experiences and knowledge with other actors at those meetings.

According to R11, there is a lot of communication taking place between the vessels where the focus on marine waste and keeping the ocean clean is of high importance.

There seem to be an overall understanding of what benefits communication provides among the asked respondents. R6 stated that communicating with other actors in the FFL value chain can lead to more awareness among the participants. R5 believes that this can provide benefits such as sharing available solutions to the problems they might be facing. R2 believed that experiences could be shared, and R8 states that by communication everyone doesn't have to make the same mistake. According to R1, communicating with other actors contributes to increased awareness regarding marine waste and the importance of the FFL project. Four of the respondents stated that they are pleased with the current level of communication.

Based on these statements we have identified the following drivers for communication, sharing of experiences, solutions to challenges, and increased awareness.

Interaction barriers

Several of the respondents stated that they do communicate with other actors to some degree in the FFL value chain, however, the communication seems to be, among some of the respondents, somewhat limited. R7 states they don't communicate with other actors in the FFL value chain, and R5 stated they only communicate with Nofir and other actors operating in the same business. On the other hand, R9 states they communicate with the FFL organizer through emails and the vessels, but not with other ports. R4 states they only communicate with the actors transporting and receiving their waste and R3 states they only communicate with the port. Two of the respondents also stated that FFL is not a topic. Among some of the respondents, there is also a limitation concerning the sharing of knowledge and experience with other actors. R9 states that they share a limited extent of experiences and knowledge, and R2 states they don't share experiences and knowledge

with other actors. R5 said they do share knowledge but are limited due to time and resources, and that could be an area of improvement.

Based on the information provided by the respondents we have uncovered the following barriers: limited communication through the value chain, limited communication with other actors, and limited experience sharing.

Drivers for the future of Fishing for Litter

For FFL to continue in the future and for more vessels to join several factors were pointed out by the respondents. According to R1, the project should allow and accept more vessels that wish to join and the project itself should receive more support. Another thing that was pointed out by some of the respondents was the need for more information and advertisement about the project. R8 stated *“I think that more advertisement is needed. We did not hear anything about FFL before we bought the vessel which was already a member of the project.”*

Another aspect that was mentioned by several of the respondents, was the need for more ports that can facilitate FFL waste. R4 stated that vessels should have the alternative to delivering waste at ports, so their fishing activity is not interrupted. According to R6, the project should continue like it is today and every port that handles waste should also be able to accept FFL waste.

Another driver that was identified by the respondents was the continued of vessels to keep delivering waste for free. As R8 stated *“If it’s free of charge to deliver the waste, it is not necessary with any compensation in my point of view”*.

Another driver among the respondents was the continuance of support from the government. According to R1, the government should also keep supporting the project, include foreign vessels in the project, and increase financial support. R2 stated the following: *“Get the politicians to understand that this project is a good thing for the sea, the environment, and the local area”*.

Barriers for the future of Fishing for Litter

For the FFL project to continue in the future, we were able to uncover barriers based on the information provided by the respondents. One of the barriers are the restriction of the number of members. According to R1, the project doesn’t currently accept more participating vessels. As R6 previously had stated it is not easy to become a member and

they had to wait in line for their vessel to become a member of FFL. According to R3, the process of becoming a member is also time-consuming.

Another barrier for FFL to continue in the future is the need for financial support.

According to R1 the financial limit on the project needs to be increased for it to continue.

It was also stated by R3 that the government should keep supporting the project financially. Another barrier we identified is the lack of advertisement and visibility.

Several of the respondents mentioned that there is a need for more advertisement and visibility for more vessels to join FFL and for it to continue in the future.

5.2 Discussion

In this chapter, we will answer our research questions based on our findings and relevant theories. We will take a closer look at the driver and barriers we uncovered, and future opportunities for the FFL project in Norway. We will also take a closer look at some of the barriers to the continuance of the projects. Further, we will compare our findings with exciting theories.

RQ1 What is the motivation and drivers for the actors in the FFL value chain and what barriers are they facing?

5.2.1 Drivers

Sustainability

Our findings show that there is a positive attitude amongst our respondents and their employees towards participation in the FFL project. They also show that sustainability is a high focus among our respondents and motivation for participating FFL project. As mentioned, there has been increasing pressure on businesses to operate in a more sustainable manner and adopt practices that reduce their impact on the environment. On the other hand, the focus on sustainability can also be an opportunity for companies to increase their economic, environmental, and social performance (Morgan et. al, 2018). As stated by Dekker (2004), one of the motivations for adopting RL practices is profit, which aligns with the statement from our respondents where it was stated that they gain a competitive advantage by participating in the FFL project.

Based on the statements, there seems to be an awareness among the fishermen regarding marine waste and its consequences. This aligns with one of the goals of FFL, which is as previously mentioned in the introductory chapter, to increase awareness regarding marine waste.

Competitive advantage

Some of the respondents also stated competitive advantage as one of the motivations for participating in the FFL project. They experienced new partnerships with other actors, and someone even have extended their activities and got new costumers, which may also have been contributed to increase in their revenue. We have identified this to be a driver for implementing CE, since it according to (Barros et al, 2021) may lead to new sources of revenue and more sustainable future for the actors, by reuse and recycling of products. The participants also aimed to use their available capacity as efficient as possible, and utilize their assets, this is also a driver to implement CE, since Barros et al, (2021) emphasised that the concept is about the setup of the firms functions to reduce, slow or narrow material and energy flows.

As mentioned earlier the participants in FFL project are motivated to conduct their business in a sustainable way. It's important for them that the community and other organizations consider them to operate within the given regulations and framework. The environmental reputation of a company may affect its operations in terms of efficiency, cost reduction and to comply within various regulations (McKinnon et. al, 2015). We identified this as a driver to implement green logistics which aims to link the environmental, economic, and social aspects to its activities (EL- Berishy et al, 2013) and may be seen as a key element when shifting towards CE (Seroka – Stolka & Kubicka (2019).

Since some of the participants are likely to face a new imposed regulation in the future, they might want to prepare themselves for the upcoming regulations. Therefore, we have identified these preparations as a driver to implement the concept of RL since according to Dekker et. al (2004), adopting RL may help various industries to be prepared for regulations in the future, by facilitate for product recovery processes. This is general in focus among the participants, as some of them wish to recycle more of the marine waste rather than take it to landfill.

Cost savings and waste reduction as incentives for FFL participation

Our findings show that one of the reasons for participation in FFL is likely the cost-saving it provides, in terms of that the vessels may deliver marine waste for free. Another reason is the concern for the environment, which can also be extracted from our findings. These two reasons for participation could be identified as a driver for participating in the FFL project.

In our theories, we mention that incentives can be used to motivate a certain behaviour, and (Iyer & Kashyap, 2007) describes incentives as something that may lead to a positive reward for an individual. The concern for the environment, the perspective, and beliefs can be connected to the internal motivation of an individual, also known as intrinsic motivation. By extracting information from our findings, we can tell that several of the respondents have a concern about the marine environment, and wish to contribute to cleaner seas, because it is the right thing to do, and many make their living off the resources the sea provides. This motivation may be one of the intrinsic reasons for the environmental concern.

The other driver for participation we could identify from our interviews was the cost reduction the vessels experienced. Before FFL, the vessels had to pay a fee to deliver waste at the port. But since the project launched the interest in participation has grown among the participants. Previously, such financial incentives, also known as monetary incentives, were described as a tool to motivate individuals to perform a task. Further, as mentioned by Wang, Huo & Duan (2020), it can also motivate recycling behaviour. Based on some of the respondent's statements, there is a reason to believe that the opportunity to deliver waste for free, it's a motivation itself and to other potential participants.

Corporate Social Responsibility

Another driver was the participation aligning with the respondent's focus on corporate social responsibility, which was a motivation and a contributor factor among several for participating in the FFL project. This aligns with proposed suggestions in the literature where social responsibility has been suggested as one of the motivational components for companies to adopt greener activities (Andiç et.al, 2012). Several of the respondents reported that they contribute to their community through their focus on CSR. By contributing to their local community, it can provide positive feelings and good morale amongst the employees towards the implementation of green processes (Andiç et.al, 2012).

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Some of the respondents also stated competitive advantage as one of the motivations for participating in the FFL project. They experienced new partnerships with other actors, and someone even have extended their activities and got new costumers, which may also have been contributed to increase in their revenue. We have identified this to be a driver for implementing CE, since it according to (Barros et al, 2021) may lead to new sources of revenue and more sustainable future for the actors, by reuse and recycling of products. The participants also aimed to use their available capacity as efficient as possible, and utilize their assets, this is also a driver to implement CE, since Barros et al, (2021) emphasised that the concept is about the setup of the firms functions to reduce, slow or narrow material and energy flows.

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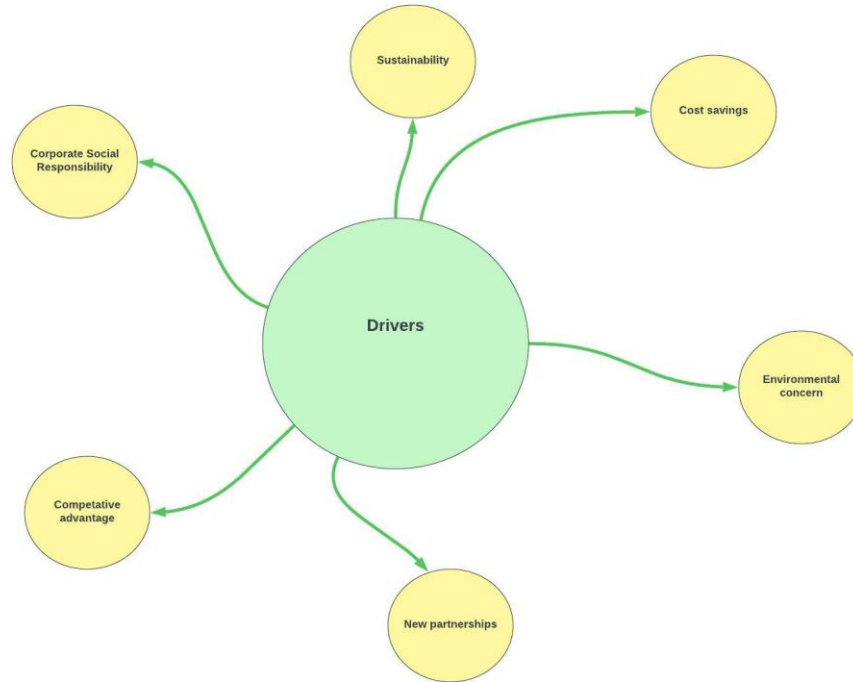


Figure 21: An overview of the drivers in FFL value chain (Source: Own).

5.2.2 Barriers

The actors in the value chain are in addition to the identified drivers, also facing some barriers during their daily operations. Based on our findings, we have identified the main barriers the actors are facing, and what barriers the FFL is facing for it to continue, based on the respondents' statements.

Lack of port facilities

One of the barriers we were able to uncover through the interview which was highlighted by several of the respondents was the lack of port facilities. Currently, there are 11 ports participating in the project, where the vessels participating can deliver marine for free (SALT, unpublished report [2021]). As R6 stated, ports, independent of whether they are participating in the project or not, should be able to facilitate FFL waste. R5, R7, R8, and R11 also expressed the same concern for the need for more waste receiving facilities. Not being able to deliver waste at the most convenient port, can lead to waste being stored for a long time, which was the case for R8.

There seems to be an agreement between several of the respondents on the need for more ports receiving FFL waste. According to the FFL report by SALT (unpublished report [2021]), they received several inquiries on the need for more receiving facilities. During a survey conducted by SALT among the participant in the FFL project in Norway, they found that 10,5 percent are very displeased with the number of facilitation ports, 15,3 percent are a little dissatisfied, and 47,3 % are somewhat satisfied. Based on SALT's findings and ours, we can assume there is a degree of alignment between our findings and theirs.

Our thesis and SALT's survey was conducted among participants in the project, where the opinion of the nonparticipants has not been highlighted. Norway is through MARPOL Annex V, obligated to ensure waste facilities that fit the vessel's needs and are placed at a convenient location, so the vessels don't experience any delays in their daily operations (IMO). Through the Directive 2000/59/EC all ships are currently paying a fee when delivering waste. Norway is also obligated through the same directive to ensure available port receiving facilities (European Union, 2000). However, in 2016, EFTA ruled that Norway has failed to fulfill its obligation to ensure sufficient port waste facilities for ships as obligated by the Directive 2000/59/EC. Norway had only ensured sufficient port waste facilities in 1514 ports out of 4443 (EFTA, 2016).

Lack of integrated information systems

Companies today recognize the importance of having an information system that is well functional concerning the sharing of information across the value chain, that is easy to use, and contributes to optimization (Daugherty et. al, 2002; Jayaraman et.al, 2008). Aligning with Daugherty et. al (2002) and Jayaraman et.al (2008) statements, the informants stated that the current registration system is convenient and easy to use. However, based on the information provided, the reporting of waste is mostly done by email or through their own internal system. The lack of an information system can, as mentioned, reduce a company's responsiveness and a lack of shared data between the actors (Meyer et al., 2017).

According to R4, the current registration system should be improved since it could simplify the registration process and the reporting to FFL and the authorities.

Adopting and implementing an information system for reporting waste, it could lead to a higher degree of integration between the actors in the FFL project, and also contribute to

increased reliability, accuracy, and efficiency through the value chain (Panayides & Song, 2009).

Lack of available information and advertisement

Several of the respondents stated that they have received information about the purpose and the goal of the project from SALT, however, it was highlighted by several of the respondents about the lack of the information and advertisement available about the FFL project. R8 stated that they haven't heard about the FFL project before they required a boat that was already a member, and R4 stated they hadn't heard about the project until they received a request for participation. R2, R4, R8, R9, and R11 also highlighted the need for more information and advertisement about the project. This aligns with the findings of Whyles et.al (2019) who evaluated the FFL scheme in the UK, where lack of information was identified as a barrier to participating in the FFL product.

Limited sharing of knowledge and experiences

Another barrier we were able to identify was the lack of sharing of knowledge and experiences across the value chain regarding FFL. We have identified this as a barrier since as mentioned by Banomyong, (2018), sharing of information among the supply chain members can improve the overall performance and be used for taking strategic, operational, and tactical decisions between partners. Several benefits were highlighted by the respondents that sharing of experiences could provide such as learning, solutions to challenges, and increased awareness. This aligns with the statement of Bartol & Srivastatva (2002) that sharing of information can lead to benefits such as organizational learning and creation, but also performance achievements, which can prove to be a benefit for the actors in the value chain of FFL. However, some of the respondents express that they were pleased with the current state of information sharing, but the importance and the benefits of information sharing across organizations seem to be a contributing factor to organizations' success which can according to Hendriks (1999) lead to competitive value for the organization when knowledge possessed by the individual is transformed into a competitive advantage for the organization. Based on the statements from the respondents and the theory presented it seems that a higher degree of information sharing can provide several benefits for the actors in the value chain, therefore we identify lack of information sharing as a current barrier.

Lack of storage and increased transportation

Our findings show that the participants experienced much unnecessary transportation and lack of storage capacity due to the limited FFL facilities participating in the project.

Some of the respondents stated that they had increased transportation since they could not deliver FFL to the closest waste management facility but had to drive to a facility that was a member of FFL. This led to a great amount of unnecessary transportation between the entities. According to Mckinnon (2015) transportation by road is a major contributor to environmental impact of logistics, and greening the logistical operations is considered as a good business practice for sustainable development.

Regarding the storage capacity, some of the respondents pointed out that they had to store the FFL waste for a long period of time before it was collected. That was storage capacity at the plant which could be used for something else, was then occupied by waste bags from FFL, which often was stored for long period of time. According to Butt (2007) the ports and the contractors should have access to the required facilities to conduct their activities, which he emphasized was important. (Song & Yeo, 2004) also emphasized that the necessary resources is crucial to have the available, and it affected the business entity how well it could stay competitive advantage compared to its competitors. Based on this finding we identified that there is much unnecessary transportation between the participating facilities. We also identified that some of the actors experienced capacity limitations regarding storage for FFL waste.

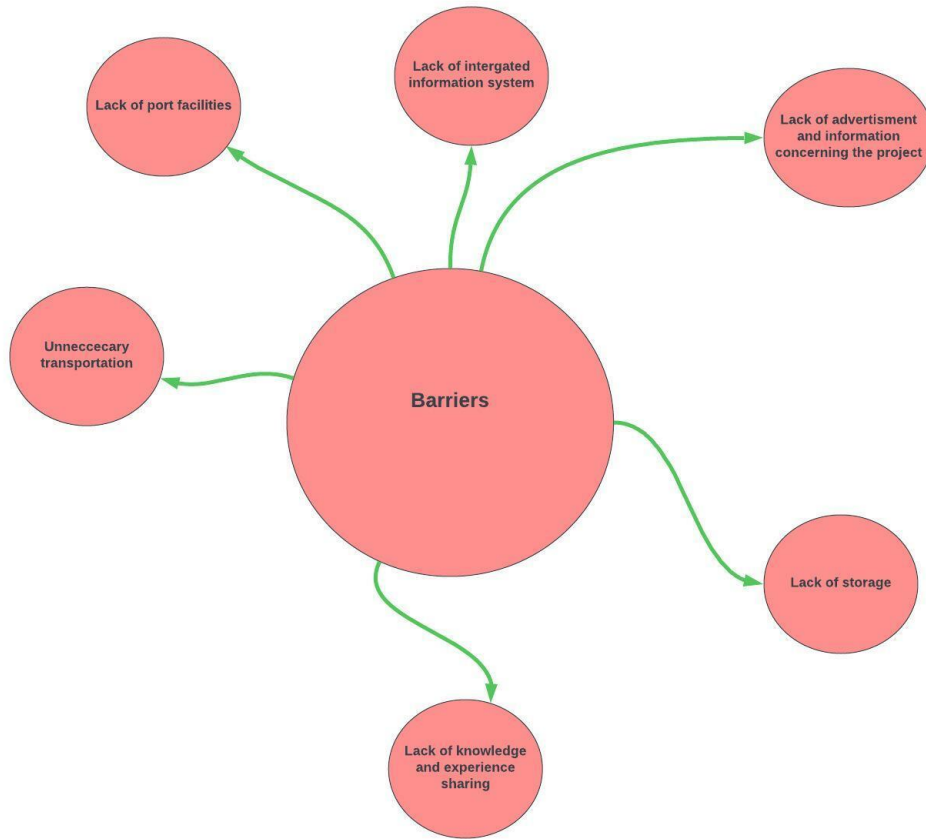


Figure 22: An overview of the barriers in the FFL value chain (Source: Own).

5.2.4 Future opportunities for the FFL project

For the continuance of the FFL project, several factors have been uncovered that need to be considered to facilitate the project for future operations. These mentioned factors are based on our findings, and it is important to discuss them and highlight some of the reasons why they are important to be considered. This should be adequate to answer the following RQ2:

“What is the future prospect for the FFL project in regard to infrastructure, regulations, finances, and management?”

Infrastructure

In our thesis, we have conducted a single-case study where we have identified the drivers and barriers among the participants in the FFL project. We interviewed 10 members of a total of 102 vessels and 11 ports currently participating. We would recommend the following further research in this area:

Since we in our case have interviewed 10 of the participating actors in the value chain, we believe it would be interesting to take a close look at the drivers and barriers among a larger number of respondents to see if there is an alignment between the uncovered drivers and barriers in this thesis and the potential findings among a higher number of representatives in the value chain.

In this case study, we assessed the value chain from the waste is retrieved by the vessel, and until it reaches the waste management companies. Based on this it could be interesting to take a closer look at the value chain after the waste leaves the waste management companies. We believe that this topic would be interesting to investigate from an RL and sustainability perspective.

Regulations

The fishing industry is regulated, and there are many regulations which is being imposed on the industry. Our findings show that many of the participants think they are regulated enough and would rather have incentives instead of being imposed more regulations. It is fair to believe that the regulations could guide the participants to certain actions, but there might be a balance between of how much regulation is to many and how much is accepted. Other factors regarding regulations are how they affect the participants, does it generate extra cost, or does it promote and reward for certain actions. Regarding future considerations of the FFL project, the regulative scheme needs to account for how it does affect the participators, and if other options are more feasible such as incentives or best particles to promote certain behavior.

Economic prospects

The fishing industry is regulated, and there are many regulations which is being imposed on the industry. Our findings show that many of the participants think they are regulated enough and would rather have incentives instead of being imposed more regulations. It is fair to believe that the regulations could guide the participants to certain actions, but there might be a balance between of how much regulation is to many and how much is accepted. Other factors regarding regulations are how they affect the participants, does it generate extra cost, or does it promote and reward for certain actions. Regarding future considerations of the FFL project, the regulative scheme needs to account for how it does affect the participators, and if other options are more feasible such as incentives or best particles to promote certain behavior.

Management

The future prospect for the management within the FFL project is to allow more participants. Our findings uncovered a great amount of participation will among the actors, especially among the fishing vessels. The potential new members are positive to join the project, but many complained that the process was slow. It is fair to believe that this is something that could be improved, so the applicants should not have to spend much time to get accepted. The project should also improve their advertisement to the market and use the available channels to reach their potential participants, since the information is not commonly distributed in their channels. Moreover, the information flow between the participants and the project could be improved, by using more similar information systems to communicate with each other which could lead to better cooperation. This would likely improve the communication and the level of information sharing in the project, as well give the participants the possibility to share knowledge, best practices, and other benefits of information sharing. It is fair to believe that these are some of the important factors need to be considerate to facilitate the project for the future. Much could be determined by how the project is conducted and the management could be factors for improvement when considerate the mentioned factors.

5.2.5 FFL vs. the new port fee

In this part of our thesis, we will uncover the strengths, weaknesses, opportunities and threats of the FFL scheme and the new suggested port fee. To give a better overview, we will separate our findings in a SWOT analysis.

RQ3: Which are the strengths, weaknesses, opportunities, and threats related to alternative return logistics systems for marine litter compared to the FFL-scheme?

Today the participating vessels of the FFL scheme can deliver waste for free at 11 ports located along the coast of Norway, however since there are only the participating ones that can deliver for free, there are still vessels that are excluded from this arrangement that are forced to pay a fee when delivering waste at the port. The suggested port fee aims to impose a tax on every vessel registered in Norway, and all vessels will be included in this arrangement and by paying a fee, they can deliver waste for free. This could also eliminate

another challenge that was pointed out by R6. He pointed out that becoming a member of the FFL project is not easy due to que. A reason for this might be that, as stated by R11, ports have reached their capacity since many vessels deliver waste to the same port.

The costs the participants have in connection to activities to the FFL are covered by the project itself, where the actors that had expenses are reimbursed through the project. With the new port fee, it is expected that the ports will experience an increase in costs, which will likely have negative economic consequences for the ports.

It is expected that the ports will possess more responsibility in the beginning since they will be responsible to establish various process that their locations. As mentioned, Norway has failed to ensure adequate receiving facilities at ports in Norway where many ports are lacking the infrastructure to facilities this. Based on this it this, there might be reason the believe that this task will prove to be a challenge, and therefore there will not be enough ports in place to facilities the delivery of waste forms the increasing number of vessels the new port fee will include. Further, the new suggested port fee will not necessarily result in the elimination of the barriers the participants of the FFL scheme is facing, the lack of port facilities.

One of the respondents pointed out that there was a wish for more waste to be recycled than what the currently is though the FFL, however, one of the reasons for this can be current state of the litter since much of it has detreated due to the condition at the bottom of the sea. Though the suggested port fee, facilitation for reuse and recycling of the collected waste is of focus. This will likely result in the need for better infrastructure such as an increase in storage facilities and the number of containers in the port.

Among our respondents, there is a positive attitude towards the project and a wish for it to continue. As mentioned earlier, the FFL scheme in Norway has since the beginning in 2016 collected 734-ton marine waste, and the question of what the new port fee would result in regarding retrieved marine was, there was almost a unified consensus among our respondents that could lead to less waste being delivered at port. As R3 stated:

“That would be a catastrophe. We know that it has been discussed, but we really hope that it would not happen. The Norwegian government should take this cost and responsibility. All the Unions have spoken clearly that this is a scheme that should be active”.

Based on our findings, there seems like FFL has contributed to an increased awareness within the fishing industry and among fishermen. By imposing the new port fee, based on the statements that it can lead to less waste being retrieved, there might be reason to believe that if less waste is retrieved, it might also contribute to a reduction in the awareness and the focus of bringing waste to port. To our knowledge, the new port fee don't contain clear goals that aims to increase the awareness of retrieving waste, this might also contribute to less waste being delivered at port.

In this section, we have discussed some of the strengths, weaknesses, opportunities, and treats regarding the FFL scheme and the suggested port fee. To present an overview, we have indemnified the drivers and barrier of both by applying a SWOT analysis as seen in the figures below.

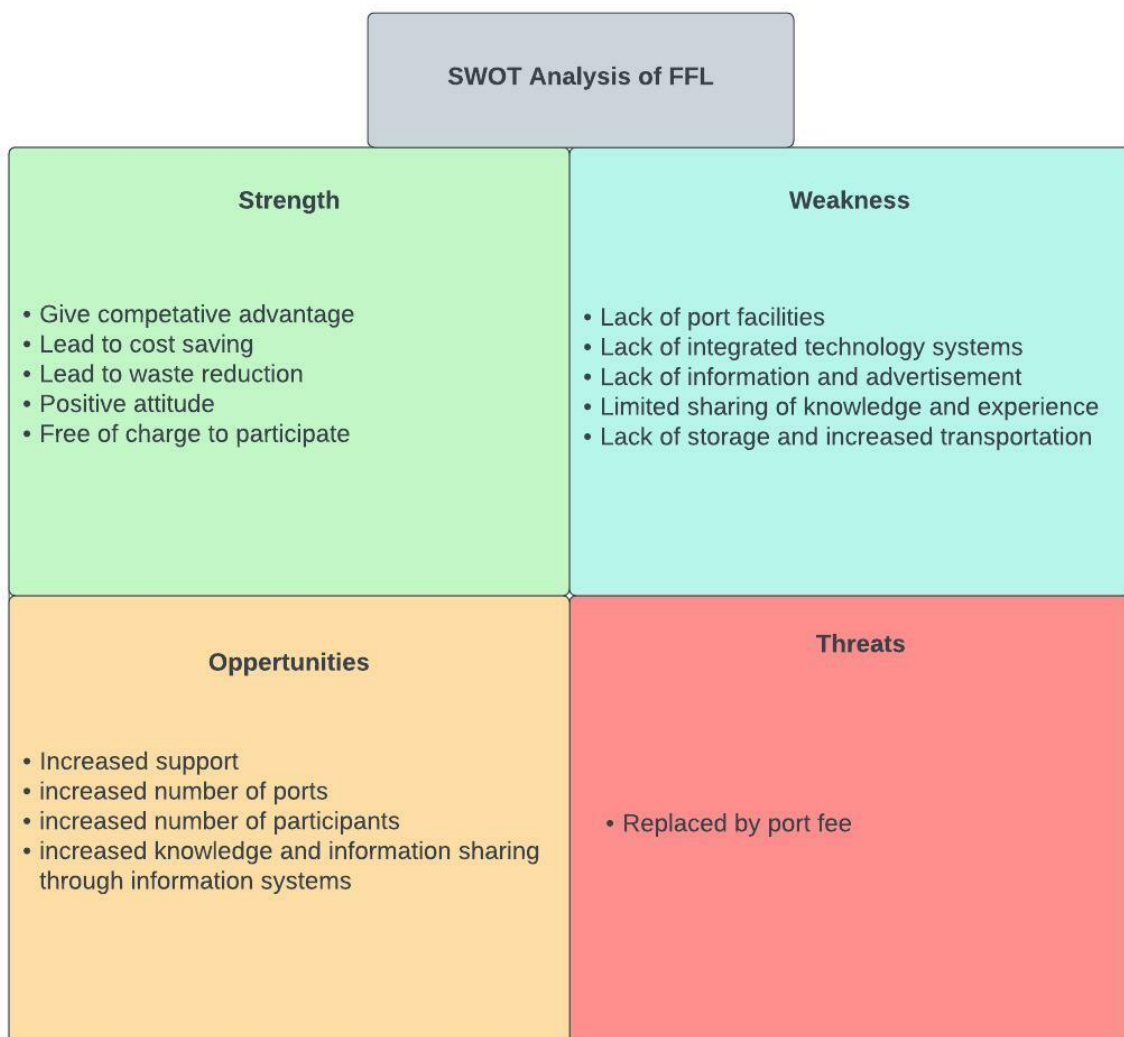


Figure 23: SWOT analysis of the FFL project (Source: Own).

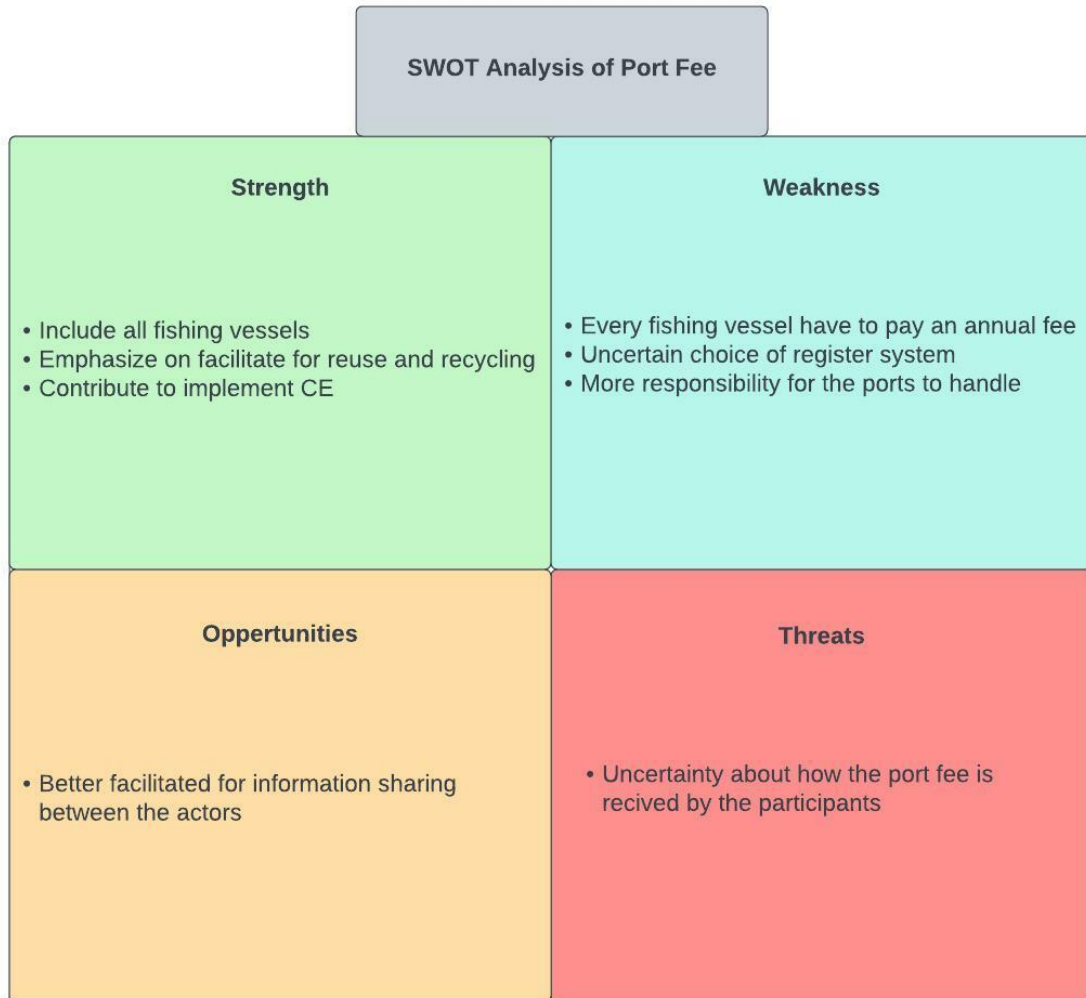


Figure 24: A SWOT analysis of the new suggested port fee (Source: Own).

6.0 Conclusion

The global concern for the environment and marine litter is a well-discussed topic. Regulations globally, internationally, and nationally have been enforced to tackle the increasing problem of marine waste, where Norway is bounded by several international laws, conventions, and agreements. Norway has also adopted action plans and sustainability goals such as The Action Plan put in place by IMO and The Sustainable Development Goals put in place by the UN which several countries have agreed to and signed. As a measure to reduce the amount of marine waste in the ocean and to increase awareness regarding marine litter among fishermen, several European countries have implemented FFL and Norway is one of them.

The focus on sustainability has increased over the years where companies are aiming to operate environmentally friendly. Due to the increased pressure on companies to operate in an environmental manner, the focus on the return, repair, and reuse of products has led to companies adopting and implementing CE and RL practices. Many have adopted closed-loop supply chains to reduce consumption of resources and gain economic benefits and green logistics practices to operate the environment and reduce the impact on the environment.

In this thesis, we aimed to explore and identify the drivers and barriers the participating members of the FFL project are facing in the value chain. Further, we have accessed the prospects of the FFL and compared it to the new suggested port fee. We identified the focus on suitability, CSR, concern for the environment, cost savings, new partnerships, and competitive advantage as drivers for participation in the FFL project among the respondents. We also identified the lack of port facilities, lack of integrated information systems, advertisement and information concerning the project, lack of storage, increased transportation, and limited sharing of knowledge and experiences as barriers the respondents are facing.

For the FFL to continue in the future we have identified several factors that might need improvement to facilitate the project in the future. We uncovered economic support, increased advertisements about the project, reduction in time spent in a queue of becoming a member, an integrated information system, and an increase in the number of port facilities

as factors that needs to be facilitated for the project to continue in the future. If the new port fee is implemented and enforced, the lack of port waste facilities is still present since EFTA has ruled that Norway has failed to fulfill its obligation through Directive 2000/59/EC. Based on our findings, this can be a challenge since there seems to be a clear need among the participants in the FFL project for more available ports accepting all kinds of marine waste.

6.1 Suggestion of future research

In our thesis, we have conducted a single-case study where we have identified the drivers and barriers among the participants in the FFL project. We interviewed 10 members of a total of 102 vessels, 11 ports and waste management companies currently participating. We would recommend the following further research in this area:

Since we in our case have interviewed 10 of the participating actors in the value chain, we believe it would be interesting to take a closer look at the drivers and barriers among a larger number of respondents to see if there is an alignment between the uncovered drivers and barriers in this thesis and the potential findings among a higher number of representatives in the value chain.

In this case study, we assessed the value chain from the waste is retrieved by the vessel, and until it reaches the waste management companies. Based on this it could be interesting to take a closer look at the value chain after the waste leaves the waste management companies. We believe that this topic would be interesting to investigate from an RL and sustainability perspective.

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Transcript

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Appendix 1: Interview Guide

Consent form	<p>I have received and understood the information of the project <i>An assessment of the value chain of the Fishing for Litter project</i>, and have been given the opportunity to ask questions: I consent to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> <i>participate in this interview using video recording</i> <input type="checkbox"/> <i>that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary</i> <input type="checkbox"/> <i>that information about me is published so that I can be recognized- if necessary</i> <input type="checkbox"/> <i>that my personal information is stored after the end of this project- if necessary</i> <p>I agree that my information will be processed until the project is completed</p> <p>----- -----</p> <p>(Signed by informant, date)</p>
Introductory question	1. Can you describe your role in the FFL- project?
Management and internal drivers	<ol style="list-style-type: none"> 1. What is your motivation for participating in the FFL project? 2. What processes have you gone through during the implementation of FFL? 3. Have FFL demanded any additional or reallocation of resources since you joined? 4. What measures have you taken to motivate employees to participate in FFL activities? 5. How does your participation in FFL align with the company's objectives and values? 6. How is the attitude among the employees to your participation in the FFL project?
Technology	<ol style="list-style-type: none"> 1. Which system do you use to report waste? 2. Who do you report to? 3. How have your experience with implementing and using the registration system for waste been?

	<ol style="list-style-type: none"> 4. Can the registration system be improved in any way? 5. Are there any other technological solutions that you think can work better?
Incentives	<ol style="list-style-type: none"> 1. To what extent do you think that incentives can contribute to more people participating in the FFL project? 2. What incentives do you think need to be in place to motivate more people to participate in FFL? 3. What incentives do you think need to be in place for more people to bring waste they catch at sea?
Economy	<ol style="list-style-type: none"> 1. To what extent has the implementation of FFL affected your costs? 2. How has the implementation of return logistics affected other factors and conditions than your costs? 3. Which activity do you think is the biggest cost driver with you in terms of participation in FFL? 4. Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties
Regulations	<ol style="list-style-type: none"> 1. What regulations and legislation do apply to you regarding marine waste? 2. How do these regulations affect you today positively and negatively? 3. To what extent do the regulations in place prevent you from carrying out the work regarding waste management of marine waste? 4. What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?
Processes	<ol style="list-style-type: none"> 1. Can you describe the processes that take place with you in connection with FFL? 2. To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today? 3. Could the processes have been performed in a different way to achieve better efficiency? 4. Could any of the processes have been performed elsewhere in the value chain to achieve better efficiency? 5. To what extent do you have access to the resources you need to be able to carry out the work with FFL? 6. Do you feel that the infrastructure is in place to be able to carry out the work as efficiently?
Interaction	<ol style="list-style-type: none"> 1. To what extent do you communicate with other actors in the value chain in FFL? <p>If communication is present:</p> <ul style="list-style-type: none"> • How do you communicate between you?

	<ul style="list-style-type: none"> • Which actors do you communicate with? • To what extent do you share knowledge and experiences with each other? • What benefits do you think this provides? • Are there other solutions in terms of collaboration and communication that you think could have been better? <p>If not present:</p> <ul style="list-style-type: none"> • What benefits do you think you could have gained by communicating and collaborating more with the other actors? • What would you say is the disadvantage of not communicating and collaborating with the other actors? • What do you think is needed for better communication between the actors?
Corporate social responsibility	<ol style="list-style-type: none"> 1. To what extent do you focus on social responsibility? 2. How do you exercise social responsibility? 3. How do you think your focus on social responsibility has contributed positively? 4. To what extent is your focus on social responsibility a motivation for you to participate in FFL?
Future prospects for FFL	<ol style="list-style-type: none"> 1. What do you think is needed for more vessels to join FFL? 2. What do you think will be the consequence if a port fee is introduced as a replacement for FFL? 3. What do you think is needed for FFL to be able to continue? 4. What do you think is needed for FFL to be able to expand with a view to: <ul style="list-style-type: none"> • Regulations • Infrastructure • Interaction Economy • Processes • Incentives 5. Are there any other solutions you think could have worked as well or better than FFL?
Closing questions	<ol style="list-style-type: none"> 1. Is there anything else you want to add that we have not been through? 2. Can we contact you if we have any questions regarding what we have asked that need to be clarified?

Appendix 2: Transcribed interviews

Transcript of respondent 1:

Date of interview:	18 March 2022
Duration of interview:	51 minutes
Interviewer:	Christine Ø. Hals
Transcriber:	Jaroslav Heggdal
Interview type:	Video recording on Teams
Language of the interview:	Norwegian
Language of the transcript:	English
Translated by:	Jaroslav Heggdal/ Christine Hals
Transcribed reviewed and accepted by the respondent:	1.4.22

The transcript is based on a video recording of the interview. This video recording will be deleted when the wording of the written transcript is reviewed and accepted by the respondent. The transcript is not an accurate word-for-word representation of the oral interview and does not contain any comments on the way the respondent behaved during the interview. The transcript should, on the other hand, convey the meaning of the statements given in proper written language with full sentences (adopted from Holm & Tukaeva, 2019).

I have received and understood the information of the project *An assessment of the value chain of the Fishing for Litter project*, and have been given the opportunity to ask questions: I consent to:

- participate in this interview using video recording*
- that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary*
- that information about me is published so that I can be recognized- if necessary*
- that my personal information is stored after the end of this project- if necessary*

I agree that my information will be processed until the project is completed

(Signed by informant, date)

The respondent consented to the above.

The letter “I” represents the interviewer, and the letter “R” represents the respondent.

I: Can you describe your role in the FFL- project?

R: We are a receiving center where our role is to receive bags with waste from the FFL project, and other items that don't fit into the bags. The waste is sorted into larger containers, when full, it is collected and replaced with empty ones

I: Then we are going to move on to management and internal drivers.

I: What is your motivation for participating in the FFL project?

R: We are aware of the great amount of waste in the ocean, and hope to contribute to the reduction of ocean waste.

I: What processes have you gone through during the implementation of FFL?

R: Not so much. Before FFL, many of the vessels collected waste even though it had some financial impact on them. Now our company receives a great amount of FFL bags which is distributed to the vessels when required. Transportation of waste is an activity we have previously conducted prior to the FFL project.

I: Have FFL demanded any additional or reallocation of resources since you joined?

R: No, our company has participated in the FFL project since its beginning. We barely invoice our operational cost and the actual time used to handle the waste. The invoice has consistently been the same throughout the years, and our plan is not to increase the price.

I: What measures have you taken to motivate employees to participate in FFL activities?

R: No motivation is necessary. Our job needs to be done anyway, regardless of it is FFL or other waste outside the project.

I: How does your participation in FFL align with the company's objectives and values?

R: Our company does not have any written values or goals, but our business aims to conduct our activities in an environmental manner. We have governmental interests, and it is expected to have environmental concerns in mind, therefore it's one of our values in our daily work.

I: How is the attitude among the employees to your participation in the FFL project?

R: The attitude is positive among the employees. They believe it is important and no special attention has been given. It's a part of our job regarding which type of waste we handle.

I: Then we are going to move on to technology.

I: Which system do you use to report waste?

R: Our company uses e-mail to report to Salt, in which we report the amount of waste delivered and which vessel delivered it, and if the waste goes to recycling or landfill. The report also mentions if there is waste outside the bags which is also handled and often pictures of the waste are also often provided to Salt. Then the email is sent, and a copy is created for us which is used to make the annual report. The report does not contain the location where the waste was discovered, but it is possible to provide that for us.

I: Do you report the location of where the waste was fished up?

R: No, it has not been requested so we only report the quantity and which boat delivered the waste. But if it was requested from us, we could provide the location since we have knowledge of what area the boat has been fishing.

I: How have your experience with implementing and using the registration system for waste been?

R: It is very easy. Just as I mentioned previously, we use e-mail most time and we archive those emails afterward.

I: Can the registration system be improved in any way?

R: Probably, but the current system is easy to use. I guess it's feasible to create a system that is linked between our business and Salt directly where the provided information is stored automatically between us. But we think it would complicate our reporting system but on the other hand, improve Salt's report system.

I: Are there any other technological solutions that you think can work better?

R: Not for our business, but for Salt, I think it might be an easier method regarding collecting information from business, so they don't have to do it manually, but our part it works well as it is.

I: Then we are going to move on to incentives

I: To what extent do you think that incentives can contribute to more people participating in the FFL project?

R: Incentives for most individuals are money. Prior to FFL, the vessels had to pay money for delivering waste at the port and it generated high costs for them regarding handling and

delivery of waste. When FFL came, a great amount of the vessels saw an opportunity to save cost. Several ships wish to participate to save cost. We think it's fairly so the vessels could deliver more waste, and the incentives which exist now should be extended. This may result in a better economy for everyone, and we hope that the scheme will continue to exist.

I: What incentives do you think need to be in place to motivate more people to participate in FFL?

R: I think we have discussed that in the previous question and also in the next question. The foundation of incentives, in this case, is that a great number of vessels have experienced their fishing gear being destroyed because other equipment has been cached in their fishing gear. The aim of the incentives is to improve the fishing conditions, and I think that everyone should have the same mentality to take waste from their activities to port and their own destroyed fishing gear, rather than throw it out on the sea. And, as I mentioned earlier, it previously was costly for boats to deliver waste, which can act as an obstacle for boats to bring and deliver waste. This awareness should be considered.

I: Then we are going to move on to the economy

I: To what extent has the implementation of FFL with you affected your costs?

R: There has been some increase in the cost in fuel and handling costs, but other than that we have no other expenses regarding the operations related to FFL. This results in no increase in costs for us since we get those expenses back.

I: How has the implementation of return logistics affected other factors and conditions then your costs?

R: It has affected us positively. Some of the participating vessels choose to deliver their catch to us since they also can deliver FFL waste. These actions were especially present at the beginning of FFL but now our facility has vessels that are regulars, so the participation in FFL has been very positive.

I: Which activity do you think is the biggest cost driver with you linked to your participation in FFL?

R: That must be the expenses concerning the forklifts

I: Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties?

R: We think the workflow is optimal the way it is. The ability to transport the waste in bags and containers directly to the next actor who is an expert on waste handling works for our business since we don't have the capacity to sort the waste.

I: Then we are going to move on to regulations

I: What regulations and legislation do apply to you regarding marine waste?

R: We are affected by several regulations. Such as The Pollution Control Act chapter 20, MARPOL 73/78, and regulations on hazardous waste. We are also obligated to follow the municipality's waste policies and other regulations that are imposed on us.

I: How do these regulations affect you today positively and negatively?

R: It's a framework that we must adapt to. It's neither negative nor positive, it's just our ordinary day at work. We have a garbage compactor, a container for steel, one for wood, and other special waste is set aside and treated as needed for collection or other actions. This is our daily work, and if the regulations have not been there, it isn't certain that we would do what we do.

I: To what extent do the regulations in place prevent you from carrying out the work regarding waste management of marine waste?

R: It doesn't affect us

I: What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?

R: The fishery is already regulated, and we don't think that it's necessary to oppose more regulations. Rather think about which incentives could promote participation.

I: Then we are going to move on to the processes

I: Can you describe the processes that take place with you in connection with FFL?

R: We provide containers for the participating and the non-participating vessels of the FFL project and we unload the bags from the vessels and to the different FFL containers at our facility. If the vessels need new FFL bags, we provide them.

I: To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today?

R: It works very well from our point of view, and we have not had any challenges concerning this.

I: Could the processes have been performed in a different way to achieve better efficiency?

R: As long as we don't need to sort the waste, which our organization does not have the competencies to, it works just fine in our case.

I: To what extent do you have access to the resources you need to be able to carry out the work with FFL?

R: To a high degree. We have all the necessary resources to do the work with FFL

I: Do you feel that the infrastructure is in place to be able to carry out the work as efficiently?

R: We have the FFL containers at the back of the main facility since we don't have any other spot for them, so we need to transport the waste a short distance. Given the circumstances and our facility, this is the optimal solution at this time. It works, but in harsh weather conditions, it may be more difficult to put the waste into those containers. The vessels which are not part of FFL can also deliver waste but at a cost.

I: Can everyone deliver depleted waste from the sea?

R: Yes, they can. But if they are not participating in the FFL project, they have to pay a cost.

I: Then we are going to move on to interaction.

I: To what extent do you communicate with other actors in the value chain in FFL?

R: We have good communication with the vessels during loading and unloading, but we do not communicate actively about FFL concerning solutions, experiences, and other details about it.

I: Are there any other solutions in terms of collaboration and communication you think could have been better?

R: No, for our part the current degree of communication works perfectly.

I: What benefits do you think you could have gained by communicating and collaborating more with the other actors?

R: Since the communication is good it contributes to raising awareness, especially concerning the vessels since they are the ones collecting the waste, so it might show the importance of the scheme and what they do regarding waste collection. But raising awareness I believe is the biggest advantage.

I: Then we are going to move on to social responsibility

I: To what extent do you focus on social responsibility?

R: Very much from our point of view since we operate a socially critical business. Since we handle food, there are regulations we must follow and several spot checks with different authorities. Regarding FFL we are aware of the importance to collect waste from the sea.

I: How do you exercise social responsibility?

R: We possess an indirect social responsibility considering that we handle food, and everyone here understands the importance of what we do. We consider ourselves as a hotel and are aware that our job is important to preserve food from the sea. Regarding waste, it is also important to preserve and be a part of a cleanup.

I: How do you think your focus on social responsibility has contributed positively?

R: We see the amount of waste that is retrieved from the sea, and that gives us pride that we contribute towards a cleaner ocean.

I: To what extent is your focus on social responsibility a motivation for you to participate in FFL?

R: To a very high degree. That is one of the greatest motivations to be able to contribute, but also a financial motivation in such a way that the vessel that needs to be unloaded also can unload waste. When requested to participate in FFL the answer was easy because of the contribution of social responsibility.

I: Then we are going to move on to future prospects for FFL

I: What do you think is needed for more vessels to join FFL?

R: I think it's about keeping the project going and receiving more support so FFL can allow more vessels to participate. It seems like more vessels like to participate, but the project does not accept more attendees, since there might be too many boats participating. I believe that incentives in the form of financial support are needed for more vessels to join and that boats are interested in participating in the project and all they need is to be accepted.

I: What do you think will be the consequence if a port fee is introduced as a replacement for FFL?

R: Then the situation will probably be like it was before FFL. It may contribute to some fishing vessels not taking some of the retrieved waste to port.

I: What do you think is needed for FFL to be able to continue?

R: In our point of view, the authorities support the FFL project like it is at this moment. Increase the support and financial limits and involve foreign vessels as well because then I believe we would see an increase in collected marine waste.

I: What do you think is needed for FFL to be able to expand with a view to regulations and infrastructure?

R: More receiving terminals attending, freezing terminals, and other terminals. There are many vessels participating, but the number of terminals attending FFL is limited. I'm not

sure if regulations would be effective, but if regulations are imposed there must be waste collection facilities available for everyone.

I: What about cooperation?

R: Extended to include more participants.

I: Financial?

R: Since we are a company we would, of course, like to earn money from our operations, but this is a part of our corporate responsibility and since our operations generate some costs, we need to cover those costs.

I: What about processes and incentives?

R: I believe it has been covered previously

I: Are there any other solutions you think could have worked as well or better than FFL?

R: It might be some other alternatives, but we are happy about the FFL and how it currently is and have not thought about what the alternatives might be.

I: We have some follow-up questions regarding what we have talked about that is, okay?

R: Yes

I: I just need to clarify something regarding processes. Does the waste from participating vessels end up in a separate container than the waste delivered from vessels that are not participating in the FFL project where the participating vessel delivers for free but the not participating vessel needs to pay a fee?

R: Yes

I: What do you think is needed for more waste collection facilities to join FFL?

R: I think waste receiver facilities must answer that question, but I think there must be enough space for containers. The other question is if the receiver facilities are pleased to handle the waste if their cost is covered, or if they must make a profit on top of that as well. But we think other terminals would consider just getting their cost covered and be happy about that.

I: Then we have some closing questions

I: Is there anything else you want to add that we have not been through?

R: No

I: Can we contact you if we have any questions regarding what we have asked that need to be clarified?

R: Yes

I: Thank you so much for participating, bye!

Transcript of respondents 2:

Date of interview: 24 March 2022
Duration of interview: 36 minutes
Interviewer: Christine Ø. Hals
Transcriber: Jaroslav Heggdal
Interview type: Video recording on Teams
Language of the interview: Norwegian
Language of the transcript: English
Translated by: Jaroslav Heggdal/ Christine Hals
Transcribed reviewed and accepted by the respondent: 7.4.22

The transcript is based on a video recording of the interview. This video recording will be deleted when the wording of the written transcript is reviewed and accepted by the respondent. The transcript is not an accurate word-for-word representation of the oral interview and does not contain any comments on the way the respondent behaved during the interview. The transcript should, on the other hand, convey the meaning of the statements given in proper written language with full sentences (adopted from Holm & Tukaeva, 2019).

I have received and understood the information of the project *An assessment of the value chain of the Fishing for Litter project*, and have been given the opportunity to ask questions: I consent to:

- participate in this interview using video recording*
- that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary*
- that information about me is published so that I can be recognized- if necessary*
- that my personal information is stored after the end of this project- if necessary*

I agree that my information will be processed until the project is completed

(Signed by informant, date)

The respondent consented to the above.

The letter “I” represents the interviewer, and the letter “R” represents the respondent.

I: Can you describe your role in the FFL- project?

R: We are a middleman between FFL and the other actors in the value chain. We order new containers when they are full and hand out bags to vessels which is being used by participants of FFL.

I: Then we are going to move on to management and internal drivers

I: What is your motivation for participating in the FFL project?

R: We think it’s a great opportunity to clean up the environment.

I: What processes have you gone through during the implementation of FFL?

R: We had been given some information from the organization about the project, what the goal is, and other practical information. Our organization has also received information about the FFL project which we could pass on to other participants. Some boats know about the project where they approach us where they wish to be a part of FFL.

I: Have FFL demanded any additional or reallocation of resources since you joined?

R: No

I: What measures have you taken to motivate employees to participate in FFL activities?

R: All the employees are positive towards FFL as well as the management. The management has managed and entered those agreements.

I: How does your participation in FFL align with the company's objectives and values?

R: It suits it very well since the focus to become more environmentally friendly has increased, so our participation in FFL is a good thing.

I: How is the attitude among the employees to your participation in the FFL project?

R: We think it’s very positive because previously the waste was thrown overboard. At that time, the delivery of caught waste was a cost for the vessels. Now it’s free to deliver, and at the same time, the ocean gets cleaned. It’s a win-win situation for everybody.

I: Then we are going to move on to technology.

I: Which system do you use to report waste?

R: We don’t report it, the reception is responsible for reporting the waste to the renovation company. We don’t have anything to do with reporting the waste.

I: Do you carry out any form of reporting when it comes to the waste associated with FFL?

R: No

I: Then we are going to move on to incentives.

I: To what extent do you think that incentives can contribute to more people participating in the FFL project?

R: We think the word is spread among the vessels, where they spread the rumor on how positive the FFL scheme is to other potential participants in the fishing fleet.

I: What incentives do you think need to be in place to motivate more people to participate in FFL?

R: We think much could be done if the word about FFL got through to more potential participants through their channels such as forums and other channels.

I: What incentives do you think need to be in place for more people to bring waste they catch at sea?

R: We don't know

I: Then we are going to move on to the economy.

I: To what extent has the implementation of FFL with you affected your costs?

R: None

I: How has the implementation of return logistics affected other factors and conditions then your costs?

R: We could not say anything about that. We think this is a more suitable question for the other actors that receive the bags.

I: Which activity do you think is the biggest cost driver with you linked to your participation in FFL?

R: Nothing, we don't have any cost drivers since it's a part of our daily operation.

I: Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties?

R: We don't have any cost regarding FFL, so we can't say anything about that.

I: Then we are going to move on to regulations.

I: What regulations and legislation do apply to you regarding marine waste?

R: Our port is affected by all regulations which are given by the authorities regarding the handling of waste.

I: How do these regulations affect you today positively and negatively?

R: We don't think they affect our activities at all.

I: What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?

R: Delivering waste should not be an expense for the vessels, and they are not interested to pay for others' litter. We think many would choose to leave the waste in the sea if that changed. The best solution would be to keep the current project the way it is.

I: Then we are going to move on to processes.

I: Can you describe the processes that take place with you in connection with FFL?

R: The bags are provided to us by the FFL organization. We deliver the bags to the unload area in our port, which again hand out bags to vessels. We administrate all the required administration regarding FFL. We order pick up when the containers are full and replace them with empty ones. The activities regarding container pickup and replacing are handed over to the renovation company. What they do with it we don't know. The renovation company also provides the necessary reporting to the FFL organization.

I: To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today?

R: We think it works very well. The vessel can unload FFL at the same place where they deliver fish and if the vessel only wants to deliver FFL waste, they don't pay any docking fee which is an incentive to deliver waste.

I: Could the processes have been performed in a different way to achieve better efficiency?

R: Current execution of the processes works just fine.

I: Could any of the processes have been performed elsewhere in the value chain to achieve better efficiency?

R: We don't think so, today's agreement works just fine. The vessels can unload fish, deliver waste, and refuel at the same port.

I: To what extent do you have access to the resources you need to be able to carry out the work with FFL?

R: We have all the resources required available, and if we need additional help FFL has always assisted us.

I: Do you feel that the infrastructure is in place to be able to carry out the work as efficiently?

R: Yes

I: Then we are going to move on to interaction.

I: To what extent do you communicate with other actors in the value chain in FFL?

R: Our communication is only with the port reception facility and Salt

I: To what extent do you share knowledge and experiences with each other?

R: Our organization has some discussions at the office, but not with any other actors.

I: What benefits do you think this provides?

R: That could benefit because somebody else may have other practices than ours so we can exchange experiences with each other.

I: Are there other solutions in terms of collaboration and communication that you think could have been better?

R: We don't know, for our point of view communication works just fine as is.

I: Then we are going to move on to corporate social responsibility.

I: To what extent do you focus on social responsibility?

R: One of our tasks is to facilitate the project, and by doing so in a cost-efficient and environmental way we think that our focus is high.

I: How do you exercise social responsibility?

R: Our contribution makes the local environment better, in our view. Our activity also contributes to port upgrades in the municipality and other industrial developments in the area.

I: How do you think your focus on social responsibility has contributed positively?

R: In our port, there have been few vessels on a layup where the profit from that has been placed in a foundation which uses the money to benefit the municipality. It finances projects that benefit the local people, such as a plateau and other activities.

I: To what extent is your focus on social responsibility a motivation for you to participate in FFL?

R: That is the environmental aspect and that is our motivation.

I: Then we are going to move on to future prospects for FFL

I: What do you think is needed for more vessels to join FFL?

R: The FFL project needs to be free in the future as it is now. The organization that runs the project should do more advertising about the project to reach out to people.

I: What do you think will be the consequence if a port fee is introduced as a replacement for FFL?

R: That would not lead to anything good, it's a bad idea.

I: What do you think the consequence of a such fee will lead to?

R: We think that much less waste from the sea would be retrieved. The vessels are not interested to pay money to be able to deliver other people's waste.

I: What do you think is needed for FFL to be able to continue?

R: Get the politicians to understand that this project is a good thing for the sea, the environment, and the local area.

I: What do you think is needed for FFL to be able to expand with a view to regulations, infrastructure, interaction, economy, processes, and incentives?

R: Maybe it should be integrated with all the other work regarding the environmental aspect which is being done since this is just a small fraction of the environmental activities. Some incentives are always positive too.

I: Are there any other solutions you think could have worked as well or better than FFL?

R: We don't think so, why change something that works.

I: We have some follow-up questions regarding what we have talked about if that is, okay?

I: Are the bags and containers delivered at your location, or to other associated ports?

R: The bags are delivered here which we distribute to the vessels, and the containers we administrate and placed at one port that the waste is transported to from other associated ports.

I: Then we have some closing questions

I: Is there anything else you want to add that we have not been through?

R: No

I: Can we contact you if we have any questions regarding what we have asked that need to be clarified?

R: Yes

I: Thank you so much for participating, bye!

Transcript of respondent 3:

Date of interview:	17 March 2022
Duration of interview:	43 minutes
Interviewer:	Christine Ø. Hals
Transcriber:	Jaroslav Heggdal
Interview type:	Video recording on Teams
Language of the interview:	Norwegian
Language of the transcript:	English
Translated by:	Jaroslav Heggdal/ Christine Hals
Transcribed reviewed and accepted by the respondent:	4.4.22

The transcript is based on a video recording of the interview. This video recording will be deleted when the wording of the written transcript is reviewed and accepted by the respondent. The transcript is not an accurate word-for-word representation of the oral interview and does not contain any comments on the way the respondent behaved during

the interview. The transcript should, on the other hand, convey the meaning of the statements given in proper written language with full sentences (adopted from Holm & Tukaeva, 2019).

I have received and understood the information of the project *An assessment of the value chain of the Fishing for Litter project*, and have been given the opportunity to ask questions: I consent to:

- participate in this interview using video recording*
- that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary*
- that information about me is published so that I can be recognized- if necessary*
- that my personal information is stored after the end of this project- if necessary*

I agree that my information will be processed until the project is completed

(Signed by informant, date)

The respondent consented to the above.

The letter “I” represents the interviewer, and the letter “R” represents the respondent.

I: We are starting with an introductory question

I: Can you describe your role in the FFL- project?

R: Our role in the FFL project is to collect waste such as lost fishing gear that is being caught in the trawl and deliver it to FFL facilities. We currently have one vessel participating in the project, and we were some of the first participants.

I: Then we are going to move on to management and internal drivers.

I: What is your motivation for participating in the FFL project?

R: Our company focuses on sustainability and since our resources are collected from the sea, we think that it’s our responsibility to care for the ocean. Before FFL was introduced, our vessels also collected waste that was caught in our trawl. At that time, we had to pay money to deliver the waste to the port since most of it is categorized as special waste. For

that reason, we are very pleased about the project, and we think it's very important that anyone that wishes to participate should be given an opportunity. Currently, we have one vessel participating and another vessel is in the process of becoming a member. Our company considers the other vessel not participating as a flaw.

I: What processes have you gone through during the implementation of FFL?

R: Our company had already established the processes previously, so the only change for our part was the name of the bags which are being used to collect waste. The bags used in FFL have now written Nofir on them, and now our vessel delivers waste for free which was not the case previously. Our crew onboard knows our policy and we have implemented that nothing that is collected from the sea is thrown back overboard.

I: Have FFL demanded any additional or reallocation of resources since you joined?

R: Not at all, the results have been the opposite as our company have saved cost. Previously it was expensive to deliver this type of waste, which was categorized as special. Now since we participate in FFL, we save those costs.

I: What measures have you taken to motivate employees to participate in FFL activities?

R: Our company has not had the need to take any actions to motivate our staff. They all understand that waste collected from the sea should only be disposed of in a proper manner which is to take it to port. This attitude is embedded in our company and our staff.

I: How is the attitude among the employees to your participation in the FFL project?

R: The attitude among our employees is very positive since they see that our participation can make a difference. We cannot provide the exact statistics, but the amount of waste collected on our vessels around the coast has been reduced. Recently the pollock season has ended for us, which is often cached by nets. Usually, our vessels retrieve net residuals in our trawl, but this season there has been a clear reduction of those residuals. Based on this result, we hope and believe that FFL helps to keep the ocean clean.

I: How does the participation in FFL align with the company's objectives and values?

R: It fits our profile perfectly since we consider sustainability and environmental aspects to be of great importance. This reflects our operations and how we conduct business.

I: Then we are going to move on to technology.

I: Which system do you use to report waste?

R: Onboard our vessel we do have a waste diary, which is a paper book that is mandatory to have. We do not report the location where the waste was found. Afterward, all waste is reported using SafeSeaNet which is a general report portal for all vessels issued by the

Norwegian Coastal Administration. It contains information about crew members, estimated time to arrival, sailing routes, waste the vessel has on board, and more.

I: Do you report where the waste was retrieved?

R: No

I: Who do you report to?

R: We report this information to the Norwegian Coastal Administration, but the main log regarding waste is our waste diary. This is kept on board and shown to the Norwegian Maritime Directorate when they have announced or unannounced inspections. The waste which is not under the FFL project is reported to the port upon arrival and the waste treatment payment also is conducted there.

I: How have your experience with implementing and using the registration system for waste been?

R: It works very well

I: What challenges what you encountered using the registration system?

R: Getting the exact amount may be a challenge, but it gets inspected onshore with more precise measures.

I: Can the registration system be improved in any way?

R: Yes, it has some potential for improvements by facilitating it better for sorting. Waste is sorted on board the vessels, but when arriving at port all of it is put in the same container. Chains and steel waste are separated onboard at our own initiative, and we deliver it to a facility onshore for the exchange of funds. Delivering steel waste to port is expensive, and this is the reason for our practice. Food waste is chopped into small bits by a machine and goes overboard since it's legal. The remaining waste onboard is cardboard and plastic which we think could have their own containers at the port. FFL is a separate practice. Electrical waste is sorted for itself and is not delivered at the port, because the port authorities do charge the vessel for it. Instead, the e-waste is delivered locally to the municipality for free.

I: Are there any other technological solutions that you think can work better?

R: No, I don't think so. SafeSeaNet works well where it centralizes all the report systems into a portal.

I: Do you register the waste using SafeSeaNet to both FFL and the Norwegian Coastal Administration?

R: I don't think there is a link between FFL and SafeSeaNet, except that you can mark the waste as FFL.

I: Then we are going to move on to incentives

I: To what extent do you think that incentives can contribute to more people participating in the FFL project?

R: Allowing more participants in the FFL program, and that participating is free of charge. The vessels did sort and collect waste before FFL. No more incentives are needed, and the project needs to be continued. If the project is canceled, I think there will be vessels that will not bring others' waste to port, even though we think it's their duty to do so.

I: What incentives do you think need to be in place to motivate more people to participate in FFL?

R: We think it might be some sort of economic incentive, perhaps an amount for each kg.

I: What incentives do you think need to be in place for more people to bring waste they catch at sea?

R: Same answer as the last question.

I: Then we are going to move on to the economy

I: To what extent has the implementation of FFL with you affected your costs?

R: In a very positive way

I: Can you elaborate?

R: Because now the vessels can deliver waste for free, and our cost has reduced since you earlier had to pay to deliver waste.

I: How has the implementation of return logistics affected other factors and conditions then your costs?

R: It's no difference. Our vessels do the same amount of work anyway regarding waste handling, so the cost and work is the same.

I: Which activity do you think is the biggest cost driver with you linked to your participation in FFL

R: We do not have any extra cost regarding our participation in FFL

I: Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties?

R: Perhaps more sorting of the waste on the vessel, but we don't think it's practical feasible. We sort the waste to our best ability and if more were required of us, I think it would be not easy.

I: Then we are going to move on to regulations

I: What regulations and legislation do apply to you regarding marine waste?

R: The general rules for shipping such as MARPOL. But we apply stricter internal additional to MARPOL. We are allowed to dispose of some waste into the sea like paper and cardboard, but we choose not to.

I: How do these regulations affect you today positively and negatively?

R: Now waste is much more regulated regarding what is allowed to throw overboard, compared to just a few years ago. More people are more aware of the consequences of pollution now. Before much of the waste was thrown overboard..

I: To what extent do the regulations in place prevent you from carrying out the work regarding waste management of marine waste?

R: They do not prevent us

I: What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?

R: Not any I could think of

I: Then we are moving on to processes.

I: Can you describe the processes that take place with you in connection with FFL?

R: When we trawl for fish, we sometimes get some waste together with our catch. Then we cut the waste loose, sort it, put the waste in provided bags, and take it to port at the end of our trip. The waste is logged on board and the bags are tagged with the vessel's name and number. The waste is unloaded at the same location where the fish is also unloaded.

I: To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today?

R: We are pleased with how things are today. It makes sense for the vessel, and the project considers the limited deck space onboard the vessels.

I: Could the processes have been performed in a different way to achieve better efficiency?

R: No, I don't think so

I: Could any of the processes have been performed elsewhere in the value chain to achieve better efficiency?

R: No, I don't think so

I: To what extent do you have access to the resources you need to be able to carry out the work with FFL?

R: We do have everything we need. The only thing we need is the bags, which are supplied by the ports.

I: Do you feel that the infrastructure is in place to be able to carry out the work as efficiently as possible?

R: Yes, it is at the ports that we deliver to.

I: Then we are going to move on to internaction.

I: To what extent do you communicate with other actors in the value chain in FFL?

R: Our only interaction is with the port. Our company receives reports annually about the amount delivered and our certificate for participating. No further communication in the value chain is conducted.

I: What benefits do you think you could have gained by communicating or collaborating more with the other actors?

R: I don't know, I don't have an answer to that question.

I: What would you say is the disadvantage of not communicating or collaborating with the other actors?

R: I can't think of anything. If something needs further explanation, we do communicate.

I: What do you think is needed for better communication between the actors?

R: I think the communication is good as it is.

I: Then we going to move on to corporate social responsibility

I: To what extent do you focus on social responsibility?

R: It is a high focus of ours. We have a new vessel which has been rebuilt to save steel and materials. Reuse of existing materials is a high focus. Students who are struggling in school, we take into our company to get work experience and learn practical work

I: How do you exercise social responsibility?

R: As mentioned earlier. We reuse, save resources, and use technology to reduce costs and the social aspect which is mentioned.

I: How do you think your focus on social responsibility has contributed positively?

R: It has contributed to our economy and improved revenue, and better terms in banks. But we think that they could do better regarding terms of loans.

I: To what extent is your focus on social responsibility a motivation for you to participate in FFL?

R: It is absolutely a part of it. On one side it is the reduction of cost and on the other side, it is the attention toward the environment.

I: Then we are going to move on to future prospects for FFL

I: What do you think is needed for more vessels to join FFL?

R: Allowing all vessels to participate. The processing time of the application process is slow, and we don't know how many are allowed currently. It might also be a good idea to promote this through various unions.

I: What do you think will be the consequence if a port fee is introduced as a replacement for FFL?

R: That would be a catastrophe. We know that it has been discussed, but we really hope that it would not happen. The Norwegian government should take this cost and responsibility. All the Unions have spoken clearly that this is a scheme that should be active.

I: What do you think is needed for FFL to be able to continue?

R: Only the government can decide if this should be continued, and we think the government should continue to support it economically.

I: What do you think is needed for FFL to be able to expand with a view to regulations and infrastructure?

R: Infrastructure could be changed somehow since all the waste can be stored outside in a harsh environment. It may be feasible to have one container in all ports and most of the ports and vessels are positive to such an alternative we think.

I: And regarding interaction?

R: Regarding interaction, I don't know

I: And regarding the economy?

R: Considering the economic aspect it should be kept free of charge for all the vessels. We are sure that if a tax is imposed, the quantity of waste delivered to the port will be reduced.

I: What about processes and incentives?

R: Regarding processes and incentives, it works very well from our point of view

I: Are there any other solutions you think could have worked as well or better than FFL?

R: Not from our point of view, it is a great project and so easy.

I: Then we have some closing questions

I: Is there anything else you want to add that we have not been through?

R: No, but the importance of this project needs to be highlighted again.

I: Can we contact you if we have any questions regarding what we have asked that need to be clarified?

R: Yes

I: Thank you so much for participating, bye!

Transcript of respondent 4:

Date of interview:

18 March 2022

Duration of interview:

46 minutes

Interviewer:

Christine Ø. Hals

Transcriber:	Jaroslav Heggdal
Interview type:	Video recording on Teams
Language of the interview:	Norwegian
Language of the transcript:	English
Translated by:	Jaroslav Heggdal/ Christine Hals
Transcribed reviewed and accepted by the respondent:	25.4.22

The transcript is based on a video recording of the interview. This video recording will be deleted when the wording of the written transcript is reviewed and accepted by the respondent. The transcript is not an accurate word-for-word representation of the oral interview and does not contain any comments on the way the respondent behaved during the interview. The transcript should, on the other hand, convey the meaning of the statements given in proper written language with full sentences (adopted from Holm & Tukaeva, 2019).

I have received and understood the information of the project *An assessment of the value chain of the Fishing for Litter project*, and have been given the opportunity to ask questions: I consent to:

- participate in this interview using video recording*
- that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary*
- that information about me is published so that I can be recognized- if necessary*
- that my personal information is stored after the end of this project- if necessary*

I agree that my information will be processed until the project is completed

(Signed by informant, date)

The respondent consented to the above.

The letter “I” represents the interviewer, and the letter “R” represents the respondent.

I: Then we are going to start with an introductory question

I: Can you describe your role in the FFL- project?

R: We are a waste disposal company that collects waste for FFL at the port. We entered contract approximately 6 years ago.

I: Then we are going to move on to management and internal drivers.

I: What is your motivation for participating in the FFL project?

R: A while ago people locally realized how much waste was around our area, the focus on waste-collecting increased but the waste was just delivered at the port, and there was a lack of organized activities to collect and process it further. We were asked to participate to collect, sorting, and processing the waste further which we agreed to. We got new costumes, and for us, it was a win situation.

I: What processes have you gone through during the implementation of FFL?

R: In the beginning, everything was aimed to be recycled, but as the project developed, we got partners involved which helped since they could receive some type of waste we could not handle. It relieved our processes and worktime.

I: Have FFL demanded any additional or reallocation of resources since you joined?

R: Not any grants, but FFL had several picking analyses at our plant and educated us about the different types of waste. We learned about what the waste consists of, and FFL learned about our processes. It gave me another view of what waste consists of and they could tell us which country it came from.

I: What measures have you taken to motivate employees to participate in FFL activities?

R: Our employees have participated in the sorting, and archived pride in their work, due to the feeling of conducting something important which was highlighted in the media at the time. At the same time, they archived great knowledge about all types of waste, which is a great motivation for them.

I: How does your participation in FFL align with the company's objectives and values?

R: Our goal is to archive the highest possible shares of waste to recycling materials and energy recovery before considering landfills. This is a goal regarding all waste we collect. Reuse is something that has been tried before, but the type of waste received from the sea is not so feasible to reuse according to our opinions.

I: How is the attitude among the employees to your participation in the FFL project?

R: It is positive. Our attitude among employees is to recycle most of the collected waste, regardless of where it came from. FFL is a little different since people around see those big bags with the writings on them. People passing by notice the bags and know where the

waste is originated from, and the FFL containers tend to be stored for a longer time at our plant before collected further by FFL partners.

I: Then we are going to move on to technology.

I: Which system do you use to report waste?

R: We keep an overview of received waste using statistics. Since the fishing season varies depending on seasons and the amount of fishing activities varies do not necessarily collect the containers monthly. Our data is sent to FFL only when they request it. But we do have a mandatory report we send annually.

I: Who do you report to?

R: We report everything to SALT

I: How have your experience with implementing and using the registration system for waste been?

R: We have our own report system in the organization, and we extract the relevant information and send it to FFL.

I: Can the registration system be improved in any way?

R: Report functions should be improved, making it easier to report to the authorities and the FFL actors.

I: Are there any other technological solutions that you think can work better?

R: A scanner that could scan the content of the bags would be nice. Otherwise, some technology that could separate lead from the wire may help together with other sporting equipment.

I: Then we are going to move on to incentives

I: To what extent do you think that incentives can contribute to more people participating in the FFL project?

R: I'm not sure, but my impression is that all the companies involved with waste management are interested to participate, to make new connections with other organizations and they do feel the responsibility to do so. I have never heard about a waste management company that has some negative thoughts about receiving marine waste.

I: What incentives do you think need to be in place to motivate more people to participate in FFL?

R: This has not been a topic, but it has been mentioned to other actors within the same industry that we are participating in FFL, so there is a great commitment among the people concerning the management of marine waste.

I: What incentives do you think need to be in place for more people to bring waste they catch at sea?

R: The only thing that needs to be put in place in my opinion, is the question about the future of FFL.

I: Then we are going to move on to the economy

I: To what extent has the implementation of FFL with you affected your costs?

R: In the beginning, we experienced some negative costs since we were responsible for everything regarding waste handling. Then FFL helped assisted us and created partnerships with other firms which whom we could work with. The containers for FFL were stored for long periods of time and used much of our available storage capacity. But as time went by, we were able to send partially full containers and consolidate other waste shipments together with FFL. This improved our storage capabilities, reduced our transport cost, which saves the environment from our point of view.

I: How has the implementation of return logistics affected other factors and conditions then your costs?

R: I think this has been answered in the last question

I: Which activity do you think is the biggest cost driver with you linked to your participation in FFL?

R: Our waste from FFL goes through the same processes as the regular waste. The difference is that FFL sends their own highly competent associates to our facility to participate in the pick analysis. Regular waste must be analyzed by ourselves

I: Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties?

R: Previously, some of the waste was sent unsorted to the next destination. When arrived, the waste which was acceptable for the specific location was extracted, and all the remaining was sent to other locations, and so on. This generated much unnecessary transportation for many different actors. Now the waste gets sorted in our facility, stored for a period of time, if necessary before it's sent to the next actor.

I: Then we are going to move on to the regulations

I: What regulations and legislation do apply to you regarding marine waste?

R: Our activity is regulated by the regional state administration, which decides how the waste should be handled and what type of waste is acceptable to handle for us. Otherwise, we are affected by certifications such as ISO 14001, and Miljøfyrtårn.

I: How do these regulations affect you today positively and negatively?

R: All regulations have affected us positively because we have the framework under which our organization can operate within clear limits.

I: To what extent do the regulations in place prevent you from carrying out the work regarding waste management of marine waste?

R: It does not limit our business, since we have a given framework to operate within.

I: What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?

R: Not sure, but more information about FFL can help. I have not heard about FFL before our organization had a question about participation.

I: Then we are going to move on to processes

I: Can you describe the processes that take place with you in connection with FFL?

R: Containers are placed at the port and when they are full or almost filled up, we are noticed. Then we collect them and replace the containers with an empty ones. When arriving at our facility the waste goes through a sorting process and a report is made. Then the waste is stored and sent to the next actor.

I: To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today?

R: It works well regarding delivery and sorting processes, but it does have some challenges when it comes the storing the waste and transportation of the waste to the next actor.

I: Could the processes have been performed in a different way to achieve better efficiency?

R: Sorting may be improved with technology. A machine that could dismantle the waste may be of help or other technical installations. Our organization is in the process of building a new facility with more advanced sorting machines. We do talk to other recycling companies and take notes.

I: Could any of the processes have been performed elsewhere in the value chain to achieve better efficiency?

R: Maybe a ship that collected all the waste from the port's participating in FFL, and further transported the waste to bigger ports with bigger facilities. That could be a more practical solution, but I'm not sure about the economical aspect of this idea. Also, how much is to be stored at each port before being transported, the time schedule.

I: Do you feel that the infrastructure is in place to be able to carry out the work as efficiently?

R: Yes. But this is always improving, and we think the future would come with more improved solutions.

I: Then we are going to move on to interaction.

I: To what extent do you communicate with other actors in the value chain in FFL?

R: We only communicate with the actors that receive our waste and the transporting companies that transport the waste.

I: To what extent do you share knowledge and experience with each other?

R: All our reports are available to all actors, and we try to have an open attitude towards everyone involved.

I: Are there other solutions in terms of collaboration and communication that you think could have been better?

R: Communication is done by email and phone which we think works great.

I: What benefits do you think you could have gained by communicating and collaborating more with the other actors?

R: It is hundred percent positive

I: I: Then we are going to move on to corporate social responsibility

I: To what extent do you focus on social responsibility?

R: From a scale from 1 to 10, I think we are 10. We have a strict policy for our transport companies which should at least comply with Euro 6 classification on their trucks.

Transport optimization is also important and focuses on recycling, reuse, and energy recovery. Our goal is to ship as small quantities of waste to landfills.

I: How do you exercise social responsibility?

R: By sorting and sending the waste to the next actor in our network. We conduct clean-up action on the beach locally and provide necessities and provide sponsorship to local sports events.

I: How do you think your focus on social responsibility has contributed positively?

R: Our activities contribute to a cleaner environment and nature.

I: To what extent is your focus on social responsibility a motivation for you to participate in FFL?

R: Our responsibility is to participate in all environmental activities.

I: Then we are going to move on to future prospects for FFL

I: What do you think is needed for more vessels to join FFL?

R: I'm not sure, but the vessels need to be able to deliver waste to different ports, so the main activity which is fishing is not disrupted. The vessels should be able to deliver to the

closest port while fishing so that needs to be facilitated. And the project is not so hyped in the media picture and the work that is being done, so the project should gain more focus from the media.

I: What do you think will be the consequence if a port fee is introduced as a replacement for FFL?

R: We think that would result in smaller vessels would not bringing the waste which is caught up in their fishing gear to port.

I: What do you think is needed for FFL to be able to continue?

R: Keep the incentives and a general acceptance for the work which is being done.

I: What do you think is needed for FFL to be able to expand with a view to regulations and infrastructure?

R: Concerning regulations, I have no opinion.

I: What about infrastructure?

R: Concerning infrastructure, I believe more ports that allow vessels to deliver FFL waste.

I: What about incentives?

R: Maybe somehow give some incentives to the ports and the fishing vessels, which do not get anything. Our organization gets covered most of the associated expenses.

I: Are there any other solutions you think could have worked as well or better than FFL?

R: I have not considered that, I don't know.

I: Then we have some closing questions

I: Is there anything else you want to add that we have not been through?

R: No

I: Can we contact you if we have any questions regarding what we have asked that need to be clarified?

R: Yes

I: Thank you so much for participating.

Transcript of respondent 5:

Date of interview: 24 March 2022
Duration of interview: 30 minutes
Interviewer: Christine Ø. Hals
Transcriber: Jaroslav Heggdal
Interview type: Video recording on Teams
Language of the interview: Norwegian
Language of the transcript: English
Translated by: Jaroslav Heggdal/ Christine Hals
Transcribed reviewed and accepted by the respondent: 1.4.22

The transcript is based on a video recording of the interview. This video recording will be deleted when the wording of the written transcript is reviewed and accepted by the respondent. The transcript is not an accurate word-for-word representation of the oral interview and does not contain any comments on the way the respondent behaved during the interview. The transcript should, on the other hand, convey the meaning of the statements given in proper written language with full sentences (adopted from Holm & Tukaeva, 2019).

I have received and understood the information of the project *An assessment of the value chain of the Fishing for Litter project*, and have been given the opportunity to ask questions: I consent to:

- participate in this interview using video recording*
- that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary*
- that information about me is published so that I can be recognized- if necessary*
- that my personal information is stored after the end of this project- if necessary*

I agree that my information will be processed until the project is completed

(Signed by informant, date)

The respondent consented to the above.

The letter “I” represents the interviewer, and the letter “R” represents the respondent.

I: Then we are starting with an introductory question

I: Can you describe your role in the FFL- project?

R: We collect the containers when they are full, then we treat the waste at our plant, and we provide an area for the organizers where they can conduct their waste analysis. They are a regular customer, and sometimes we assist them with those analyses.

I: Then we are going to move on to management and internal drivers.

I: What is your motivation for participating in the FFL project?

R: It suits our company profile, and they are a customer that generates an income, and it is also a nice project to be a part of as well.

I: What processes have you gone through during the implementation of FFL?

R: This was implemented before I started at the company, so it was already implemented before my time. I don't think the implementation has been complicated. In the beginning, I believe there were some meetings and other procedures about how the waste analysis should be conducted and where to place the waste containers. But they are like a regular customer so the processes related to FFL have been pretty standard.

I: Have FFL demanded any additional or reallocation of resources since you joined?

R: No, nothing else than that the organizers sometimes use our facility for the waste analysis where we assist them and some guidance about our plant and the equipment.

I: What measures have you taken to motivate employees to participate in FFL activities?

R: We have not done anything special except informed the involving personnel about the project where the participating people have been positive towards the project.

I: How does your participation in FFL align with the company's objectives and values?

R: It suits our values very well since our business strives to be the best regarding the activities we are conducting. Our strategy has been leading in the area and we feel that our business takes social responsibility through our operations.

I: How is the attitude among the employees to your participation in the FFL project?

R: It's positive and we are proud to participate in the project. Sometimes it could be a lack of space in our facility, but there have been no complaints, so the attitude is positive.

I: Then we are going to move on to technology.

I: Which system do you use to report waste?

R: We have our own systems that we use to report to other actors.

I: Who do you report to?

R: We report to FFL, the weight, the location where the waste is picked up, the amount, and the date we received the waste, and we also report to the government and some other actors which I'm not sure of.

I: How have your experience with implementing and using the registration system for waste been?

R: I haven't been participating in the implementation process, but it's very standardized.

I: Can the registration system be improved in any way?

R: It probably could, but regarding FFL I'm not sure if it is relevant. Everything can be improved or become more user-friendly.

I: Are there any other technological solutions that you think can work better?

R: The waste analysis can be challenging weighing the waste and the content because everything that arrives is tangled up and it's a physically demanding job. Maybe there is some room for improvements there.

I: Then we are going to move on to incentives.

I: To what extent do you think that incentives can contribute to more people participating in the FFL project?

R: I believe more ports that receive marine waste in regard to FFL. Some of our customers wish to participate in FFL so believe there is a need for more waste facilities where they can deliver retrieved waste.

I: What incentives do you think need to be in place to motivate more people to participate in FFL?

R: More resources to find more efficient ways of sorting better and more economical support to fund more workers and project groups since this demands a lot of resources that we don't get funding for.

I: What incentives do you think need to be in place for more people to bring waste they catch at sea?

R: More receiving facilities of FFL and more economical support. Compensate some of the work which involves retrieving waste from the sea. But I'm not sure about how the current situation is for the vessels.

I: Then we are going to move on to the economy.

I: To what extent has the implementation of FFL with you affected your costs?

R: It's covered, so our business does not have any cost regarding the FFL project. We offer some space at our facilities, which I think is included in our compensation for the FFL project, but it is very manageable for us to handle that waste.

I: How has the implementation of return logistics affected other factors and conditions then your costs?

R: We handle the waste within our organization and transported it to our facilities for energy recovery or our landfill. Nothing of our waste, as far as I know, has been sent to recycling due to the poor condition of the waste when it's received. So, I would say it has affected us positively.

I: Which activity do you think is the biggest cost driver with you linked to your participation in FFL?

R: Transportation of the waste.

I: Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties?

R: The waste could be cleaned and sorted before it reached our facilities, but the reality is different since it requires many resources. If it were possible, it has definitely helped our processes to become more efficient.

I: Then we are going to move on to regulations.

I: What regulations and legislation do apply to you regarding marine waste?

R: I'm not sure about that, but I think we don't have any restrictions when handling FFL waste. But The Norwegian Food Safety Authority has rules stating what waste that can go to the landfill and there are also waste regulations and landfill regulations that we are covered by. I don't think there are any special regulations regarding marine waste.

I: How do these regulations affect you today positively and negatively?

R: We have some costs linked to the regulations since we must make sure we follow them and that can allocate expenses, but that is usually integrated in our price.

I: To what extent do the regulations in place prevent you from carrying out the work regarding waste management of marine waste?

R: None

I: What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?

R: I think that there should be economical incentives and not regulations, or some guide stating that you are obligated to collect waste if possible.

I: Then we are going to move on to processes.

I: Can you describe the processes that take place with you in connection with FFL?

R: We have different containers placed at several locations where there is one container for one type of waste and another container for another type of waste. When the containers are full the actor contacts us for pickup. If a waste analysis is ordered by FFL, we save the waste for FFL's arrival at the plant, if not, the waste is processed further and distributed. On some occasions, other port facilities need FFL containers, but they contact FFL directly which organizes pick-up when the container is full.

I: To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today?

R: I think it works well, but there is a wish from all actors participating in the project that more waste should be recycled in the future, but when the sorting process is so complicated it makes it very hard in real life.

I: Could the processes have been performed in a different way to achieve better efficiency?

R: Yes, if the waste was cleaner, the processes at our plant would be executed more efficiently. Also, an additional storage facility could help us since our storage area is limited.

I: To what extent do you have access to the resources you need to be able to carry out the work with FFL?

R: We have all the necessary resources available

I: Do you feel that the infrastructure is in place to be able to carry out the work as efficiently?

R: Yes, we do. The quantity we receive from FFL is not big so it doesn't demand more resources on our part.

I: Then we are going to move on to interaction

I: To what extent do you communicate with other actors in the value chain in FFL?

R: We communicate with Nofir, which provides us with guidance and information. Otherwise, we communicate with other actors who are in the same business, and we share experiences on how things could be done and we communicate with other customers who share information and experiences.

I: To what extent do you share knowledge and experiences with each other?

R: We could improve in that area, but we do share knowledge with each other, but are limited by time and people are busy in their work.

I: What benefits do you think this provides?

R: I think this could give us benefits through sharing available solutions to the challenges we are facing. Everyone should not sit by themselves and reinvent the wheel so cooperation would improve that.

I: Are there other solutions in terms of collaboration and communication that you think could have been better?

R: Maybe have more access to information across the industry since the industry has grown a lot over a short period of time, but this question was hard to answer.

I: Then we are going to move on to corporate social responsibility

I: To what extent do you focus on social responsibility?

R: We have a great focus on social responsibility since our business is responsible to handle different types of waste in an environmentally friendly manner. Our focus on corporate social responsibility is fundamental to our business.

I: How do you exercise social responsibility?

R: Always try to improve ourselves. We are ISO certified so we conduct different activities with strict environmental goals within our organization. Some of the solutions could probably be performed for cost-efficiently, but we want to give our customers the best solutions, and we also share knowledge.

I: How do you think your focus on social responsibility has contributed positively?

R: It does match our policy and our visions, so we are positive and proud to work with FFL.

I: To what extent is your focus on social responsibility a motivation for you to participate in FFL?

R: That is one of the most important reasons for our work with FFL.

I: Then we are going to move on to future prospects for FLL

I: What do you think is needed for more vessels to join FFL?

R: I don't have so much knowledge about that, but some economic incentives so they can keep doing the job with FFL, and that FFL keeps getting economic support in the future, if not it should be replaced by a similar or a better solution.

I: What do you think will be the consequence if a port fee is introduced as a replacement for FFL?

R: I don't think the waste would be picked up and brought to port.

I: What do you think is needed for FFL to be able to continue?

R: That the project continues to receive support.

I: What do you think is needed for FFL to be able to expand with a view to regulations, infrastructure, interaction, economy, processes, and incentives?

R: More knowledge sharing about how to sort the waste and how to do it better can contribute to more waste being recycled. Another thing is improved cooperation between the actors and more economical incentives.

I: Are there any other solutions you think could have worked as well or better than FFL?

R: I have no opinion about that.

I: Then we have some closing questions

I: Is there anything else you want to add that we have not been through?

R: No

I: Can we contact you if we have any questions regarding what we have asked that need to be clarified?

R: Yes

I: Thank you so much for participating, bye!

Transcript of respondent 6:

Date of interview:	23 March 2022
Duration of interview:	43 minutes
Interviewer:	Christine Ø. Hals
Transcriber:	Jaroslav Heggdal
Interview type:	Video recording on Teams
Language of the interview:	Norwegian
Language of the transcript:	English
Translated by:	Jaroslav Heggdal/ Christine Hals
Transcribed reviewed and accepted by the respondent:	1.4.22

The transcript is based on a video recording of the interview. This video recording will be deleted when the wording of the written transcript is reviewed and accepted by the respondent. The transcript is not an accurate word-for-word representation of the oral interview and does not contain any comments on the way the respondent behaved during the interview. The transcript should, on the other hand, convey the meaning of the statements given in proper written language with full sentences (adopted from Holm & Tukaeva, 2019).

I have received and understood the information of the project *An assessment of the value chain of the Fishing for Litter project*, and have been given the opportunity to ask questions: I consent to:

- participate in this interview using video recording*
- that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary*
- that information about me is published so that I can be recognized- if necessary*
- that my personal information is stored after the end of this project- if necessary*

I agree that my information will be processed until the project is completed

(Signed by informant, date)

The respondent consented to the above.

The letter “I” represents the interviewer, and the letter “R” represents the respondent.

I: Then we are going to start with an introductory question.

I: Can you describe your role in the FFL- project?

R: My role oversees our vessel operations in the sea. The vessel operates in various regions in the Norwegian ocean. We contacted Salt where we wished to be a part of the project since we catch a lot of waste in our gear and our participation have been a good experience.

I: Then we are going to move on to management and internal drivers

I: What is your motivation for participating in the FFL project?

R: Our motivation for participation is to reduce some of our waste disposal costs, as well as our interest in environmental concerns and show that we care for the environment in the ocean.

I: What processes have you gone through during the implementation of FFL?

R: Our employees have been given instructions about the processes. The bags are taken on board, and they know what type of waste that should be put into them which does not include our own waste but just the waste which is caught from the sea.

I: Have FFL demanded any additional or reallocation of resources since you joined?

R: No

I: What measures have you taken to motivate employees to participate in FFL activities?

R: We have a policy that nothing is thrown overboard, and the employees know that. That's our motivation.

I: How does your participation in FFL align with the company's objectives and values?

R: It suits our company very well, and I think the project is great.

I: How is the attitude among the employees to your participation in the FFL project?

R: It's very positive, but we miss more facilities that handle FFL waste, it's too few of them. All the ports should be able to facilitate FFL and receive the FFL-big bags, even if they are not participating in the program, which would lead to a reduction in the need for transportation. There is much unnecessary transportation because when we deliver waste our company often needs to rent a truck and drive separately FFL waste to another facility that receives FFL waste.

I: Then we are going to move on to technology.

I: Which system do you use to report waste?

R: All waste on board is registered in a "Garbage Record Book", which is reported to the government. But the waste connected to FFL is just sent to the receiving facilities and they do the necessary reporting.

I: Who do you report to?

R: I'm not sure about that, but everything is documented and saved in our logbook.

I: How have your experience with implementing and using the registration system for waste been?

R: I can't answer that since the crew on the vessels and the captain do that job.

I: Can the registration system be improved in any way?

R: I think I have to ask our vessel about that one.

I: Are there any other technological solutions that you think can work better?

R: I think it works well. If it had not worked, we would probably hear about it. We report everything that is being delivered.

I: Then we are going to move on to incentives.

I: To what extent do you think that incentives can contribute to more people participating in the FFL project?

R: I think the issue here is to be accepted as a member and many of the vessels want to be a member of FFL, but it is not easy to become one. Our vessel spent time in a queue before it was accepted for the FFL project. Moreover, we think that more receiving facilities should be built, or that more of the existing facilities should accept FFL waste, even if they are not participating in the project. This would simplify the system and FFL would not have to rent venues or human capital to sort the waste. This would lead to a reduction in transport costs, and it will be good for the environment. It will also save us much transportation between the facilities from our point of view since we must transport the waste every time a vessel brings waste, which leads to more transportation than necessary.

I: What incentives do you think need to be in place to motivate more people to participate in FFL?

R: The awareness of pollution has increased very much in the fishing industry, and we think that vessels take their waste to shore. Nothing gets thrown overboard from our vessels and the environmental aspect is in focus among fishermen.

I: What incentives do you think need to be in place for more people to bring waste they catch at sea?

R: I think the most important thing is to accommodate waste delivery facilitates for fishing vessels in a convenient manner where it is easy to deliver and not where the vessels need to rent cargo trucks at port or travel far to be able to deliver and pay extra for the needed transport.

I: Then we are going to move on to the economy.

I: To what extent has the implementation of FFL with you affected your costs?

R: For our part, the cost has not been an issue. Since our vessel must pay to deliver other waste, the implementation of FFL has reduced some of our waste expenses since we now can deliver some waste for free. But the biggest motivation is that there must be enough facilities available where you can get rid of the waste.

I: How has the implementation of return logistics affected other factors and conditions then your costs?

R: I don't have any opinion about that

I: Which activity do you think is the biggest cost driver with you linked to your participation in FFL?

R: The cost of transport. We must drive one hour and take a ferry to reach the FFL facility. If the quantity of FFL waste is small, we deliver the waste to a closer facility.

I: Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties?

R: The cost of waste disposal is just one among other costs. It's rather about having a location that can handle the waste.

I: Then we are going to move on to regulations.

I: What regulations and legislation do apply to you regarding marine waste?

R: IMO, The Norwegian Maritime Directorate, Directorate of Fisheries, and other regulations regarding ships so we follow all regulations regarding waste.

I: How do these regulations affect you today positively and negatively?

R: We think the FFL project is affecting us very positively and I hope it will be active in the future. If a fee were imposed instead of FFL, I'm afraid some vessels may just leave the waste in the sea. I believe that most waste is retrieved, so it is important that the system works and rather developed than removed. But the regulations do not affect us positively or negatively.

I: To what extent do the regulations in place prevent you from carrying out the work regarding waste management of marine waste?

R: It's not of any obstacle.

I: What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?

R: I think FFL should be responsible for the transportation of the waste from the vessel to the waste facility that is a part of FFL since there are not that many waste facilities available that are a part of FFL. Regarding the regulations, we think that this topic is being regulated enough.

I: Then we are going to move on to processes.

I: Can you describe the processes that take place with you in connection with FFL?

R: Our crew has been instructed that waste that is not ours, should be sorted and put in FFL bags. We are then responsible to tag the bags and deliver the bags to the port that is

part of the FFL project. We have some meetings on board, and in those meetings, the environment is an important topic we discuss.

I: And after the bags are tagged the waste is picked up?

R: No, we are responsible ourselves to make sure the waste is delivered to the correct FFL waste facility so it would be better if we could deliver at facilities that are not a part of FFL.

I: To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today?

R: The processes for our part work smoothly and we are provided with relevant information with how much we have delivered and receipts, so we think it works very well.

I: Could the processes have been performed in a different way to achieve better efficiency?

R: I don't think so, I think it works well. Only the transportation part could be improved since it's too few waste facilities that are a part of FFL.

I: Could any of the processes have been performed elsewhere in the value chain to achieve better efficiency?

R: I'm not sure about that. I think if it was possible to track the waste, that could help.

I: To what extent do you have access to the resources you need to be able to carry out the work with FFL?

R: We have the necessary resources available.

I: Do you feel that the infrastructure is in place to be able to carry out the work as efficiently?

R: Yes, it is.

I: Then we are going to move on to interaction.

I: To what extent do you communicate with other actors in the value chain in FFL?

R: Many vessels that participate in FFL communicate with each other. In our area, we have a group consisting of several vessels where we meet a few times annually and discuss subjects such as environmental aspects and other operational topics and we also share experiences with each other. It was at those meetings I became aware of the FFL project.

I: To what extent do you share knowledge and experiences with each other?

R: During those meetings, we share experiences and knowledge with each other.

I: What benefits do you think this provides?

R: It makes the participant more aware.

I: Are there other solutions in terms of collaboration and communication that you think could have been better?

R: I think that if the fishing gear is reported lost, it is important to follow it up and the report systems are getting better which shows that this is development in this area.

I: Then we are going to move on to corporate social responsibility.

I: To what extent do you focus on social responsibility?

R: We take a great amount of corporate social responsibility where our employees are local, and we use local industry and local vendors.

I: How do you exercise social responsibility?

R: Our activities contribute to our local community in form of tax and that we employ locally.

I: How do you think your focus on social responsibility has contributed positively?

R: Many young local people want to work for us and in our eyes, that is a positive contribution by using local resources.

I: To what extent is your focus on social responsibility a motivation for you to participate in FFL?

R: Our focus is to keep the ocean clean. We are the first to detect the waste and we can do something about it. We believe that the volume of waste in the sea is reducing.

I: Then we are going to move on to future prospects for FFL.

I: What do you think is needed for more vessels to join FFL?

R: Easy to dispose of the waste when caught, and that it is facilitated by FFL. Further, the vessels should not have any extra expenses regarding deliveries of the retrieved waste, therefore, we think that all the waste facilities should be able to facilitate FFL so it's easier for the vessels to deliver the waste.

I: What do you think will be the consequence if a port fee is introduced as a replacement for FFL?

R: I think many of the vessels would rather throw it back to the sea.

I: What do you think is needed for FFL to be able to continue?

R: The project should be like it is today and instead of having some facilities where you can deliver FFL, every port that has waste handling services should be able to facilitate FFL.

I: What do you think is needed for FFL to be able to expand with a view to regulations, infrastructure, economy, processes, and incentives?

R: It should not cost much or anything to deliver waste and the transportation, if needed, should be facilitated by FFL. Otherwise, I think the project works well since there are tons of waste being collected and retrieved from the sea and delivered.

I: Are there any other solutions you think could have worked as well or better than FFL?

R: Other alternatives may be that it's possible to dispose of the FFL waste together with other types of waste, but the vessel's own waste should be at the owner's expense. I think the project works well and should continue and not be replaced with a port fee since that can lead to waste being left at sea and frustration.

I: We have some follow-up questions regarding what we have talked about if that is, okay?

R: Yes

I: I have a question concerning interaction. You mentioned that you gather as a group to discuss relevant subjects, can you elaborate?

R: The group was created by fishing companies on their own initiative. There we discuss cases, sent in prior to the meeting, regarding the environment and safety and such.

I: Are the waste regarding FFL sorted and tagged on board?

R: The waste is put in bags marked with FFL.

I: Then we have some closing questions

I: Is there anything else you want to add that we have not been through?

R: No

I: Can we contact you if we have any questions regarding what we have asked that need to be clarified?

R: Yes

I: Thank you so much for participating, bye!

Transcript of respondent 7:

Date of interview:	22 March 2022
Duration of interview:	34 minutes
Interviewer:	Christine Ø. Hals
Transcriber:	Christine Ø. Hals
Interview type:	Video recording on Teams
Language of the interview:	Norwegian
Language of the transcript:	English
Translated by:	Christine Ø. Hals
Transcribed reviewed and accepted by the respondent:	4.4.22

The transcript is based on a video recording of the interview. This video recording will be deleted when the wording of the written transcript is reviewed and accepted by the respondent. The transcript is not an accurate word-for-word representation of the oral interview and does not contain any comments on the way the respondent behaved during the interview. The transcript should, on the other hand, convey the meaning of the statements given in proper written language with full sentences (adopted from Holm & Tukaeva, 2019).

I have received and understood the information of the project *An assessment of the value chain of the Fishing for Litter project*, and have been given the opportunity to ask questions: I consent to:

- participate in this interview using video recording*
- that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary*
- that information about me is published so that I can be recognized- if necessary*
- that my personal information is stored after the end of this project- if necessary*

I agree that my information will be processed until the project is completed

(Signed by informant, date)

The respondent consented to the above.

The letter “I” represents the interviewer, and the letter “R” represents the respondent.

I: We are starting with an introductory question.

I: Can you describe your role in the FFL- project?

R: We manage what is delivered to the port by boats, weigh it, and send it to the next actor in the value chain. We register it to some degree, but mainly we weigh it. We receive waste from oil installations, fish farms, and lifeboats. If we receive waste that can be considered “special” due to the waste’s size, or large quantities we take picture of it and send it to FFL for documentation. We handle what arrives and store it in 1500L bags,

otherwise, we use a rope to tie it with, then we put it in a container, when full it gets picked up.

I: Then we are going to move on to management and internal drivers.

I: What is your motivation for participating in the FFL project?

R: We received a request to participate that we accepted immediately. Participating I believe gives us a competitive advantage by attracting more boats by offering an additional service that others don't necessarily offer. Participating is a positive thing to do.

I: What processes have you gone through during the implementation of FFL?

R: Not many. The participation is not "High tech" and easy for us. It has been explained to us how we should do it and how we do the invoice. I think we send an invoice for a half-hour of work for handling the waste per boat and if there is something special demanding an hour or two, we document it, but that is rare. We have not gone through many processes.

I: Have FFL demanded any additional or reallocation of resources since you joined?

R: No

I: What measures have you taken to motivate employees to participate in FFL activities?

R: Our employees see what we are doing, and they think it is a positive thing. Now all waste is brought to port, not only waste for FFL but also other marine waste so there has been a change in attitude. I have an impression that they are good at bringing the waste to port. There is not a problem with their motivation since they are motivated.

I: How is the attitude among the employees to your participation in the FFL project?

R: They are positive, and they see the value of participating. I see that the participants have become a positive thing, where they receive a diploma saying how much waste they have delivered each year, and there is a lot delivered at port.

I: Then we are going to move on to technology.

I: Which system do you use to report waste?

R: It is very "low tech". The one receiving the waste reports the weight, who delivered it and the registration number. We put that information in a document and send the document as a voucher with the invoice to FFL.

I: Do you report where the waste is picked up?

R: No, but I know the boats have been encouraged to do so but we don't receive that information.

I: How have your experience with implementing and using the registration system for waste been?

R: Unproblematic.

I: Can the registration system be improved in any way?

R: Probably, but not for our part. I don't believe that it can be improved here. It is during the analysis of the waste it needs to be registered, not here with us because we don't have the time or the competence to do it.

I: Are there any other technological solutions that you think can work better?

R: No

I: Then we are going to move on to incentives

I: To what extent do you think that incentives can contribute to more people participating in the FFL project?

R: I believe it must be facilitated better, so that smaller vessels can deliver their waste close to where they unload fish.

I: What incentives do you think need to be in place to motivate more people to participate in FFL?

R: I don't believe there is more room for the bigger boats to participate, having the opportunity to deliver waste for free is motivation enough for them. But regarding the smaller vessels, there should be deployed more waste bags and containers at the unloading fish facilities.

I: What incentives do you think need to be in place for more people to bring waste they catch at sea?

R: It must be easy to deliver and dispose of the waste for the smaller boats. For the bigger vessels, the scheme works well.

I: Then we are going to move on to the economy.

I: To what extent has the implementation of FFL with you affected your costs?

R: Practically nothing. As mentioned, we send an invoice containing the time spent on handling the waste and that is it. The job connected to FFL project takes little time.

I: How has the implementation of return logistics affected other factors and conditions then your costs?

R: It has not affected us to any degree.

I: Which activity do you think is the biggest cost driver linked to your participation in FFL?

R: To improve and be better than our competition and offer a service and hopefully attract more customers. Being part of FFL is good advertisement.

I: Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties?

R: No, for us there is nothing that can be improved when it comes to cost efficiency, and I believe our activities in our facility cannot be done any better. I don't know what happens with the waste after the container leaves our site if it is sorted or shipped for reuse abroad.

I: Then we are going to move on to regulations

I: What regulations and legislation do apply to you regarding marine waste?

R: We were asked to sort all waste such as lines, household goods, paint, and steel at first. But we don't have time or the competence to do so. We made an agreement that it safer for us to send all waste mixed together to the next actor in the value chain who has the competence and skills to sort and handle it in a professional manner. We basically rent competence.

I: How do these regulations affect you today positively and negatively?

R: It doesn't affect when we solve it the way we do.

I: To what extent do the regulations in place prevent you from carrying out the work regarding waste management of marine waste?

R: It does not.

I: What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?

I: I don't believe regulations are the solution, but rather a campaign that aims to change the attitude and information towards fishermen. I think that regulations and fines are not the right way to go, but information on the importance to bring waste to the port.

I: Then we are moving on to processes.

I: Can you describe the processes that take place with you in connection with FFL?

R: We receive the waste, weigh it, register it and place it in a container.

I: To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today?

R: I cannot answer that because we don't sort it.

I: Could the processes have been performed in a different way to achieve better efficiency?

R: I cannot answer that. We just move what we receive into a container.

I: To what extent do you have access to the resources you need to be able to carry out the work with FFL?

R: We have good access.

I: Do you feel that the infrastructure is in place to be able to carry out the work as efficiently as possible?

R: Yes

I: Can everyone that catches waste at sea deliver it at the port?

R: Yes. We have received inquiries from boats that want to deliver waste and that is not a problem, but if you are registered at FFL, then you can deliver for free, if not we order a container, and then it is removed at their expense.

I: Then we are going to move on to interaction

I: To what extent do you communicate with other actors in the value chain in FFL?

R: None

I: What benefits do you think you could have gained by communicating and collaborating more with the other actors?

R: We do communicate with everyone that delivers waste here. The FFL scheme has been ongoing for some years now and everyone knows what to do.

I: To what extent do you share knowledge and experience with each other?

R: We only discuss if there is any special waste arriving and where they should dispose of it. In those cases, the vessel calls us, and we arrange for a customized container to pick it up if the waste is big in size. So, we communicate by phone.

I: What benefits do you think this provides?

R: The boats get rid of the waste from the deck in a short time, and we get to remove it quickly from our premises. So, we get operate efficiently.

I: Are there other solutions in terms of collaboration and communication that you think could have been better?

R: No, not really.

I: Then we going to move on to corporate responsibility

I: To what extent do you focus on social responsibility?

R: To a high degree, it is a matter of course. I think we have a high degree of focus when it comes to social responsibility, we don't throw away anything, everything goes in the trash, and we keep the premises in order.

I: How do you exercise social responsibility?

R: We do our job as one should do it. We keep the premises tidy, and we don't mix waste like fluorescent lamps and batteries.

I: How do you think their focus on social responsibility has contributed positively?

R: We sort dangerous waste and separate it from other waste, which contributes positively.

I: To what extent is your focus on social responsibility a motivation for you to participate in FFL?

R: It is a part of it, and it also gives us a compatible advertising effect. Everyone today wants to participate in a project like FFL that doesn't provide any costs for us, so our participation is a contribution to the project.

I: Then we are going to move on to future prospects for FFL

I: What do you think is needed for more vessels to join FFL?

R: I don't think it is room for more boats here, there are hardly any boats that are not participating in FFL. I think they need to be informed about FFL, the possibilities regarding delivering marine waste for free, and be invited by the FFL organization. I think the reason for those vessels which is not participating is that they don't know about the project.

I: What do you think will be the consequence if a port fee is introduced as a replacement for FFL?

R: I guarantee you that there is going to be less for us to do here. I guarantee you that we are going to move backward. The attitude among people has improved, so I don't think that it's going to lead to radical changes, but when the fishing men are at sea and they have to decide between getting paid less to deliver someone else's litter because it is a collective responsibility, I am sure that the trend of bringing the waste to port is going to turn around.

I: What do you think is needed for FFL to be able to continue?

R: I don't know, but maybe FFL needs to argue and present documentation for it to continue, but it is up to the politician. Organizations within fishing might put some pressure and argue for the project to continue. The FFL project is 100 percent funded through the treasury and what someone is arguing is that instead of actors getting paid to deliver waste, they can pay for it themselves instead and charge it through a port fee.

I: What do you think is needed for FFL to be able to expand with a view to regulations and infrastructure, interaction, economy, processes, and incentives?

R: It is economy, otherwise I think the project is working very well.

I: Are there any other solutions you think could have worked as well or better than FFL?

R: No, but when it comes to the climate it sounds like the costs don't matter, so maybe like a deposit arrangement, but then we are left with the problem of foreign fishermen that leaves their waste which you must pay for. So, I think the FFL scheme has to continue and let rather boats deliver their own waste from the deck because waste that is not delivered at port is left at sea. What we receive like crab pots is not the most dangerous thing left at

sea, but fishing nets on the other hand can keep trapping fish for many years, we don't receive much. But the ocean clean-up that the Coastal Administration is doing is very good.

I: Then I have some closing questions

I: Is there anything else you want to add that we have not been through?

R: No, nothing I can think of.

I: Can we contact you if we have any questions regarding what we have asked that need to be clarified?

R: Yes

I: Thank you so much for participating, bye!

Transcript of respondent 8:

Date of interview:	18 March 2022
Duration of interview:	25 minutes
Interviewer:	Christine Ø. Hals
Transcriber:	Jaroslav Heggdal
Interview type:	Video recording on Teams
Language of the interview:	Norwegian
Language of the transcript:	English
Translated by:	Jaroslav Heggdal/ Christine Hals
Transcribed reviewed and accepted by the respondent:	1.4.22

The transcript is based on a video recording of the interview. This video recording will be deleted when the wording of the written transcript is reviewed and accepted by the respondent. The transcript is not an accurate word-for-word representation of the oral interview and does not contain any comments on the way the respondent behaved during the interview. The transcript should, on the other hand, convey the meaning of the statements given in proper written language with full sentences (adopted from Holm & Tukaeva, 2019).

I have received and understood the information of the project *An assessment of the value chain of the Fishing for Litter project*, and have been given the opportunity to ask questions: I consent to:

- participate in this interview using video recording*
- that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary*

- that information about me is published so that I can be recognized- if necessary*
- that my personal information is stored after the end of this project- if necessary*

I agree that my information will be processed until the project is completed

(Signed by informant, date)

The respondent consented to the above.

The letter “I” represents the interviewer, and the letter “R” represents the respondent.

I: We are starting with an introductory question.

I: Can you describe your role in the FFL- project?

R: I am the captain on board a fishing vessel and I’m happy to participate in the FFL project together with my crew, so my job is to motivate them to follow the guidelines.

I: Then we are going to move on to management and internal drivers.

I: What is your motivation for participating in the FFL project?

R: To contribute to cleaning the ocean, by taking waste that is caught in our gear and delivering it to the port for further processing

I: What processes have you gone through during the implementation of FFL?

R: Not so many. We bought a vessel that was already participating in the FFL program, so our company has not conducted any processes regarding the implementation.

I: Have FFL demanded any additional or reallocation of resources since you joined?

R: No, we have not noticed any changes there

I: What measures have you taken to motivate employees to participate in FFL activities?

R: None, except that we have had some discussions that we all agree about the importance of the project and that it is both positive for us and the environment that we are a part of it.

I: How does your participation in FFL align with the company's objectives and values?

R: It fits very good

I: How is the attitude among the employees to your participation in the FFL project?

R: It is very good.

I: Then we are going to move on to technology.

I: Which system do you use to report waste?

R: We do not report anything, we deliver the bags containing the waste to the port, and they do all the necessary reports.

I: Who do you report to?

R: We just deliver the big bags.

I: Do you use any registration system to report the waste?

R: No

I: Then we are going to move on to incentives

I: To what extent do you think that incentives can contribute to more people participating in the FFL project?

R: I think everyone has some interest in the environmental aspect, and how to contribute. Especially as a fisherman, you want to remove fishing waste from the sea because it might cause problems for further fishing activities, in terms of old fishing gear in the sea, damage to the current fishing gear you or your colleagues are using. Or if the waste in the sea damages someone else's fishing gear.

I: What incentives do you think need to be in place to motivate more people to participate in FFL?

R: I don't think incentives are the most important factor since I believe everyone is glad to collect marine waste. I think the most important is the attitude among people and having easy access to bags for the collection of waste and getting it onshore easily.

I: What incentives do you think need to be in place for more people to bring waste they catch at sea?

R: I think the most important factor is that the vessel can deliver waste regardless of which port. You should be able to deliver any kind of waste at every port and not that one port accepts some sort of waste and not the other, while others do. The waste disposal should be in a convenient location, where vessels deliver fish or where the vessel refuels.

I: Then we are going to move on to the economy

I: To what extent has the implementation of FFL with you affected your costs?

R: We have not experienced any effects on our cost, but I think if more vessels were a part of FFL it would reduce the amount of damage to the shipowner's fishing gear. Which would lead to a cost reduction for the vessels.

I: Which activity do you think is the biggest cost driver with you linked to your participation in FFL?

R: We do have not extra costs regarding the FFL project. When our vessels are docked, our vessel can unload the waste.

I: Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties?

R: There is surely some potential, but I can't think of anything at this moment. But it should be something that would facilitate the ease of use, that the vessel can deliver waste in a convenient and easy method.

I: Then we are going to move on to regulations

I: What regulations and legislation do apply to you regarding marine waste?

R: MARPOL

I: How do these regulations affect you today positively and negatively?

R: It does not affect us negatively, because much of it is common sense as well. The positive is that the regulations are international and affect everyone. If everyone respects the regulations the environment would be cleaner.

I: To what extent do the regulations in place prevent you from carrying out the work regarding waste management of marine waste?

R: No, I can't think of anything.

I: What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?

R: More ports that can receive the waste. There have been some occasions where our vessel intended to deliver bags at the port, but the port was not participating in the FFL project so the vessel could not deliver the waste. The bags were stored for a longer time on the vessel for that reason.

I: Then we are moving on to processes.

I: Can you describe the processes that take place with you in connection with FFL?

R: When we fish the waste gets caught in our trawl gear. We remove the waste from the trawl on deck and put it in FFL bags. When the journey is completed, the bags are delivered to the port.

I: To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today?

R: I think it works very well.

I: Could the processes have been performed in a different way to achieve better efficiency?

R: There is always room for improvement, but I would not like to criticize since it works very well.

I: Could any of the processes have been performed elsewhere in the value chain to achieve better efficiency?

R: Probable yes, but I do not have any specific answer for this.

I: To what extent do you have access to the resources you need to be able to carry out the work with FFL?

R: All the necessary resources are available to us, and we take the waste to port when needed.

I: Do you feel that the infrastructure is in place to be able to carry out the work as efficiently as possible?

R: Yes, but I wish there were more port locations available that could receive FFL.

I: Then we are going to move on to interaction.

I: To what extent do you communicate with other actors in the value chain in FFL?

R: We communicate with other actors, but FFL is not very often a topic.

I: To what extent do you share knowledge and experiences with each other?

R: If we have a good experience concerning something worth mentioned, we do share the information among other actors, which is usually done by phone

I: What benefits do you think this provides?

R: The benefit is that everyone does not have to do the same mistake.

I: Are there other solutions in terms of collaboration and communication that you think could have been better?

R: I think it would be a good idea to share the experience through the different unions the vessels are a part of. If you have experienced something, both positive and negative, you could share it among the other partners through the unions.

I: Then we going to move on to corporate responsibility

I: To what extent do you focus on social responsibility?

R: We have a high degree of focus concerning corporate social responsibility.

I: How do you exercise social responsibility?

R: By expanding our business and creating more available work for people, especially in our small community which has a small number of residents. Through our contribution, we hope that this might be a better place for our residents and our children to grow up in.

I: How do you think your focus on social responsibility has contributed positively?

R: Our employees are local, go to the same stores, the same schools and car garages. We support different sports events, religious events, and cultures. Our local employees contribute to our society.

I: To what extent is your focus on social responsibility a motivation for you to participate in FFL?

R: It has some parallels. If our community should be a good place to live, we all need to contribute a little. Then this community will be even better.

I: Then we are going to move on to future prospects for FFL

I: What do you think is needed for more vessels to join FFL?

R: I think that more advertisement is needed. We did not hear anything about FFL before we bought the vessel which was already a member of the project.

I: What do you think will be the consequence if a port fee is introduced as a replacement for FFL?

R: That might be negative for some of the vessels. In the worst case, some vessels might consider not bringing the waste to port, due to a new tax. Because it might be unfair to them, that they must pay tax for someone else's litter. We would pay the tax and take the waste to port, but I'm not so sure for everyone else. The other decision factor might also be the generation, as the newer generation seems to care more for the environment than the older generations.

I: What do you think is needed for FFL to be able to continue?

R: As mentioned before, more advertisements about the project and what it entails. And more ports where it's possible for vessels to deliver to.

I: What do you think is needed for FFL to be able to expand with a view to regulations and infrastructure?

R: I think new regulations are the wrong way to go. The focus should rather be to work on the same side as the shipowners, not against them. Rather focus on how to facilitate the project for the members and make it more convenient.

I: And regarding the collaboration?

R: There should be open communication and the project should be facilitated for the shipowners in a convenient manner.

I: And regarding the economy?

R: If it's free of charge to deliver the waste, it is not necessary with any compensation in my point of view.

I: And regarding processes and incentives?

R: As long it is easy to get rid of the waste, I think incentives or other bonuses are necessary for getting the job done.

I: Then we have some closing questions

I: Is there anything else you want to add that we have not been through?

R: No, but there should be more information out there, maybe get a copy of the report, so we know how much that has been collected. Here we participate in a clean-up of the port once a year where we see how much has been collected, which is positive. More information saying what needs to be collected and removed.

I: Can we contact you if we have any questions regarding what we have asked that need to be clarified?

R: Yes

I: Thank you so much for participating, bye!

Transcript of respondent 9:

Date of interview:	23 March 2022
Duration of interview:	37 minutes
Interviewer:	Christine Ø. Hals
Transcriber:	Jaroslav Heggdal
Interview type:	Video recording on Teams
Language of the interview:	Norwegian
Language of the transcript:	English
Translated by:	Jaroslav Heggdal
Transcribed reviewed and accepted by the respondent:	11.04.22

The transcript is based on a video recording of the interview. This video recording will be deleted when the wording of the written transcript is reviewed and accepted by the respondent. The transcript is not an accurate word-for-word representation of the oral interview and does not contain any comments on the way the respondent behaved during the interview. The transcript should, on the other hand, convey the meaning of the statements given in proper written language with full sentences (adopted from Holm & Tukaeva, 2019).

I have received and understood the information of the project *An assessment of the value chain of the Fishing for Litter project*, and have been given the opportunity to ask questions: I consent to:

participate in this interview using video recording

- that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary*
- that information about me is published so that I can be recognized- if necessary*
- that my personal information is stored after the end of this project- if necessary*

I agree that my information will be processed until the project is completed

(Signed by informant, date)

The respondent consented to the above.

The letter “I” represents the interviewer, and the letter “R” represents the respondent.

I: We are starting with an introductory question.

I: Can you describe your role in the FFL- project?

R: We were contacted by the organizer for the FFL project, to participate as a receiver port for FFL, which we agreed to do. We collect the marine waste from the participants of the FFL project, then we weigh it, register what is being received, and make the waste ready for pickup by the next actor. We also provide registration forms to any vessels that are interested in participating in FFL and send forms to FFL for approval, where we have not experienced that any vessels have been denied participation.

I: Then we are going to move on to management and internal drivers.

I: What is your motivation for participating in the FFL project?

R: Our organization cares about the environment, and it suits our environmental policy to participate in such a project where we have the chance to assist our customers to get rid of their marine waste. We think that facilitating waste delivery for FFL is a great project.

I: What processes have you gone through during the implementation of FFL?

R: We have not gone through any radical changes in our organization regarding the implementation process, some administrative adjustments about how to register the waste, and the details about it. Otherwise, when the containers are full FFL is contacted and they take the responsibility from that stage.

I: Have FFL demanded any additional or reallocation of resources since you joined?

R: No, not for our part.

I: What measures have you taken to motivate employees to participate in FFL activities?

R: Our business care about the environment. The employees are highly motivated, and our organization is aware that marine waste is a challenge, and we are happy to contribute.

I: How does your participation in FFL align with the company's objectives and values?

R: Our business has a great focus on the environment and how to reduce the environmental impact. We focus on development where more environmentally friendly products are developed.

I: How is the attitude among the employees to your participation in the FFL project?

R: It is very positive.

I: Then we are going to move on to technology.

I: Which system do you use to report waste?

R: We write all the details in a word document we have received where we report quantities and what we have received to the FFL organizer. Moreover, we also use email, it's not complicated.

I: Who do you report to?

R: Salt, which is the FFL organizer.

I: How have your experience with implementing and using the registration system for waste been?

R: It has not been any issues regarding the register systems.

I: Can the registration system be improved in any way?

R: From our point of view, the current system works just great. If some changes in the future or will improve, we would probably get notified.

I: Are there any other technological solutions that you think can work better?

R: No, I think the current system works fine for our organization now. Maybe it could become more digitalized, but that's the organizer's decision.

I: Then we are going to move on to incentives

I: To what extent do you think that incentives can contribute to more people participating in the FFL project?

R: It's hard to answer this question because from our point of view since it is the vessels that handle most of the waste, it is easier for them to answer concerning this. But we think that distributing the information about FFL to the market and the potential participants is important and distribute the information using the right channels so that the fishermen

receive this information. And the question about budgets should be raised, what is the limitation for FFL participation, and so on.

I: What incentives do you think need to be in place to motivate more people to participate in FFL?

R: Get information out to the market and to the potential participants. Perhaps do some more marketing work about the project and how easy it is to participate.

I: What incentives do you think need to be in place for more people to bring waste they catch at sea?

R: We think most of the vessels are motivated to bring marine waste to port and dispose of it properly, because the alternative, to dispose of it at sea is not beneficial to anyone. I think an impression that there is a focus among fishermen to bring the waste to port, but there are costs related to the delivery to waste. As long as you have an arrangement such as FFL, it encourages boats to deliver waste at ports.

I: Then we are going to move on to the economy

I: To what extent has the implementation of FFL with you affected your costs?

R: It has affected us very little.

I: How has the implementation of return logistics affected other factors and conditions then your costs?

R: It has affected us very little.

I: Which activity do you think is the biggest cost driver with you linked to your participation in FFL?

R: The time consumed receiving, weighing, and packing the waste into containers.

I: Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties?

R: No, we think our current setup works just fine.

I: Then we are going to move on to regulations

I: What regulations and legislation do apply to you regarding marine waste?

R: Not any concerning marine waste so I cannot think of any regulations that affect us at this time.

I: What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?

R: It's hard to answer this question, I think the fishing fleet must answer this question.

I: Then we are moving on to processes.

I: Can you describe the processes that take place with you in connection with FFL?

R: The vessels deliver the waste to shore, then we weigh the waste, and pack it in containers. Then we register how much is delivered from which vessel. When the containers are full, we contact the FFL organizers, which organize the pickup of the containers.

I: To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today?

R: The vessels do the sorting of the waste onboard the vessel where they are provided different bags for different types of waste. It's completely sorted when arriving at the port.

I: Could the processes have been performed in a different way to achieve better efficiency?

R: It works great from our point of view

I: Could any of the processes have been performed elsewhere in the value chain to achieve better efficiency?

R: From our point of view the current situation is fine, maybe someone else in the value chain has a second opinion.

I: To what extent do you have access to the resources you need to be able to carry out the work with FFL?

R: We have the necessary resources available since we use our staff.

I: Do you feel that the infrastructure is in place to be able to carry out the work as efficiently as possible?

R: Yes, it is. Many of the vessels come here to repair their equipment and at the same time they could deliver waste, which we believe saves them time, so they don't have to go to other ports afterward just to deliver waste.

I: Then we are going to move on to interaction.

I: To what extent do you communicate with other actors in the value chain in FFL?

R: We have communication with the FFL organizers, regarding reporting the waste, annual reports, and some newsletters. The communication is mostly via emails. We do not communicate with other ports. The communication between us and the vessels happens daily.

I: To what extent do you share knowledge and experience with each other?

R: Almost nothing

I: Then we going to move on to corporate responsibility

I: To what extent do you focus on social responsibility?

R: Very much, this is a wide topic, but our activities have a strong environmental focus, and it is a part of our daily operations. We pick our vendors based on how they operate and their focus on the environmental aspect as well.

I: How do you exercise social responsibility?

R: We consider the environmental aspect by the nature of the products we manufacture. Our employees are aware of corporate social responsibility, and we also have a policy concerning how to behave and a code of conduct that emphasizes the values our organization has towards corporate social responsibility and the environment.

I: How do you think your focus on social responsibility has contributed positively?

R: We think that our focus on this topic is setting a culture among us, and maybe affecting other organizations to do as well.

I: To what extent is your focus on social responsibility a motivation for you to participate in FFL?

R: It is great because it reflects our values regarding the environment and reduces the environmental impact. Being a part of the solution where vessels can deliver waste for free is a great thing to do. When we got the request from the FFL organization to participate, it was never any doubt from our side. The project is great.

I: Then we are going to move on to future prospects for FFL

I: What do you think is needed for more vessels to join FFL?

R: Marketing that aims at the markets where the vessels are located. Get the information to their channels. I know the budget of the project has been increased at some point, but I'm not sure about the budget limitations.

I: What do you think will be the consequence if a port fee is introduced as a replacement for FFL?

R: I have heard some rumors about a port fee. But I do not know the current status and what the result would be if it does. I don't know what the consequences would be, due to a lack of information about the topic. But what I can say is that the logistic aspect of it needs to be considered, where the vessels should deliver the waste. The most important thing is that it's simple, so the participants do not feel overwhelmed.

I: What do you think is needed for FFL to be able to continue?

R: Have enough budget since everything has a cost. But I think everyone wants to participate. And who should be responsible to pay the price and how.

I: What do you think is needed for FFL to be able to expand with a view to regulations and infrastructure?

R: I think a good start is to make the project permanent, currently it is a trial if I'm not mistaken. Making it a permanent solution could make others to being interested to participate. Having the project as a trial and the rumors concerning the project being shut down would not incentivize new participants in my opinion. But I think the project works very well

I: Are there any other solutions you think could have worked as well or better than FFL?

R: I think it works great. But the question is who should be left with the bill and who should take the profit from it. The environmental aspect in my point of view is voluntary work, which benefits everyone.

I: Then we some follow-up questions if that is, okay?

R: Yes

I: What benefits do you think you could have gained by communicating or collaborating more with the other actors?

R: The communication works just fine just the way things are now. We have not been incentivized to communicate with other actors in the value chain. There has not been any need for that.

I: Does your participation affect other factors than the economical aspect?

R: Our processes are still the same as before FFL, the only difference is that the waste is being put in different containers than before. And our organization thinks it's nice to participate and be able to tell others.

I: The work that your organization conducts for FFL, how do you think that contributes to your surrounding society?

R: We contribute to our local community. Our vessels may come here to repair their equipment, and at the same time deliver waste. It may attract more participants since our facility is central.

I: Then we have some closing questions

I: Is there anything else you want to add that we have not been through?

R: No

I: Can we contact you if we have any questions regarding what we have asked that need to be clarified?

R: Yes

I: Thank you so much for participating, bye!

Transcript of respondent 11:

Date of interview: 25 March 2022
Duration of interview: 40 minutes
Interviewer: Christine Ø. Hals Jaroslav Heggdal
Transcriber: Jaroslav Heggdal
Interview type: Video recording on Teams
Language of the interview: Norwegian
Language of the transcript: English
Translated by: Jaroslav Heggdal/ Christine Hals
Transcribed reviewed and accepted by the respondent: 9.04.22

The transcript is based on a video recording of the interview. This video recording will be deleted when the wording of the written transcript is reviewed and accepted by the respondent. The transcript is not an accurate word-for-word representation of the oral interview and does not contain any comments on the way the respondent behaved during the interview. The transcript should, on the other hand, convey the meaning of the statements given in proper written language with full sentences (adopted from Holm & Tukaeva, 2019).

I have received and understood the information of the project *An assessment of the value chain of the Fishing for Litter project*, and have been given the opportunity to ask questions: I consent to:

- participate in this interview using video recording*
- that Jaroslav Heggdal & Christine Øvereng Hals can provide information concerning me to the project- if necessary*
- that information about me is published so that I can be recognized- if necessary*
- that my personal information is stored after the end of this project- if necessary*

I agree that my information will be processed until the project is completed

(Signed by informant, date)

The respondent consented to the above.

The letter “I” represents the interviewer, and the letter “R” represents the respondent.

I: Then we are starting with an introductory question

I: Can you describe your role in the FFL- project?

R: We joined the FFL project because of our fishing activities in the North Sea area. We retrieved some waste during our activities, and it was not easy to get rid of the waste when we came to shore so because of this, our company joined the FFL project that made it possible for us to deliver such type of waste to the port.

I: Then we are going to move on to management and internal drivers.

I: What is your motivation for participating in the FFL project?

R: Our motivation is to help clean the ocean of waste that is floating on the water or at the bottom of the sea.

I: What processes have you gone through during the implementation of FFL?

R: Not so many processes. We have not been through any big implementation processes.

I: Have FFL demanded any additional or reallocation of resources since you joined?

R: No, not for our part.

I: What measures have you taken to motivate employees to participate in FFL activities?

R: We have had some conversations about it. We had discussed the problem of litter in the ocean many years ago so it was already an established practice that nothing should be thrown overboard. The ocean is the reason we can make our living from fishing and that is our motivation.

I: How does your participation in FFL align with the company's objectives and values?

R: It fits us very well.

I: How is the attitude among the employees to your participation in the FFL project?

R: It's positive.

I: Then we are going to move on to technology.

I: Which system do you use to report waste?

R: Mostly e-mails

I: Who do you report to?

R: Directly to FFL.

I: How have your experience with implementing and using the registration system for waste been?

R: It has been good.

I: Can the registration system be improved in any way?

R: Everything can be improved but the current setup works just fine. The system is not too complicated and easy to use.

I: Are there any other technological solutions that you think can work better?

R: Maybe if there was a site online where the participants could report waste upon arrival, and after the report is submitted someone would make contact to organize pick-up of the waste where it is convenient.

I: Then we are going to move on to incentives.

I: To what extent do you think that incentives can contribute to more people participating in the FFL project?

R: I think there would always be someone that wants incentives prior to participating in a project that requires work, but the main incentive in my point of view is that our fishing activities are our livelihood, and we should not be a contributor to littering of the ocean since it our workspace and we are responsible for our actions.

I: What incentives do you think need to be in place to motivate more people to participate in FFL?

R: It is probably not an incentive, but more available information on the market about the project and more convenient ways to carry out the processes because the processes can be demanding and hectic.

I: What incentives do you think need to be in place for more people to bring waste they catch at sea?

R: I'm not sure, I think everyone has an interest in disposing of waste properly, but I think that many vessels believe that participating generates an expense so it would be nice to have some sort of incentive which covers the cost the vessel has regarding taking someone else's litter from the sea and bringing it to port.

I: Then we are going to move on to the economy.

I: To what extent has the implementation of FFL with you affected your costs?

R: Not at all, it has not generated any expenses but also not any income.

I: How has the implementation of return logistics affected other factors and conditions then your costs?

R: Not so much. The positive is that we have been able to retrieve and bring some waste to the port, so the economic factors have not affected us negatively or positively.

I: Which activity do you think is the biggest cost driver with you lined to your participation in FFL?

R: It does not affect our costs, as long it has not done any damage to our gear. It's always enough space to store the retrieved waste on deck or below deck.

I: Are there any activities that take place at your place that you think could have been carried out elsewhere in the value chain that could have contributed to greater cost-efficiency for you and other parties?

R: I think a stricter regime toward the suppliers of fishing gear would help to facilitate better return practices and policies. I believe some sort of deposit on the fishing gear, that was used to facilitate the return of worn-out fishing gear in a proper manner.

I: Then we are going to move on to regulations.

I: What regulations and legislation do apply to you regarding marine waste?

R: I can't name them specifically, but we are regulated by various laws from the Norwegian Maritime Authority and waste management generally.

I: How do these regulations affect you today positively and negatively?

R: It's positive in my opinion since we harvest food for people around the world, it's how we make our living, and through our activities, we should try to make a small negative impact on the environment in my opinion.

I: To what extent do the regulations in place prevent you from carrying out the work regarding waste management of marine waste?

R: Not at all from our point of view.

I: What regulations do you think need to be put in place so that more people participate in FFL or deliver waste from the sea?

R: As I mentioned earlier, a proper return policy where the purchaser must pay a deposit that is later used to facilitate proper disposal of fishing gear.

I: Then we are going to move on to processes.

I: Can you describe the processes that take place with you in connection with FFL?

R: We put the retrieved waste from the sea into bags, and then deliver them to port.

I: To what extent do you think that the processes with regards to receiving waste, sorting waste, and delivering the waste work today?

R: I think it works well, but I think there is room for improvements. In some ports, they have reached their capacity since it seems that many vessels deliver waste at the same facility.

I: Could the processes have been performed in a different way to achieve better efficiency?

R: Probably, but I'm don't have any specific examples.

I: Could any of the processes have been performed elsewhere in the value chain to achieve better efficiency?

R: Yes, it probably could, but I don't have any examples right now.

I: To what extent do you have access to the resources you need to be able to carry out the work with FFL?

R: We have all the necessary resources available, but an extension of the project could benefit many smaller vessels with cargo restrictions on deck. By extension, I mean more ports participating in the FFL project so the vessels could unload waste where they unload their fish.

I: Do you feel that the infrastructure is in place to be able to carry out the work as efficiently?

R: The FFL project could be more spread around the ports so it's easier to facilitate delivery for smaller vessels also.

I: Then we are going to move on to interaction.

I: To what extent do you communicate with other actors in the value chain in FFL?

R: There is a lot of communication between the vessels where there is a high focus among fishermen on keeping the ocean clean. If you were caught littering at sea, I think that would arise great negative attention.

I: To what extent do you share knowledge and experiences with each other?

R: We do that all the time, but not all the vessels exchange the same amount of experiences and knowledge regarding FFL.

I: What benefits do you think this provides?

R: The benefits are that more waste is retrieved from the sea, and as the focus arises on the environmental aspect, more pressure to improve waste management is imposed on the authorities which is a good thing. But overall, we think this has improved over the years.

I: Are there other solutions in terms of collaboration and communication that you think could have been better?

R: Nothing comes to mind.

I: Then we are going to move on to corporate social responsibility.

I: To what extent do you focus on social responsibility?

R: That is of great importance to us.

I: How do you exercise social responsibility?

R: We focus on that no litter is to enter the sea, the surrounding area, and where we conduct activities. Our company also support the local communities in term of supporting

local sports events, other social events, and funded projects in our local community. This is important for us as we want to conduct our activities in a sustainable way by using the surrounding resources, even if it costs more.

I: How do you think your focus on social responsibility has contributed positively?

R: We think we have some positive impact where we facilitate trainee programs from different schools, and we have the next generation in mind that will take over this generation's activities in the future.

I: To what extent is your focus on social responsibility a motivation for you to participate in FFL?

R: That is a great motivation in my mind. We show that we care for the environment and not only exploit the available resources in the ocean.

I: Then we are going to move on to future prospects for FFL.

I: What do you think is needed for more vessels to join FFL?

R: More visibility about the FFL project in the public eye and an extension of the projects by adding more ports, but I do understand that FFL has a budget that they need to stick to, which is also important to take into account.

I: What do you think will be the consequence if a port fee is introduced as a replacement for FFL?

R: I think that in the beginning there will be some complaints, but as time passes it would become more accepted. I'm personally not a fan of new taxes, but if that happened it could lead to a positive result since the vessels have to pay and it is mandatory to participate and bring retrieved waste to port. By introducing a port fee the vessels will be able to deliver the waste at any port since they are paying to do so. Sometimes forcing someone can give positive results.

I: What do you think is needed for FFL to be able to continue?

I: I'm not sure about that.

I: What do you think is needed for FFL to be able to expand with a view to regulations, infrastructure, interaction, economy, processes, and incentives?

R: When it comes to regulations and infrastructure a mandatory port fee could be imposed as I have mentioned. Regarding economical terms, if a deposit on new fishing gear is imposed where the owner gets a return on that deposit when they return their old and used fishing gear back

I: Are there any other solutions you think could have worked as well or better than FFL?

R: Maybe an imposed tax could be a solution, or regulations put in place by the government on deposits on fishing gear could work better than FFL, which is based on voluntariness, but I'm not sure.

I: Then we have some closing questions

I: Is there anything else you want to add that we have not been through?

R: No

I: Can we contact you if we have any questions regarding what we have asked that need to be clarified?

R: Yes

I: Thank you so much for participating, bye!