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Navn: Erik Marthinussen og Robin Riga

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Authors:

Erik Marthinussen

Robin F. Rigan

Abstract

This thesis explores the governance of the relationship between the end-consumer-turned-supplier (ECTS) and reverse logistics systems. Through an extensive review of literature, it is evident that the relationship between the ECTS and reverse logistics systems is flawed, resulting in suboptimal recycling behavior. The trust mechanism, which is predominantly prioritized, proves to be insufficient in effectively governing this relationship. The literature also highlights the significance of incorporating other control mechanisms such as price and authority for more balanced governance.

The thesis adopts a comprehensive methodology, including a thorough literature review, data collection from municipalities in Norway, and analysis of findings in conjunction with relevant literature. The research aims to contribute to the understanding of effective governance in the ECTS-reverse system relationship, offering insights and recommendations for sustainable waste management strategies.

The proposition put forward in this thesis emphasizes the need for a more effective governance approach to tighten the recycling behavior gap. Trust alone is not enough, and a balanced governance framework with increased utilization of price and authority mechanisms is necessary. By integrating a balanced utilization of price, authority, and trust, waste management systems can incentivize responsible behavior, ensure compliance, and promote positive attitudes towards waste reduction and recycling, ultimately contributing to sustainable waste management. Also, the role of material recycling rate in this thesis is used as an indicator of source sorting efficiency, indicating effective governance.

Furthermore, the thesis proposes two concrete measures for utilizing price and authority. Firstly, it suggests national standardizations and regulations, enhancing authority enforcement. Furthermore, an approach that empowers waste management actors, who are disadvantaged in this relationship, to have greater control and influence over the outcome, as manifested in the material recycling rate. Secondly, the thesis recommends implementing a Pay-As-You-Throw (PAYT) system as a strategy to incentivize the ECTS and address the

increased CO₂ fee. By linking waste disposal fees to the amount of waste generated, the PAYT-system encourages responsible behavior and source sorting. These measures contribute to a more effective and balanced governance approach, integrating price and authority mechanisms to drive sustainable waste management practices.

Overall, this thesis underscores the importance of a balanced governance approach and the utilization of multiple control mechanisms to enhance source sorting efficiency and promote sustainable waste management. By bridging the gap between recycling intentions and actions, the research aims to contribute to the development of more effective waste management policies and the pursuit of sustainable lifestyles.

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1. Introduction

In the age of sustainability and intentional consumerism, efficient waste management plays a crucial role. The European Union's target of achieving a 65% recycling rate by 2035 reflects the global shift in priorities towards more sustainable waste management (Johansson, 2016). However, there are inherent challenges in reaching this target, necessitating further research in the field.

Firstly, it is essential to acknowledge the increasing waste generation resulting from the steady growth in the global population.

“Taking into account the growing population, which in just over ten years between 1999 and 2011 increased by 1 billion people and reached 7 billion people (UN 2015) and is estimated to be 9.7 billion by 2050, the increasing of industrialization and urbanization [1] man can no longer afford to manage waste as waste, but has to use it as a resource” (Johansson, 2016, p.402).

This growing concern for efficient waste management sets the stage for the relevance and urgency of this research.

The transition from a linear take-make-waste model (De los Rios & Charnley, 2017) to a circular economy is a fundamental aspect of the European Green Deal. However, the world's circularity rate remains low at 7.2%, indicating a pressing need for active consumer participation in the reverse logistics process (CGR 2023). The role of the consumers as suppliers in generating volume for the system becomes crucial (Jalil et al.2016). However, they face challenges in terms of low-value products and insufficient compensation for their recycling efforts (Flygansvær et al., 2021).

Climate psychology recognizes that individuals have competing priorities and concerns beyond environmental matters. To address this, the focus should be on modifying individuals' actual behaviors rather than solely increasing awareness (Stoknes, 2015). Despite consumers' positive attitudes towards recycling, studies have revealed a significant gap between intentions and actual

behaviors (Flygansvær et al., 2021; Tudor et al., 2007). This disparity emphasizes the need for interventions that modify individuals' behaviors.

The work of Flygansvær et al. (2021) serves as a significant source of inspiration for this study. Their research showed that despite effective nudges, a recycling behavior gap still remained. Given that the end-consumer-turned-supplier (ECTS) operates as a supplier within this process (Jalil et al, 2016), the relationship between the reverse logistics system and the ECTS is flawed. The inadequacy of material supply and improper recycling practices by the end-consumer-turned-supplier (ECTS) indicate a failure to fulfill their role effectively. Therefore, we wish to investigate how to govern the relationship between the ECTS and reverse logistics systems to enhance source sorting efficiency and promote sustainable waste management. This research is designed to narrow the gap between recycling intentions and actions, address the increasing urgency for sustainable lifestyles, and contribute to the development of more effective waste management policies.

The research question guiding this thesis is:

How can the relationship between the end-consumer-turned-supplier (ECTS) and reverse systems be effectively governed to enhance source sorting efficiency and promote sustainable waste management?

To answer this question, the study will explore three control mechanisms: price, authority, and trust, identified by Bradach & Eccles (1989) as mechanisms governing transactions among economic actors. Through a comprehensive examination of the literature, an investigation into these mechanisms within the domain of household waste management, data collection from Norwegian municipalities, and a thorough analysis of the findings in conjunction with relevant literature, this thesis seeks to offer valuable insights into the effective governance of the relationship between the end-consumer-turned-supplier (ECTS) and the reverse supply chain.

2. Literature review

This chapter establishes the theoretical foundations for this thesis. We have delved into reverse logistics literature to comprehend the characteristics of the reverse systems and of the ECTS, as well as recycling behavior and the relationship between the actors. Then, we introduce the theory of governance mechanisms, and present three distinct mechanisms; price, authority, and trust. We examine the existing literature concerning household waste management within the context of governance mechanisms, and explore how these mechanisms might synergize.

2.1 Reverse logistics systems

A reverse logistic system is the set of activities set in place to recycle resources from the end-user, back into production (Barnes, 1982). The collection function is characterized as the start of the reverse process (Jahre, 1995). Inherent supply uncertainty, where the time, amount, and quality of returned goods are unknown before being collected, is another characteristic of a reverse logistics system.(Fleischmann et al, 2000). Hence, the start of the reverse logistics system features a high degree of variability in decision-making, both from a system perspective and from the ECTS. Thereby, the collection-function which initiates the reverse logistics system is of particular importance.

The effect of a reverse logistic system is a move from the traditional linear take-make-waste system and a move towards a circular economy (Anderson & Brodin, 2005). The reverse logistics system plays a critical role in recycling by ensuring that sorted household waste is transported to the correct locations to maximize recovery.

Socio-economic factors affecting household participation in recycling, sustainable reverse logistics design, reverse exchange classification for public service supply chain management, and reverse service supply chain all contribute to the reverse logistics system (Jalil et al., 2016). According to Jalil et al. (2016), a symbiotic relationship between reverse logistics and waste

systems can produce both environmental and economic benefits. However, for this relationship to be effective, all stakeholders must participate in waste management.

Stakeholder involvement and collaboration are essential for the efficiency of the reverse logistics system (Xie and Breen, 2014 ; Beh et al., 2016). Beh et al. (2016) argues that stakeholder collaboration can lead to a circular economy, while He et al. (2016) adds that a service-oriented waste management approach can enhance stakeholder value and environmental sustainability. Bing et al. (2014) presents a multi-objective optimization model to design reverse logistics networks that minimize costs and environmental impacts, which can improve sustainability and social responsibility. However, a recent study by Drakenstein Municipality in South Africa (Volschenk, 2021) suggests that accessibility rather than cost-effectiveness should be the focus of a reverse logistics system in waste management. The study found that curb-side recycling is the optimal system in South Africa, taking into account ECTS participation, recycling efficiency, and separation rate.

2.1.1 Reverse systems and the ECTS

Upon examining reverse logistics systems, it is evident that stakeholder participation plays a vital role in effectively separating and managing waste through reverse logistics. One interesting aspect to consider is how end consumers become suppliers within the stakeholder relationship in waste management. This idea relates to the concept of encouraging end-consumers to return products to the manufacturer or retailer for recycling or reuse (Jalil et al, 2016).

Jalil et al (2016) says that the end-consumer must become like the first step in the reverse logistics process and help generate volume to the reverse logistics system, and that it constitutes the first part of the reverse logistics system, end-consumer turned supplier (ECTS).

The relationship between stakeholders resembles a business-to-business (B2B) system, where the end-consumer acts as a supplier in the supply chain, requiring collaboration between the ECTS and companies to establish a more sustainable supply chain and reduce waste (Beh et al.,2016). Although the consumer does not feel like a supplier and behaves differently from a business, the consumer does not act as a customer either, as the relationship is based on the consumer being a supplier in the waste management supply chain (Zikmund and Stanton, 1971). Therefore, literature discusses how reverse logistics systems could benefit from making the consumer feel like a supplier.

2.1.2 ECTS characteristics

Flygansv er et al. (2021) looked at the different characteristics of ECTS. Most influential is socio-demographic, housing, motivation and knowledge of the ECTS. Characteristics of ECTS influenced by socio-demographic factors, such as age, income, education, and gender, in relation to recycling behavior have yielded contradictory findings in the literature. (Shrum et al., 1994; Rousta et al., 2015; Monnot et al.,2014)

However, it is important to note that recent research suggests a shifting perspective regarding the impact of socio-demographic factors on recycling behavior, indicating that their influence may be diminishing. In opposition, the housing situation of ECTS emerges as a more influential characteristic (Jalil et al., 2016). The type of housing, size, number of occupants, and other factors associated with the housing environment significantly affect recycling behavior.

Additionally, the accessibility and convenience of the recycling system, along with the availability of appropriate recycling equipment, play a crucial role in shaping ECTS behavior (Bernstad, 2014). Furthermore, motivation and knowledge are important characteristics influencing recycling behavior. Motivation, whether internal or external, has a profound effect on ECTS engagement in recycling. Schultz (1999) states that external motivation is

influenced by social norms, while internal motivation stems from personal values and attitudes. The absence of knowledge can hinder progress, but sharing information, while not as powerful as motivating individuals, can still play a role in enhancing recycling behavior (Schultz, 1999).

Barnes (1982) states that the incentives for the ECTS to act as a commercial intermediary in the reverse logistics system is weak. Brodin and Anderson (2008) points to the fact that the ECTS are not economically compensated for their recycling efforts, and rather than being compensated for said efforts, they are required to pay for them through fees (Halldórsson et al., 2019).

Flygansvær et al (2021) says that due to this a paradox occurs, in which the ECTS are expected to fulfill an important role in the reverse logistics process, but neither feels like one nor being treated like one.

2.1.3 Understanding and influencing ECTS behavior

To understand recycling behavior amongst the ECTS is detrimental to knowing how we can move forward to a more sustainable future. In order for us to use waste as a resource and not just see it as a troublesome exogenous factor of human life we need to make sure it is properly disposed of.

“(...) man can no longer afford to manage waste as waste, but has to use it as a resource”

(Johansson, K. 2016, p.402).

People are usually positive towards recycling, but there is a gap between what they say and do. They have busy schedules and other more pressing concerns in their daily life, and therefore recycling falls down the priority list (Stoknes, 2015).

To influence the ECTS to act as a part of the reverse logistics process, and hence feel like one, understanding how to impact their behavior is necessary.

Johansson (2016) did research on understanding recycling behavior. She concluded the research by pointing out some important principles: designing recycling facilities as close to the recycler as possible, knowledge among the ECTS about how and where to recycle, and lastly, working on establishing a deeper understanding of the environment and the impact of recycling for motivational gain. Meanwhile, a research in the UK on hospital workers' waste behaviors found that their own personal beliefs about the benefits of recycling were the main predictor for their recycling behavior (Tudor et al, 2007).

How can governments influence the ECTS to act a certain way without forcing them or drastically changing incentives? Something that researchers have suggested is nudging. It builds on behavioral economics and psychology (Stoknes, 2015). Thaler and Sunstein (2008) define a nudge as any aspect of design that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. In situations where consumers need to exhibit a specific behavior but lack sufficient motivation to do so, it can be beneficial to employ certain strategies. Recycling serves as a prime example of an action that municipalities desire consumers to embrace, even if it may not be their top priority.

There is not one default way to nudge the population, and there is not necessarily a "right" way to do so. It is important to know the characteristics of the given situation and the group to be nudged to determine suitable nudges (Zhang and Wang, 2020). Flygansvær et al (2021) investigated the effect of nudging. They chose three different nudges, namely the social norm nudge, the distance nudge, and the availability nudge. The social norm nudge saw the effect of activating social norms to affect motivation, where they told the consumers about the importance of recycling as well as telling them about their neighbors recycling behavior. The distance nudge revolved around reducing the distance in which the ECTS had to travel to recycle properly. Also, they moved glass and metal containers closer to residual and paper waste. Their third intervention was the access to sorting equipment. They supplied participants with different colored bags for different types of waste, including a reusable bag for metal and glass.

Flygansvær et al. (2021) discovered that through the social norm nudge in promoting food waste recycling, the experimental group showed a significant improvement in recycling behavior. Furthermore, they argued that the results support the use of social norm nudges to promote desired recycling behaviors. They also found that the distance nudge successfully influenced recycling behavior for glass and metal waste, as demonstrated by the reduction in residual waste and the self-reported increase in quantities. Lastly, the study confirmed the effectiveness of the availability nudge in promoting positive recycling behavior. The findings highlighted the importance of equipment availability and its role in encouraging individuals to improve their recycling practices.

Behavioral psychology investigates the effects of incentives, and their possible negative and positive effects. An issue related to monetary incentives has been highlighted, specifically how they can affect individuals' intrinsic motivation and the external motivation they derive from financial rewards (Druckman et al, 2011). Furthermore, an experiment revealed that offering monetary incentives for blood donations can actually decrease contribution levels (Titmuss, 1971). Consequently, it is important to understand and review behavioral psychology theories, particularly when considering or designing incentive-based reverse logistic systems.

The concept of social norms have varied definitions in literature, involving individual beliefs and evaluations of others in a social context. It involves the cognitive structure of these beliefs as well as the actual behavior and actions that are shared and accepted within a social group. A key distinction is made between descriptive norms, which relate to common behavior, and injunctive norms, which involve approved behavior. (Wallen, 2017).

Farrow et al. (2017) examined the existing evidence on the effectiveness of social norms in promoting pro-environmental behaviors. The authors analyzed different conceptualizations of social norms and provide an overview of studies in experimental economics and social psychology that have investigated the impact of social norm interventions on pro-environmental behavior. From their review of the impacts of various types of social norm interventions on pro-

environmental behaviors, they found that these interventions are effective at inducing significant changes in behavior, and that descriptive norms seem to demonstrate particularly consistent effects in this regard.

2.2 Governance mechanisms

We have reviewed the characteristics of the reverse system and the ECTS, and introduced theoretical and empirical literature on their behavior and the interaction between them. Now, we will look at theory on how to govern inter-, and intra-firm relations.

Hierarchy and market mechanisms have long been viewed as alternative mechanisms for governing and allocating resources (Coase, 1937 & Bradach & Eccles, 1989). Bradach & Eccles (1989) present three independent control mechanisms that govern economic transactions between actors: price, authority, and trust. Price reflects the market mode of exchange, authority reflects the hierarchical dimensions, and trust, on the other hand, refers to the use of social norms and personal relationships (behavioral dimensions). Price, which can be used as a control mechanism where employees are incentivized by financial rewards, authority where managers have the power to make decisions and enforce rules, and trust where employees feel a sense of community and shared values. “(...) For instance, price and authority are often played off each other within firms, while trust and price are sometimes intertwined to control transactions between firms” (Bradach & Eccles, 1989, p.97).

Rather than viewing market and hierarchy as mutually exclusive control mechanisms (Coase, 1937), they suggest that price, authority and trust are independent and can be combined in a variety of ways. According to Streeck & Schmitter (1985), such a view on governance mechanisms is also consistent with macro level models of social orders. Furthermore, they argued that however evident it may be that one of these three mechanisms are dominant for a specific group or at a particular point in time, it is widely accepted that modern societies, polities, and economies can only be comprehensively analyzed by considering a combination of these mechanisms or models (Streeck & Schmitter, 1985).

Bradach & Eccles (1989) asserted that in the real world, price, authority, and trust interact in various ways. They described these interactions as “overlapping, embedded, intertwined, juxtaposed, and nested” (p.116). Furthermore, they suggested that the analysis should not solely focus on the individuals transactions, but rather on the entire structure’s dynamics, as the transactional contexts can impact the control that can be exerted on individual transactions. Adler (2001) supports this notion, contending that there are three primary forms of organization: market, hierarchy, and community. While the market form is based on price mechanism, and the hierarchy form is based on authority, the community form relies on trust. Furthermore, asserting that real-world organizational structures tend to incorporate a blend of all three ideal-typical forms and depend on a corresponding mixture of price, hierarchy, and trust mechanisms.

Haugland & Reve (1994) adopted the definition of Bradach & Eccles (1989), and empirically explored combinations of the governance models. The authors focus on how inter-firm transactions are governed by different combinations of market incentives (price), hierarchical mechanisms (authority), and social mechanisms (trust). They wanted to discuss how social dimensions can complement transaction cost economics, and to formulate a model that portrays the governance of inter-firm transactions within distribution channels as a combination of price, authority, and trust. In their research paper they posited that price, authority, and trust serve as three distinct governance mechanisms that can be combined in various ways. Also, they argued that a comprehensive understanding of effective governance cannot be derived solely from transactional characteristics but must also take into account relational factors (Haugland & Reve, 1994).

Further in our paper we will also adopt price (market), authority (hierarchy) and trust (relational) as the three mechanisms of governance.

2.2.1 Price

Bradach & Eccles (1989) states that price reflects the market mode of exchange - by this recognizing that the price of a good or service is determined by supply

and demand, and that prices reflect the exchange value of goods and services. It is a mechanism by which a company uses market transactions to allocate and coordinate activities between business units. In essence, the business units within the company are treated as independent entities that must compete in the market for resources.

In addition, Bradach & Eccles (1989) describe how the concept of “price”, also known as market incentives, fits into the framework of transaction cost economics. Haugland & Reve (1994) further elaborate that transaction cost economics examines the use of market incentives and hierarchical mechanisms as two possible approaches for structuring buyer-seller relationships. This theory seeks to identify efficient governance structures based on specific transactional characteristics.

Williamson (1991) says that the mechanism of price or market incentives serves to provide relevant information to the actors involved, allowing them to make necessary adjustments, and that in situations where buyer and seller belong to the same organization, coordination is more intentional in nature. Transactions between departments within an organization are governed by administrative procedures and controls, with prices being determined by such procedures. Any necessary adjustments that need to be made by the departments will be carried out using established rules and procedures. Thus, market transactions are governed by market incentives, while transactions within an organization are governed by administrative apparatus (Haugland & Reve, 1994).

However, Bradach & Eccles (1989) believe that price mechanisms can be a part of authority hierarchies, and authority mechanisms can limit independent exchange partners in the market. An example of this could be in a modern multidivisional firm, which is widely recognized for introducing features of markets into hierarchies (Bettis, 1980; Page and Hooper, 1981). Thus, implying that depending on the firm or organization, a combination of the two control mechanisms price and authority is probable between organizations and within them.

2.2.2 Authority

Authority can be understood as a control mechanism that is dependent on the use of power or influence to enforce regulations, decisions, and rules (Bradach & Eccles, 1989). Haugland and Reve (1994) conception of authority relates to the dependence on organizational mechanisms, including rules and procedures. They argue that authority refers to the hierarchical mode of exchange that relies on administrative procedures and control. Furthermore, they assess the extent to which one party exclusively possesses the ability to determine trade terms and the degree to which standard operating procedures for supervision are implemented. Also, claim that authority is positively correlated with uncertainty and frequency, due to the ability authority has to guide towards the desirable results (Haugland & Reve, 1994).

Coase (1937) summarized his argument: "The operation of a market costs something and by forming an organisation and allowing some authority (an "entrepreneur") to direct the resources, certain marketing costs are saved." (p.392). Coase argued that the costs of using the market to allocate resources and coordinate economic activity can be high, as it requires individuals to search for suitable trading partners, negotiate and enforce contracts, and resolve disputes. These transaction costs can be reduced by the creation of a firm (the entrepreneur), which can provide an internal organization that facilitates coordination and reduces uncertainty, also seen by Haugland and Reve (1994) to be the effective use of authority between trade partners.

Drawing from transaction cost economics, there is an argument that when there is asset specificity, uncertainty, and high frequency, an authority-dominated governance vector is necessary. This is because there is always a risk of opportunistic behavior from trading partners, and actors require safeguards to minimize this risk. Authority can serve as an effective means to reduce such actions. As a result, an authority-dominated governance vector is also relevant in situations where there is a high likelihood of opportunism, as argued by Haugland and Reve (1994).

Based on literature, there is some support for a relationship between experience and an authority-dominated vector. As mentioned above, we found an

empirical association between uncertainty and an authority-dominated governance vector. The results do not allow the conclusion that higher levels of uncertainty should be handled by authority. It is possible that relationships relying on trust have been able to reduce perceived uncertainty by developing relational norms and personal relationships (Haugland and Reve, 1994).

Their results suggest that in stable relationships or long-term contracting, trust is a dominant governance mechanism. This contradicts transaction cost analysis. Further, they provide two possible explanations for this result. First, in situations where exchange partners remain independent, the actors face certain limitations regarding what authority mechanisms can be used. Further, when dealing with two separate organizations, and compared to a single organization, possible authority mechanisms are limited. They stated that this may particularly lead to limitations in governing by authority (Haugland and Reve, 1994).

Authority as a concept of control has been discussed for a long time. Back in 1904, Max Weber, described authority as "the probability that a command will be obeyed by a given group of persons.". He discusses in his article, "The Concept of Authority", that authority is seen in 3 forms: traditional, charismatic, and rational-legal. Traditional authority is based on customs and traditions; Charismatic authority is based on the personality and qualities of the leader; Rational-legal authority is based on a formal system of rules and laws that are created and enforced through established procedures (Wallimann, 1977).

John R. Searle provides an examination of authority in "the construction of social reality" (1983) and argues that the concept is a socially constructed phenomenon created and maintained by linguistic acts (Kind, A.,2001). He distinguishes between deontic and institutional authority. Deontic authority is based on social norms and rules that create obligations and duties for individuals, while institutional authority is based on the structures and procedures of institutions such as governments, courts, and corporations. He also mentioned his belief in how deontic authority can be strengthened by

institutional authority as these are interconnected. Institutional authority establishes a structure for creating and enforcing social norms, while deontic authority reinforces the legitimacy of institutional authority by integrating social norms as moral obligations and responsibilities.

John Howard Schütz explored in 2007, the origin of authority and defined it as institutionalized or formal power, which grants the right to wield power. Schütz emphasized the close association between authority and legitimacy, mandate, and office, which all contribute to its "right" to power. He argued that the source of authority extends beyond an implicit source based on the reasons for submitting to authority. Rather, the source of authority is rooted in the "call" individuals feel towards social organizations that inspire obedience and long-lasting influence. This "call" emerges even before the community is formed, and its power lies in the command that transcends personal relationships and benefits the community as a whole. Schütz referred to the source of authority as the "actor".

2.2.3 Trust

Trust is a more general control activity that is less specific than price and authority but has the benefit of being less intrusive and costly, due to the mechanism being built on social norms and personal relationships (Haugland & Torger, 1994). Arrow (1974) summarizes the obvious advantages of trust as a control mechanism: "Trust is an important lubricant of a social system. It is extremely efficient; it saves people a lot of trouble to have a fair degree of reliance on other people's word."(p.23, as cited in Bradach & Eccles, 1989). Trust as a concept is defined as "The probability that he/she will perform an action that is beneficial or at least not detrimental to us is high enough for us to consider engaging in some form of cooperation with him" (Gambetta, 1988, p.217, as cited in Bradach & Eccles, 1989). Trust is heavily viewed in business decisions as different stakeholders depend on each other and are strongly affected by different outcomes.

It is therefore interesting to see how trust works in different combinations as the effect of trust is correlated to how the actor is impacted, and which efforts are needed to complete the task. To see the effect of how trust works in a system, it is important to discuss Lewis & Weigert (1985) who sketch how the cognitive, emotional, and behavioral elements of trust combine to form a unitary social experience. Bradach & Eccles (1989) also examine how (a) diffuse social norms of obligation and cooperation, and (b) personal relationships that overlap with economic exchanges provide the basis for trust.

Trust is a complex construct that has been extensively examined by sociologists. Talcott Parsons (1963) emphasized the significance of trust as a vital element to ensure the smooth functioning of society. Trust reduces uncertainties and risks and facilitates the creation of relationships. Georg Simmel (2004) highlighted the cognitive and affective dimensions of trust, emphasizing that it is founded on both cognitive and emotional confidence in the reliability and competence of the trusted party, as well as an emotional bond with them. This emotional bond can lead to significant emotional investments in relationships, given the belief that they are safe and reliable.

Luhmann (1982) and Heineman (1984) also stressed the importance of trust in social systems. Luhmann (1982) stated that trust is a necessary precondition for social communication and cooperation, while Heineman (1984) argued that trust is an essential element of democratic governance. Furthermore, Lewis & Weigert (1985) suggested that trust functions as the underlying assumption of social order. The emotional, cognitive, and behavioral dimensions of trust contribute to a situation where individuals are willing to take risks with the expectation that others will act competently and dutifully. Trust is a fundamental social reality that impacts various aspects of human behavior, such as lying, family exchanges, money attitudes, and court cases.

Eccles (1981) conducted a study on 26 residential homebuilders and discovered that the relationships between general contractors and subcontractors were typically stable and enduring over extended periods of time, with competitive bidding only occurring infrequently. This type of bilateral arrangement was

referred to as the "quasifirm" by Eccles. It's worth noting that general contractors do not rely solely on trust as they periodically evaluate the market and request bids from other subcontractors. Additionally, the transactions in this industry are characterized by relatively low levels of asset specificity, which makes switching subcontractors relatively easy. However, the presence of market prices helps in fostering trust and developing stable exchange relationships (Eccles, 1981).

2.3 Control mechanisms in waste management

Literature focuses on inter- and intra-firm transactions and governance (Bradach & Eccles, 1989; Haugland & Reve, 1994), we have argued that these governance models also apply to the relationship between waste management companies and the ECTS. Thereby, the conclusion that these factors can be combined, and that effective governance cannot be derived from analysis of transactional characteristics alone, but that relational factors should also be included (Haugland & Reve, 1994) also applies to our case between ECTS and the renovation companies..

Hence, we wish to further elaborate on how waste management companies and other stakeholders might have applied or combined these three governance mechanisms. However, first we would like to separate each of the three governance mechanisms and identify separate measures within each of them to get an overview of how these mechanisms might divert from each other.

2.3.1 Price in household waste management

Price is about incentives or disincentives to motivate organizations or individuals to act in a particular way (Bradach & Eccles, 1989; Haugland & Reve, 1994). In the context of ECTS and renovation companies, price is used as a tool to incentivize sustainable behavior. According to Kamenica, E. (2012) monetary incentives are powerful tools for motivating people. Reviews of empirical evidence in firms have demonstrated that, in a variety of settings,

incentives improve performance (Prendergast, 1999). Incentives have proven to be efficient to increase productivity within a firm. Lazear (2000) conducted a study to analyze how the implementation of piece-rate compensation, as opposed to fixed salaries, affected the productivity of workers in an auto-glass company. According to his findings, the introduction of incentives resulted in a 44% increase in output per worker.

Kamenica (2012) states that monetary incentives do work, and especially for tasks that people do not want to do. However, behavioral economists argue that monetary incentives may crowd out intrinsic motivation. In a model described by Benabou & Tirole (2003), a principal and an agent have access to some private information regarding the agent's level of interest in a particular assignment. If the task is going to be less enjoyable, the principal might offer additional compensation. Therefore, uninformed agents will rationally anticipate that when they are better compensated for the work, they will like it less, and as a result, they will be less driven to complete it. Given that recycling is a social norm and that there is an environmental issue, recycling may be viewed as a prosocial behavior.

According to the model put forth by Benabou & Tirole (2006), altruism is heterogeneous, and people are concerned with the opinions of others regarding their level of altruism. In such a situation, adding a financial incentive to prosocial behavior lessens the degree to which doing so genuinely indicates altruism. As a result, financial incentives may cause people to be less eager to do good. There is convincing empirical evidence for this mechanism provided by Ariely et al (2009). Clearly, when incentivizing recycling behavior, one must consider the aforementioned difficulties related to prosocial behavior and intrinsic motivation. However, different incentive systems have been implemented around the world.

2.3.1.1 Pay-As-You-Throw (PAYT)

There are different ways to incentivize wanted recycling behavior. A typical way to do so is through monetary incentives. A system called pay-as-you-

throw, or PAYT, has been adopted around the world (Alzamora & Barros, 2020). PAYT systems apply the polluter pays principle and shared responsibility concept by identifying citizens as one of the actors involved in the activities that generate urban waste. Thus, citizens are responsible for the costs that their part in the chain of consumption generates (Batllell & Hanf, 2008). Furthermore, Batllell & Hanf (2008) states that PAYT-systems incentivize participation in waste policies by linking waste collection charges to the amount of waste generated. This created an economic incentive where citizens pay for the amount of pollution they produce. Also, this is believed to treat all citizens equitably under the same cost distribution principle of the PPP (Batllell & Hanf, 2008).

PAYT systems come in various forms but can generally be classified into two categories: those that charge based on weight and those that charge based on volume. Alzamora & Barros (2020) did a review of municipal waste management charging methods in different countries, and said the following about the different versions of PAYT:

“In the schemes based on weight, the solid waste are collected and weighed by an equipped truck. (...). The schemes based on volume are more common, but also there are more forms it can take. One of them is the bags/stickers, in which the user buys “official” bags and/or stickers from the local trade and the collectors are advised to collect only these official bags or stickers; imbued in the prices of bags/stickers are the cost of collection, transportation and final disposal services.(...) A second volume-based scheme is the container, a kind of monthly subscription, in which the user chooses the volume or number of containers he or she will use for collection, and pays according to the selected quantities.”(Alzamora & Barros, 2020, p. 48)”

Werf et al (2020) did a study on household food waste disposal in Toronto. Their goal was to gain insight into the current disposal of food waste, and to help develop and implement effective interventions to reduce food waste. They did a four-season waste characterization study with 200 single family households across eight neighborhoods in the city of Toronto, which provides its residents with a pay-as-you-throw program. The program included a choice of four garbage cart sizes with increasing fees, and several free recycling or

organic waste bags. In their studies they concluded that Toronto's PAYT waste program had been effective at diverting food waste into the green cart (rather than ordinary garbage bags), but that it did not have any effect on reducing its generation. Also, they added that they believed implementing a PAYT weight-based system rather than volume-based, that it might have helped reduce food waste.

Morlok et al (2017) analyzed a PAYT system through a case study from the German County of Aschaffenburg. They covered 32 municipalities with 173,000 inhabitants over almost 20 years of implementation.

Aschaffenburg County introduced a weight-based collection system for residual waste, bio waste, and bulky waste, alongside a separate paper collection from all households. The primary rationale for implementing a weight-based charging mechanism was to ensure fairness based on the principles of user and polluter pays. The study's findings demonstrated a marked improvement in waste management performance in the county after the introduction of a weight-based PAYT system in 1997. Notably, there was a substantial increase in recyclable waste collection and a significant reduction on residual waste disposal. As a result, the county achieved an impressive collection rate for recyclables of up to 86%, surpassing the average performance of a PAYT system, which is typically around 70%. According to the researchers, the key distinguishing factors in this specific case were the utilization of a weighing system, the provision of a comprehensive infrastructure for collecting recyclable waste, and a high level of environmental awareness and active citizen support.

They concluded that the County of Aschaffenburg's adoption of PAYT represents a leading environmental practice, as the weight-based approach resulted in notably elevated rates of recycling compared to other municipalities and counties. Although the PAYT system resulted in very minimal residual waste, they also noted that it did not appear to have a substantial impact on the overall quantity of waste produced and handled by the county over the long term. To summarize, their findings suggest that the implementation of PAYT alone is insufficient for achieving significant waste reduction. Instead, effective

waste prevention policies at the national or regional level, such as product policies, waste prevention plans, tax regulations and other measures, are necessary.

Literature states that PAYT systems have a positive effect on the recycling of household waste. However, some researchers believed it would also help decrease the amount of waste generated. As Morlok et al (2017) stated, the system does not show a significant decrease in the amount of waste generated. This was also the case with Werf et al (2020), which showed that there was no decrease in food waste despite a higher recycling rate. The aforementioned researchers, along with many others, seem to believe that there should be a correlation between a higher recycling rate and better recycling efforts, and decrease in waste generation in general. However, this does not seem to be the case. However, Dahlen and Lagerkvist (2010) stated that there was on average 20% less household waste per capita where the policy was applied compared to the other cities. Surprisingly, they also said that none of the differences could be explained by higher recycling rates as there was no significant difference in the amount of separated recyclables per capita compared to other cities.

Furthermore, there have been concerns about how the ECTS would adapt to the introduction of a PAYT system. As previously noted, Emmanouil et al (2022) reported that the implementation of the new system in Greece was generally well-received. However, it is possible that this positive reception was not due to the public's enthusiasm for a PAYT-system, but rather their dissatisfaction with the current system. Brown and Johnstone (2014) did research with 4000 households across 4 countries as to how the ECTS responded to the policy. They found that respondents in households who generated relatively more waste compared to others were less supportive of PAYT, but that experience with PAYT increases the ECTS support for these systems. They did, however, note that the ECTS support for environmental taxes and charges can increase through exposure.

[2.3.1.2 Other monetary incentivized recycling plans](#)

Rewarding the ECTS for recycling household waste, like compensation, is not as widely adopted around the world as a PAYT scheme. A reward is a consequence that an individual receives for completing a task or performing well, which strengthens the likelihood of the behavior being repeated in the future (Blaukopf and DiGirolamo, 2007). Reward leads to motivated behavior. However, behavioral economists have pointed to the fact that people are loss averse.

“A number of cognitive researchers, led by Daniel Kahneman, have shown that we are consistently too loss averse. People care more about losing a dollar than gaining a dollar. About twice as much.” (Stoknes, 2015, p. 58).

By this, the PAYT system should have a greater effect on recycling behavior than a compensation or a reward. Nonetheless, Jin et al (2020) investigated value compensation models in waste recycling in an industrial park. They found that government value compensation can improve the reuse of waste and increase the environmental benefits and profits of the companies involved in waste recycling. Although, this research was conducted in an industrial park with companies rather than end-consumers, and a different type of waste.

Smart incentive-based recycling system

Jin et al (2020) suggested a smart incentive-based recycling system that is designed for household waste. It is their belief that incentive mechanisms can be effective in increasing resident participation in waste recycling activities. They suggest that traditional recycling strategies, which rely on law enforcement and public awareness, may not be as effective. Additionally, the authors note that smart bins and online systems alone may not be enough to motivate residents to recycle. The survey conducted by Martin et al (2006) suggests that many householders are willing to participate in recycling activities but are discouraged by unreliable and inconvenient local recycling services. Suggesting that rewarding residents for their recycling efforts could help to maintain their enthusiasm for the activity.

Zhou et al (2021) believed that incentive-based recycling experiences would encourage residents to gain more perceived benefits from recycling activities. According to Noorasikin et al (2018), consumer perceived value plays a crucial role in motivating sustainable recycling behavior. In a study by Shaw and Maynard (2008) researchers explored the use of incentives to encourage household waste recycling. The majority of respondents showed a favorable attitude towards community-based rewards and local taxation rebates.

Furthermore, the authors noted that a conventional recycling system based on incentives involves three primary channels for collecting household waste:

- Residents can sell their recyclables to door-to-door recycling collectors
- Residents can bring their recyclables to collection stations and exchange them for cash incentives
- Residents can place their recyclables in designated smart recycling bins and receive incentives in return

According to Shaw & Maynard (2008), the smart incentive-based system retains the original three channels for collecting household waste, while introducing significant changes in the central database and the addition of data-analytics. In Shanghai, an existing basic incentive-based recycling system was enhanced to showcase the effectiveness of the newly designed system. The authors observed that the smart system offered a convenient service not only for residents but also for other stakeholders in the waste recycling process. As a result, the system helped to boost household recycling rates and further reduce the amount of household waste in cities.

The Green Account mode

Xiao et al (2020) mentions the “Green Account mode” which started in 2009. It is an innovative point redemption scheme to encourage citizens to sort household waste into dry and wet waste in Shanghai. Households can earn 10 points twice a day by properly sorting their disposable waste at collection points. The scheme operates like a bank, keeping track of households’ waste behavior and assigning points accordingly. By accumulating these points,

households can redeem them for daily necessities, such as parking tickets, food, and beverages, on the Green Account online platform.

The authors pointed to implementation problems in the early stages. Firstly, the point of the recording rule is inefficient as citizens can earn more points by throwing less waste more frequently. In addition, some food packaging is interfused into wet waste easily, hence, the quality of wet waste becomes lower. Additionally, complex personal relationships can affect point recording and make the scheme less attractive. Also, point redemption was deemed inconvenient, with only 40% of the 1.2 billion points recorded were exchanged.

They reported that the Shanghai Municipal Green and Appearance Administration Bureau addressed the implementation problems by adding more automatic kiosks in various communities to make point redemption easier. They also implemented stricter supervising rules to ensure fairness in point recording. Despite its flaws, Xiao et al. (2020) noted that the Green Account Program has established a strong foundation for municipal solid waste (MSW) sorting regulation and is expected to play a crucial role in complementing the mandatory MSW sorting efforts.

2.3.2 Authority in household waste management

Haugland and Reve (1994) see authority as the set of rules and guidelines implemented by the actor. In the context of household waste management it is the implementation of guidelines, regulations and rules provided by authorities. An example is Norway from 1. January 2023 has implemented that all waste made from households and companies are to be sorted for material recycling and reuse (Miljødepartementet., 2022).

On a bigger scale we see that directive 2008/98/EC, established by the directorate-general for environment in the European Union, created a comprehensive framework for waste treatment in the EU. This framework aims to protect the environment and human health by implementing regulations for

waste management, recovery, and recycling, with a focus on reducing resource pressure and promoting reuse. The directive was transposed into EU member laws 12. December 2010. (European Parliament and Council, 2008)

The law implements the polluter pays principle, holding waste producers responsible for recycling costs. It emphasizes waste prevention, reuse, recycling, and other recovery methods over disposal. Member states must set targets to reduce waste and increase recycling. The law also establishes monitoring and reporting systems. EU regulations have influenced countries like Australia, which has set targets to reduce waste generation, increase recycling, and ban waste exports (National Waste Policy, 2023). The law promotes responsibility, standards, and sustainability in waste management. (Directive 2008/98/EC, 2008)

Overall, the EU waste management law uses authority as a control mechanism to ensure a reduction in pollution and improvement in human health. It establishes guidelines to ensure responsibility and standards are met, while also promoting a more sustainable approach to waste management (European Parliament and Council, 2008).

In response to increasing environmental awareness, the Irish government has implemented bylaws that apply to all households, apartments, and commercial premises. To comply with these regulations, participants must either prove they have a contract with an authorized waste collector or demonstrate regular use of an authorized waste facility. The goal of these bylaws is to ensure that everyone in Ireland contributes to recycling their waste in an environmentally acceptable manner, that waste collectors are authorized, waste is correctly separated, and to reduce illegal dumping and backyard burning. Failure to comply may result in a fixed fee of €75, issued by local authorities, and a fine of up to €2,500 upon conviction.

In managed apartment complexes, the management company is responsible for providing adequate containers and proper disposal paperwork, while each citizen is responsible for separating recyclable waste from food and residual waste. The implementation of these rules and regulations is aimed at

encouraging citizens to contribute to meeting the climate challenge, improving the quantity and quality of recyclable materials collected, reducing the amount of waste sent to landfill or incineration, and helping to conserve the finite resources of our planet (Mywaste, 2019).

Another example is the deposit refund-tax in the US. The deposit-refund tax is a system that brings society to the optimal level of waste production. Economists are interested in making consumers internalize the disposal costs and encouraging the correct disposal through subsidization. (Ashenmiller, 2010).

Also, Ashenmiller (2010) investigates whether bottle recycling laws, which increase the incomes of low-wage workers, have the added effect of reducing petty crime rates. Their findings suggest that cities in states with bottle laws experience an average 11% decrease in petty crime rates compared to non-bottle law states due to being able to increase household income from depositing bottles.

In a study conducted by Ishimura (2022), the effectiveness of a policy aimed at promoting municipal domestic recycling of plastic waste in Japan was examined. The research indicated that this policy, known as the CPRL, had a greater impact on recycling volume compared to policies targeted at households. The findings also emphasize the significance of municipal-level policies in facilitating the recycling of post-consumer plastic waste, alongside initiatives focused on recycling in households.

According to Evison & Read (2001) recycling of household waste in the UK is one of the main focuses of attention in terms of waste policies and strategies. The UK Government is dedicated to improving recycling rates through various reforms. These include enhancing consistency in household recycling collections in England, implementing a deposit return scheme for drinks containers in England, Wales, and Northern Ireland, and reforming the UK packaging producer responsibility system by implementing extended producer responsibility for packaging. (DAERA, 2019).

Viscusi et al (2023) examined the impact of state recycling laws and deposit laws on recycling behavior using data from a national panel of 1,498 households that relocated between states. By comparing recycling rates before and after interstate moves, the study provides a quasi-experimental analysis. The findings indicate that moving to states with deposit laws for beverage containers resulted in a 41% increase in the number of material types recycled, compared to the national average recycling rates. Stringent recycling laws also had a positive effect, albeit smaller, increasing the number of materials recycled by 9%, with glass recycling experiencing the largest boost of 17%. Conversely, relocating from states with deposit laws to states without such laws led to a 13% decrease in the number of materials recycled. Moving away from states with stringent laws showed statistically significant effects only for plastic recycling, which decreased by 12%.

In conclusion, Viscusi et al (2023) stated that states considering the implementation of recycling promotion efforts should recognize the constructive role of both stricter legal regimes and deposit policies. While both policies are significant, deposit policies have a more influential incentive effect. It is important to note that the impact of recycling laws and deposit policies is not dependent on each other, meaning that adopting both policies does not diminish or enhance the effects of the other. The impacts of both interventions are substantial and have an additive effect on recycling behavior.

2.3.3 Trust in waste management

As mentioned previously, trust is a more general control mechanism that is built on social norms and personal relationships (Haugland & Torger, 1994). In the context of waste management, trust describes the relationship between the ECTS and the reverse system. As a governing mechanism, it can be how municipalities and waste management companies try to nudge the population to better recycling behavior (Flygansvær et al, 2021), the development of mutual trust in the relationship, or even establishing positive recycling behavior through social norms and other social activities.

Mintz & Kurman (2019) aimed to understand the influence of individual-level variables on recycling behavior in a cross-cultural context. Specifically, they

examined the role of social norms and perceived behavioral control as factors that may moderate or mediate the relationship between culture and reported recycling behavior. The survey was conducted among 172 Jewish and Muslim-Bedouin residents in a rural regional council in Israel. Participants completed scales measuring social norms, perceived behavioral control, and reported recycling behavior. The findings indicated significant cross-cultural differences, with higher reported recycling among Jewish residents compared to Muslim-Bedouin residents. Perceived behavioral control had a similar impact on recycling for both groups. Social norms had a stronger influence on recycling behavior among Muslim-Bedouin residents compared to Jewish residents, but there was no significant interaction effect between culture and social norms. Both social norms and perceived behavioral control played a mediating role in the relationship between culture and recycling behavior.

According to Mintz & Kurman (2019), their research emphasizes the integration of culture into models explaining pro-environmental behavior, particularly social norms and perceived behavioral control. From a practical standpoint, the findings suggest the need for culturally tailored messages to promote pro-environmental behavior in diverse communities. It highlights the importance of incorporating normative messages and information to enhance perceived behavioral control in recycling initiatives for better population cooperation. Effective public awareness and cooperation are crucial for successful and cost-effective recycling programs.

In 2013, Deo Pentayya conducted a survey in the UK to explore public trust in waste management services and institutions. The survey revealed the complexity of trust as a concept in waste management, and identified dependent factors for trust. Pentayya found that trust is heavily influenced by perceived independence, accountability, competence, and the sympathetic basis of information sources. In waste management, it was particularly important to use different sources of information to balance perspectives, as no single source was considered independently trustworthy. The findings of the survey demonstrated how trust can be used to reduce the extent of management conducted behind closed doors, force disclosure of information, and provide

people with an opportunity to balance information from different sources, ultimately leading to a positive effect on the efficiency of the reverse logistic system. The article also highlights the need to view and understand trust as a concept in order to repair and avoid the effects of distrust.

In 2020, Jiesper Pedersen conducted an anthropological case study in five Copenhagen apartment buildings to investigate the connection between trust and pro-environmental behavior in waste management. The study found that residents' trust in the waste management system was influenced by their perceptions of its reliability, transparency, and fairness, and that a lack of trust could hinder engagement in pro-environmental actions such as sorting and separation. The study recommends multiple approaches to establish trust in waste management, including improving communication, information sharing, and accountability. Targeted awareness campaigns and measures to enhance the transparency and fairness of the system are essential to achieve this. Ultimately, building trust is essential for achieving long-term sustainable behavior change in waste management and other environmental concerns.

We can also draw a strong relevance to different recycling systems in Norway. By incorporating trust as a control activity, the municipalities in Norway trust the actor will recycle as the system intends. We see that trust is often used in the combination of nudging. In Oslo, the system works by giving out free, different-colored, garbage bags and trusting the actor will recycle correctly. Nudging is used to lessen the effort of recycling for the actor and trust is used as the glue to make sure the system works (Flygansvær, 2021).

2.3.4 Price, authority and trust in household waste management

Previously, we introduced the three control mechanisms and discussed Bradach & Eccles' (1989) theory on how they can be employed in conjunction with each other. We also examined each mechanism individually in relation to recycling and household waste. In this next section, we aim to demonstrate through empirical evidence how these mechanisms are integrated in reverse systems, as reported in literature.

Morlok et al (2017) emphasized the significance of social factors (e.g., public opinion, social norms, knowledge level, attitude) when implementing a successful PAYT system. In 2022, Emmanouil et al. (2022) explored the extent of public awareness about PAYT systems in Greece. The researchers wanted to clarify how individuals perceived the implementation of PAYT within a socioeconomic framework. To achieve this goal, the team employed an online questionnaire survey in 2021.

In general, the study's participants appeared willing to embrace a major shift towards a generation-based charge system for waste management in place of the current method, which charges based on the size of the household. Approximately 80% of respondents responded positively to the question, "Should we replace the current waste collection system (green bin and recyclables' bins) with the PAYT system?"

Nonetheless, the participants expressed uncertainty about the potential success of this transformation. Roughly 30-35% of respondents believed that their fellow citizens and local authorities, respectively, would be up to the task, while 46% remained neutral. Another 9,5% believed that the authorities would not be able to implement the system effectively. A comparable lack of confidence in the local government was demonstrated in the research conducted by Drimili et al (2020), where citizens of Athens believed that their city was dirty, and the local government was mainly responsible for the situation. The researchers noted environmental education is nowadays a part of the Greek elementary school curriculum, but that the transfer of this knowledge to older individuals is lagging.

Emmanouil et al (2022) concluded that a considerable number of respondents were in favor of the PAYT systems' implementation, but underscored the need for the government and local authorities to prepare their communities for the forthcoming changes to ensure a seamless transition. In addition to technical challenges, the researchers identified critical issues with implementation, such as a lack of citizen engagement and social acceptance, and the need to strike a balance between application, implementation and cost concerning the current waste management paradigm. The team recommended that education be given

priority to integrate environmental awareness and community responsibility, emphasizing its vital role in the success of similar incentives.

Viscusi et al (2011) investigated whether individuals are more likely to engage in pro-environmental actions based on their personal valuations of the environment, which can be attributed to the warm glow effect- a phenomenon where the act of generosity itself serves as both the underlying motivation and a source of positive feelings (Bianchi, 2022) – or if social norms that promote pro-environmental behaviors play a more significant role. They also delved into the degree to which these social norms are shaped by legal frameworks and regulatory policies that establish behavioral standards. Through empirical analysis, they assessed the significance of these factors on recycling behavior.

Viscusi et al (2011) revealed that while personal values and social norms do have an impact, policy measures such as bottle deposits and recycling laws show the potential to significantly influence recycling rates. The researchers noted that due to the binary value of recycling decisions, the impact of such policies can be quite remarkable, transforming previously non-recycling households into avid recyclers. However, they also acknowledged the significant influence of individual attitudes towards the environment, as well as their perceptions of what others should do.

The policy measures Viscusi et al (2011) refers to, bottle deposits and recycling laws, are examples of using authority as a control mechanism to regulate behavior. Additionally, the significant influence of individuals' attitudes towards the environment and their perceptions of others' behavior highlights the importance of trust as a control mechanism. By combining the authors findings, such as implementing recycling laws while simultaneously promoting a sense of trust within the community towards environmental initiatives, recycling behavior can potentially be further enhanced. This combination of control mechanisms might create a more comprehensive approach to encourage pro-environmental behavior, ultimately leading to more sustainable waste management practices.

In a 2022 study, Claude Fluet and Murat Mungan investigated the interplay between trust and authority, and how it varies based on the degree of observability of the actor. They found that when an actor feels that their actions are not being observed, a system that heavily relies on trust would not be effective in encouraging compliance, and authority would be necessary. However, the authors propose that the most efficient system, in terms of time and results, is one that combines observable behavior with both laws (authority) and norms (trust), allowing for incentivization through the complementary use of both mechanisms. Ultimately, the level of observability of the actor plays a critical role in determining the degree to which trust can effectively function in incentivizing compliance, with increased observability leading to greater encouragement and trust.

In their article Fluet and Mungan (2022) suggest that the effectiveness of a recycling system depends on the actor's perceived visibility within the system. This raises questions about how such a system would work in smaller municipalities with close-knit communities compared to densely populated cities where anonymity is more common. The authors argue for a system that combines trust and authority when actors feel visible within the recycling system but relies more heavily on authority when anonymity is a factor. On the other hand, the recycling system could benefit from having a recycling system designed to be visible and trackable as trust plays the role of a lubricant in a system (Arrow, 1974)

In the 2012 study "A Cross-Country Study of Household Waste Prevention and Recycling: Assessing the Effectiveness of Policy Instruments," Ferrara and Missios examined the impact of policy instruments, such as price and authority, on household waste prevention and recycling. The authors found that authority had a significant influence on the effectiveness of waste reduction and recycling programs. Authority based recycling programs promoting accessibility were found to be effective in promoting recycling behavior due to their accessibility. Although leading to a higher cost, accessibility is argued to be a leading contributor to better recycling behavior. Curbside recycling programs can be seen as a more expensive authority based recycling system as

the logistics and time management of the program is price demanding. Price is seen as a less important factor when authority is more present as the increased price has a lower negative impact than the positive impact of accessibility. The authors suggest that a combination of authority and price should be carefully evaluated before implementation. While both price and authority policies can have positive impacts on waste reduction and recycling, combining them should be done through an analysis of how much price change is worth the increased accessibility.

A study was undertaken to investigate the level of endorsement for environmental taxes, particularly Pay-As-You-Throw (PAYT), among the ECTS. Brown & Johnstone (2014) discusses how environmental taxes can improve government finances and correct environmental problems, but public support for them is often low. The authors examine reasons for this negative attitude towards environmental taxes and use a household survey conducted by OECD in 2011 to analyze support for a specific environmental tax, PAYT charges for mixed waste collection, in four countries. They find that people who are exposed to PAYT tend to be more supportive of them, indicating that public resistance to such schemes is likely to dissipate following their introduction. Hence, when using PAYT, or price, as a control mechanism might have a positive effect on trust in the population. These findings suggest that applying these mechanisms together may have a mutually positive reinforcing effect.

Another study conducted by Heller & Vatn (2017) aimed to investigate the effectiveness of economic incentives in promoting environmentally friendly behavior by combining classical institutional economics and self-determination theory. It found that normative motivation is important for sorting household waste and that economic incentives had a divisive effect on motivation. Furthermore, illegal waste disposal increased in response to a differentiated waste fee. The study suggests that caution is needed when considering introducing a differentiated waste fee scheme to ensure sustainable behavior.

According to the article, a stand-alone PAYT scheme led to illegal dumping and less motivation amongst the ECTS in the municipality in which it was

implemented. To govern this, a combination of the control mechanisms might be effective. The result stresses the importance of exercising authority in enforcing rules and regulations against illegal dumping and building trust in promoting motivation when implementing a PAYT scheme (price). This highlights how each of the control mechanisms play off one another, and how important it might be to exercise a combination of these.

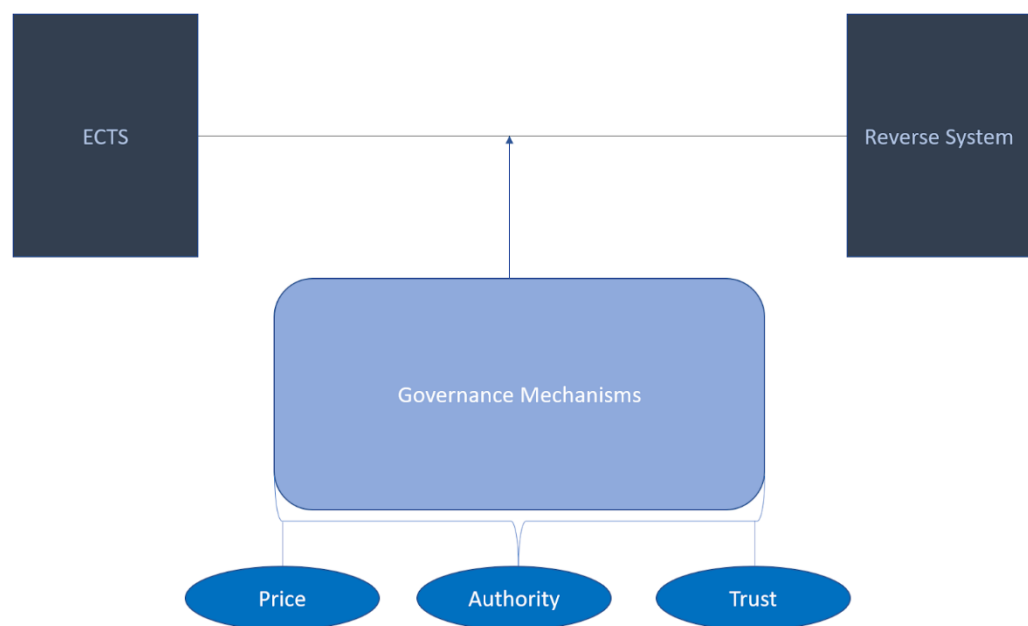
2.4 Theoretical Framework

We have explored two key areas of literature: the reverse system and the ECTS, and control mechanisms (in waste management). In the literature review we have tried to understand how governance mechanisms, price, authority, and trust (Bradach & Eccles, 1989) relates to the relationship between the ECTS and the reverse system.

Price mechanisms provide economic incentives to influence waste generation and disposal behaviors. The most prominent way to provide economic incentives for recycling, according to the literature, is through a system called Pay-As-You-Throw (Morlok et al., 2017; Batllell & Hanf, 2008; Alzamora & Barros, 2020). Authority in waste management practices sets the legal framework, regulations, requirements, and mandates for recycling behavior (Viscusi et al., 2023). Moreover, this also implies the degree to which these measures are enforced. The trust mechanism fosters stakeholder engagement and encourages compliance with waste management guidelines, as well as emphasizing the importance of norms and other social mechanisms (Mintz & Kurman, 2019; Flygansvær et al., 2021; Pentayya, 2013; Pedersen, 2020). By integrating a balanced utilization of price, authority, and trust, waste management systems can incentivize responsible behavior, ensure compliance, and promote positive attitudes towards waste reduction and recycling, ultimately contributing to sustainable waste management. .

The literature shows that the relationship between the reverse system and ECTS is flawed, and there exists an intention-action gap (Flygansvær et al., 2021; Jalil et al., 2016). We suspect that the reality of governing the relationship between the consumer and the system deviates from economic transaction theory (Williamson, 1985), which states that trust is built over time through repeated successful transactions. We believe that in order to narrow the recycling behavior gap, there needs to be a more effective governance of this relationship.

As illustrated with the point of intersection in the theoretical framework, we wish to investigate how to govern the relation between the ECTS and reverse system, using governance mechanisms.



3. Methodology

In this chapter, we outline the research design and methodology utilized to understand the relationship between the ECTS and the reverse systems in Norway, in the context of governance mechanisms, informed by the conceptual framework discussed in the previous chapter.

3.1 Research Design

Our thesis employs a qualitative research design, making use of semi-structured interviews as a primary data collection tool. This research design facilitates a detailed examination of the ways in which different renovation companies and municipalities implement and enforce recycling programs, guided by the control mechanisms of price, authority, and trust. We used an exploratory approach due to the fact that the field of using governance mechanisms in a recycling setting is relatively unexplored (Scrima, 2017). We also used a deductive approach, allowing themes to emerge from the data rather than imposing preconceived ideas (Research-Methodology, 2023). This top-down approach lets us use the literature to guide the formation of our thesis and tested with empirical data.

We conducted interviews with representatives from different waste management companies in Norway to learn more about how they utilized the governance mechanisms. For instance, how they implement and enforce their recycling programs, how they incentivize recycling behavior, and how they motivate and build relations with the ECTS. In addition, we aim to get insights into how effective these programs are at achieving their recycling goals by using a comparative design (Khan 2022). The data gathered will be used to identify which control mechanisms (price, authority, and trust) are being used by each renovation company, and how effective these mechanisms are at governing the relationship between the ECTS and the reverse system. Ultimately, we wish to understand how to best govern this relationship.

3.2 Sampling Strategy

Six renovation companies were selected for this study. To understand the complexity of recycling behaviors in different municipalities, we chose a variety of renovation companies that had different reverse systems and different demographics. For each renovation company, we interviewed the respective head of communication, or the manager, as they have a crucial role in implementing and maintaining these systems.

We selected three renovation companies for our study based on population size (over 100,000 residents), with a focus on those with differing reverse waste management systems. To understand the potential impact of population size on recycling behavior, we also included three smaller renovation companies. The selection was based on the size of the municipality, their geographic location, and their approach to waste management and recycling programs. These factors were considered to ensure a diverse range of participants and capture a wider range of experiences and perspectives.

In our pursuit to locate individuals with experience and knowledge in recycling reverse logistics, we employed "purposive sampling," (Campbell 2020). This sampling method proved to be well-suited for our qualitative research. Selecting candidates based on relevance significantly enhanced the credibility of our research instead of random sampling.

3.3 Interview guide development

Magaldi (2020) defines semi-structured interviews as purposeful conversations designed to extract specific information. These interviews consist of a set of questions designed to guide the discussion towards pre-determined topics, while also allowing the conversation to adapt and vary, often changing significantly between different participants. This method is unlike a structured interview, which strictly adheres to a pre-set list of questions asked in the same sequence for each participant.

Semi-structured interviews have a more flexible structure, characterized by open-ended questions. The conversation can progress in various directions, until all the required topics have been sufficiently explored. Fylan (2005) elaborates that semi-structured interviews are particularly useful when the objective is to understand why something works, rather than quantifying how much or how many. The inherent flexibility of semi-structured interviews allows for spontaneous follow-up questions and diversions to investigate areas

requiring further explanation. This adaptability makes semi-structured interviews a versatile tool for data collection, enabling researchers to delve deeper into the subject matter. When generating each question, we pressured the importance of not leading the subject as this would give a bias in the results.

Before conducting the interviews, we thoroughly presented ourselves and our research intentions, explained how we aimed to contribute to existing literature, and outlined our hopes to learn from their experiences and knowledge.

In the first part of the interview, we were interested in understanding the interviewee's perspective on the relationship between the renovation companies and the consumer. We sought their views on how they perceived and characterized the consumer, how they assessed and measured the efficiency of their recycling system, and their observations on the shifts in recycling rate and overall performance of the reverse systems over recent years. This initial stage of the interview established the foundation for an engaging discussion and allowed us to subtly guide the interview into the subject we wished to explore.

The second part of the interview was subdivided into three segments, each intended to delve into one of the control mechanisms: Trust, Price, and Authority. Each segment consisted of three open-ended questions, supplemented by several follow-up questions posed during the interview. These additional queries served to subtly steer the conversation and ensure we remained focused on the subject at hand.

We concluded the interview with a series of final questions, inquiring if the interviewee had any additional comments they wished to share about our research. We also asked about their perception of which control mechanism they think should be prominent in the municipalities. The wrap up allowed us to explore any unsought areas and rounded up the interview. Also, the professionals were allowed to share their opinion and give a short answer to our research question.

3.4 Participant Selection

Avfall Sør (Kristiansand and Vennesla)

The first participant we interviewed was the Head of Communication at Avfall Sør, the company responsible for renovation in Kristiansand and Vennesla. Avfallsør operates with a team of 90 workers, managing waste for approximately 130,000 residents and four recycling stations. The participant stated that he worked mainly with household waste.

The participant has a significant history with Avfall Sør, with a career spanning 30 years. Initially working as an engineer with a background in natural and environmental protection, he later transitioned into a communication role, where he has now spent the last 15 years. This career shift was driven by his recognition of the pivotal role communication could play in influencing recycling behavior.

Oslo kommune

We interviewed Jørgen, a communications advisor at Oslo renovation. Jørgen has worked there for seven and a half years dealing with most aspects of the profession, including social media, websites, press work, and project communication. Everything within communication between the municipality and the consumer. Oslo renovation is responsible for 700.000 residents.

Hallingdal Renovasjon (Hol, Ål, Gol, Hemsedal, Nesbyen, Flå and Krødsherad)

We interviewed Eirik, the head of Hallingdal Renovasjon which is responsible for renovating in the seven municipalities: Hol, Ål, Gol, Hemsedal, Nesbyen, Flå, and Krødsherad. They operate with a team of 60 employees divided into four different sub-departments: Transport, recycling, incineration, and

outdoors. Furthermore, they renovate for approximately 11,000 permanent residents and 22,000 cabin residents. The participant has three years experience in the general manager position at Hallingdal Renovasjon.

Avfallsservice (Lyngen, Storfjord, Kåfjord, Skjervøy, Nordreisa og Kvæningen)

From Avfallsservice, we had two participants. Karl-Martin, who was in charge of operations, and Vegard who was recently hired as a communications advisor. Avfallsservice is responsible for renovating in the six municipalities: Lyngen, Storfjord, Kåfjord, Skjervøy, Nordreisa, and Kvæningen. They have six employees in their administration and employ a total of 32 people.

ReMidt (17 municipalities in Trøndelag og Møre og Romsdal)

From ReMidt, we interviewed Erik. He has been working as a communications manager at Remit IKS since the 1st of January 2020. But he has had the same job for 6 years since they merged 3 inter-municipal companies from January 1, 2020. Before that, he worked in an inter-municipal company called Hamos IKS, which is now part of Remit IKS. The company has 130.000 residents, that is about 68.000 subscribers, and 30.000 cabin subscriptions, in 17 different municipalities.

Fosen (Indre Fosen, Ørland og Åfjord)

We interviewed Ola. He has worked in Fosen waste management since 2010. Ola started as a general manager and in 2020, got tired of the position and started working with various projects and developments. The company has 25.000 residents, 11.000 subscriptions and 5.000 cabin subscriptions in three different municipalities.

3.5 Data Collection

To uphold the integrity of the data, both authors were present during all interviews, and we took measures to prevent any loss of information. Each interview was recorded to ensure accuracy and prevent data loss. Notes were continuously created throughout the interviews. Afterwards, the recordings were transcribed, and a comprehensive summary was created from the transcriptions. This summary served as a valuable reference to capture and revisit the information gathered during the interviews. All interviews were transcribed using the transcription tool in Microsoft Teams.

In this thesis, the guidelines of BI Norwegian Business School for data and personal information were followed to ensure lawful processing of data and personal information. Permission was sought for recording interviews and the degree to which we were allowed to use the collected data. This involved explaining the nature of the thesis and why we were interested in data collection from the individual. To ensure that the data is not used contrary to the guidelines of BI Norwegian Business School after turning in the thesis, all gathered data will be deleted.

3.6 Data Analysis

The transcribed interview data was analyzed using thematic analysis. We used an deductive approach, allowing themes to emerge from the data rather than imposing preconceived ideas. This helped us to identify key patterns related to the use of the control mechanisms and their effect on recycling behavior.

The evaluation of each waste collector's utilization of the mechanisms trust, price, and authority is based on the interview responses as well as a careful overall assessment by the authors, taking into account the context of section 2.3 from the literature review. The grading system ranges from 0 to 5, where 5 represents the highest rating and illustrates a very high utilization of the mechanism, while 0 represents a complete absence of the mechanism.

3.7 Ensuring Data Validity and Reliability

The methodology employed in this study is designed to facilitate a comprehensive understanding of the relationship between governance mechanisms and recycling behavior within Norwegian municipalities. By utilizing semi-structured interviews, we aim to capture the nuanced experiences and insights of key individuals involved in municipal recycling programs, allowing for a richer understanding of the complexities involved in promoting sustainable recycling behaviors. To further enhance validity and reliability, we used peer debriefing which involved continuous discussions with our supervisor and member checking, which involved revisiting participants with our initial findings to ensure their views were accurately represented.

4. Results

In this segment of the thesis we will present our findings. The different actors are separated and presented individually to maintain structure and coherence, and finally compared to each other. The authors first present characteristics of each individual system, followed by three main components that follow the framework, namely trust, price, and authority, and lastly, a summary of the findings.

4.1 Avfall Sør (Kristansand og Vennesla)

Characteristics of the system:

- Utilizes a form of PAYT (Pay-As-You-Throw) system based on charging for each collection of residual waste and food waste, as well as a variable fee according to size of the bin.
- Households sort residual waste, plastic, organic waste, glass & metal, and paper & cardboard in individual bins.
- Approximately 130,000 inhabitants
- Curbside recycling and environmental stations

- Pick-up varies, but usually every 2nd week.

4.1.1 Trust

Before delving into trust, we asked an initial question to all representatives: “What is your view on the consumers?”. This is a broad and open question, as the consumers are often segmented and differentiated within the municipalities, but we emphasized a more general impression. This question was intended so that we, without any influence through other questions and much thought, could have the “top of mind” impression from the representatives.

When asked the initial question, the response was that they have different customers. However, they operated with a general attitude which was that the ECTS wanted to get rid of their waste the easiest way possible, but to retain a clear conscience when doing so. Also, he added that there is a behavior gap between what they say and do.

“We have various customers, but we have a starting point that we work with, which is that the customer is interested in getting rid of their waste in the easiest possible way while also doing it responsibly (...) Through our waste analysis, however, we also see that many customers tend to be a bit "Pinocchio. In this analysis of collected waste almost 70% of what was in the residual waste could have been sorted into another container. However, in the survey around 80-86% claim they sort their waste properly.”

When asked about if the main reason behind this is due to lack of knowledge and expertise, or just a matter of effort, Lars stated that he thinks it is mainly due to lack of effort. Also, he added that it is dependent on circumstances as well, providing an example that underscores the significance of ensuring convenient waste disposal for the ECTS. Furthermore, he also commented on the collaborative efforts (e.g., information posters, nudges) from both Avfall Sør and key personnel and why this relation is of importance as well.

“It’s mostly about willingness. For example, if you live in a housing cooperative where sorting is poorly facilitated, and the first thing you encounter when you enter the waste room is a large bin for general waste, then it’s easy to just throw everything in there. If it’s not properly arranged, you won’t bother going all the way to the plastic packaging, for instance. Or if you have a caretaker who doesn’t care much and has received posters from Avfall Sør about source separation but doesn’t hang them up or create awareness about it.”

Avfall sør places considerable emphasis on trust as a mechanism to govern the relationship between the system and the ECTS, and to further promote improved recycling behavior. They believe that it is of the utmost importance to showcase examples of success from the reverse system.

“We do a lot to gain the trust of the public. Information, various campaigns, get the message out! We convey that it makes a difference and that it pays off to sort waste for a better environment, showing examples and concrete figures and such. It is important to fuel good examples such as plastic and glass, for instance, how we collect them, where they are taken, and what new products they are transformed into.”

They hold the belief that without the trust of the ECTS, recycling efforts will be diminished. In order to acquire or maintain this trust, they advocate for a consistent and ongoing effort. The reason behind this is they believe that it takes very little to undermine the trust they have been trying to build up for years.

“We have many who try to cast doubt on the system, both through the media and by referring to what’s happening abroad and such. It takes very little to undermine the trust we have tried to build up.”

Additionally, Lars explained that plastic was being exported to China prior to 2017, but China stopped accepting it thereafter. As a consequence, Nordic plastic waste was discovered scattered throughout Europe, and this issue garnered attention in documentaries and similar media.

“(...) There has been some “cowboy” business going on. And when you see documentaries and such about this, it may be that Nordic plastic and waste are found in other parts of Europe, and this greatly affects the reputation.”

Even though the plastic referred to was from industry, it had a negative effect on the trust between the system and the ECTS according to Lars. Hence, the increasing efforts for campaigning the success of the system as referenced earlier. When asked if the consumers believe their waste is being handled correctly, he said that Avfall Sør believes so.

“Yes, with the work we put in to reassure the consumers, we believe that residents trust that their waste is being handled properly.”

Furthermore, he provided an example of one of their measures taken to show the public how their disposal of food waste. It was a scheme where the food waste is gathered and driven to a composting facility, where it is made into good composting products. From there, it is driven out to recycling stations around the municipality for the ECTS to buy and use in their own composting.

“This helps to build trust because the food waste you deliver to Avfall Sør can be collected/purchased by yourself when you visit the recycling station. This creates a circular loop where your apple cores, for example, are transformed into high-quality compost that you can use in your own garden.”

As mentioned earlier, Lars and Avfall Sør have discovered that the ECTS have a tendency to exaggerate their own recycling behavior. Upon receiving the question about how much trust the reverse system has in the consumers, he stated that they do not have full trust in the consumers. However, he emphasized that they still believe that the vast majority of people would like to dispose of their waste conscientiously.

"We do not have complete trust in the consumer. For instance, consumers often claim to recycle better than they actually do. Another example is when some individuals misuse collection points, contaminating the recycling efforts of the majority who follow the rules. However, overall, people are generally loyal and responsible."

The representative believes that social norms and social pressure can play a role in altering recycling behavior and efforts but may not always work as intended or even in a positive way. He explains that when they implemented packaging bags for plastic. The consumers were supposed to tie the bag to their regular bin when it was time for collection of waste. However, there was one person who was usually significantly better at recycling and lived a very sustainable lifestyle. Due to this, the person in question bought generally little plastic wares, and thus, did not have much in the plastic packaging bag. His neighbors assumed this was because he threw everything in the residual bin and were under the opinion that he recycled poorly.

"(...) I think the fact that we spend so much resources and time on the development of trust, and creating norms, that it goes without saying that we believe in its impact. Social pressure is also an intriguing factor (...) He was more diligent than his neighbors but faced criticism because they assumed he was doing poorly. Meanwhile, those who put out 2-3 bags a week were praised, even though the consumption of plastic isn't environmentally friendly. Social norms and pressure play a role in such neighborhoods."

Furthermore, he believes that trust between the ECTS and the reverse system is a key factor to the success of the system.

“(..) Mutual trust is also important for obvious reasons; the population won't be diligent with waste sorting if they don't trust that it will be handled correctly. Similarly, it's important for us to have trust in consumers, and that's what we work on through campaigns, education, nudging, and the like.”

Avfall Sør believes in the creation of norms and educating the public.

“(..) We have a lot of school visits at our station, and a colleague who works as an environmental advisor goes to schools and workplaces.”

Also, the representative noted that Avfall Sør is the biggest shareholder in Returkraft AS where they allocated resources explicitly to educate the people about source sorting, recycling, renewable energy, climate awareness and the circular economy.

“There, they have a nice "schoolroom" with education and lots of exciting tasks in climate, environment, energy, and consumption. They have target groups ranging from kindergartens up to university level, as well as various teams and associations.”

4.1.2 Price

The representative clarified that residents in the area are charged a fixed fee for renovation services, along with a variable fee based on the frequency of emptying the biowaste and residual waste bins. This variable fee operates on a Pay-As-You-Throw (PAYT) system (Alzamora & Barros, 2020), allowing residents to save money through source sorting their waste, resulting in less frequent emptying of the residual waste bin. Additionally, residents can further

reduce costs by composting some of their bio waste at home. When asked about his thoughts on effectiveness of this incentive-based system, he answered the following:

“(...) Yes, the variable fee per emptying of residual waste and food waste. It is very flexible and convenient for those who want to save some money by being diligent in their source sorting, but it can also be a kind of complacency for those who don't care. (...) We want to tighten it up a bit now going forward and will investigate this model, and see if we should switch to something else. There are many good aspects to it, but we need to increase material recycling by 2035.”

When asked to explain the issue with complacency regarding the incentive-based system, he pointed out the significant amount of material that could still be sorted at the source from the residual waste. This suggests that despite the presence of incentives for source sorting, there is still much progress to be made.

“(...) that in the residual waste bin, there is 50-70% of raw materials or other items that could have been sorted at the source is the biggest challenge now. (...) and now we need to extract more value from the residual waste to increase material recycling. We need people to make a greater effort in sorting.”

Since the PAYT-system did not incentivize the appropriate behavior sufficiently, the representative was asked his thoughts on perhaps raising the fee, effectively making it even more expensive. To this, he responded:

“I think that upping the price from 40 kr per bin to something like 200 kr will have a bad effect on recycling rate as the consumers will have a bad reaction to prices suddenly rising.”

The representative was then asked to elaborate on this, as increasing the fee should in theory increase the incentive. However, he presented arguments about how this might affect all the work they have already done with regards to trust amongst the ECTS, illegal dumping and blowback from the media.

“One of the reasons why I don't believe it will work in practice is the potential blowback from the media. Additionally, the culture in several places down here is that garbage should be burned, whatever doesn't float, we sink, and so on. (...) Therefore, it is risky to increase prices as it may lead to illegal dumping of waste, burning, and so on. At the same time, it undermines trust (...) It is a balancing act of multiple factors, and there is no quick fix to this because then this waste can emerge elsewhere.”

Before finishing the line of questioning within price and incentive-based systems, we asked the representative if he thought the PAYT system had contributed to a better recycling rate since implemented.

"It is difficult to say exactly how much impact this has had on the recycling rate. The recycling rate has improved, but it is not easy to attribute this improvement to either the variable fee, campaigns, increasing climate focus, or some other factors."

4.1.3 Authority

According to the representative, there are regulations, guidelines, and laws in place that empower them to enforce our regulations towards their subscribers.

"Yes, we have that. The Waste Regulations and provisions in the Pollution Control Act, and we also have guidelines. We can issue fines or file a report with the police."

When asked about whether this is something they enforce, the representative stated that Avfall Sør does not deliver sanctions or fines if the rules or

guidelines are broken. Also, they do not analyze the waste on a household-level, meaning that in practice, there is very little chance of getting ‘caught’ when improperly recycling.

“We never really issue fines in practice. We also have had poor experiences with filing complaints, as the burden of proof lies on us. It seldom leads to any constructive outcomes. (...) Even if we know which person has left waste at an environmental station, for example (via a letter or similar means), we have the option to report it, but it doesn't get us anywhere, so we choose not to (...) Some of the individuals involved are also social cases and do not have the means to pay any fines (...) We do not check if the Nilsen family is recycling properly, so no, not on a household level”

However, they may refuse to pick up unsorted or wrongly sorted waste or leave a note to the household that they need to recycle better.

“If the waste collector notices that there is only residual waste in the bin designated for glass and metal packaging, they may attach a note or simply leave the bin behind, as it has not been sorted according to the guidelines of Avfall Sør.”

The representative explained that whenever they change their regulations, or make changes to the guidelines, it will usually get some backlash from the public. However, he noted that this reaction usually eases over time, and after a while most of the ECTS has adjusted.

“We also observe that any changes create a lot of fuss in the beginning. Altering the frequency of emptying, modifying the pickup locations, introducing new bins, and so on. (...) changes implemented initially are likely to face some backlash, but we also see that the population gradually adapts to them over time.”

Further, he provided us with this example:

*“(..)*we established a guideline 25 years ago stating that everyone must place their bins out by the accessible road, and we received a lot of complaints at that time. However, now, there are no complaints at all because the population has been drilled on this specific requirement.”

According to the representative, Avfall Sør prioritizes work with trust and communication rather than authority. Furthermore, he pointed to the fact that the consumers might feel threatened by strict authority, and that it may undo much of the work they have already done to nurture this relationship.

“(..) rather than using the stick approach, we believe in encouraging and informing consumers about how to sort waste, dispose of hazardous materials, and so on. Our strategic approach lies in communication, focusing on changing attitudes and sharing positive stories.”

4.1.4 Summary

The representative was finally presented with our research question and was asked to provide his professional opinion on how he believes these mechanisms should be used to govern the relationship between the ECTS and reverse supply chain. To this, he responded that a combination of the three could be most beneficial.

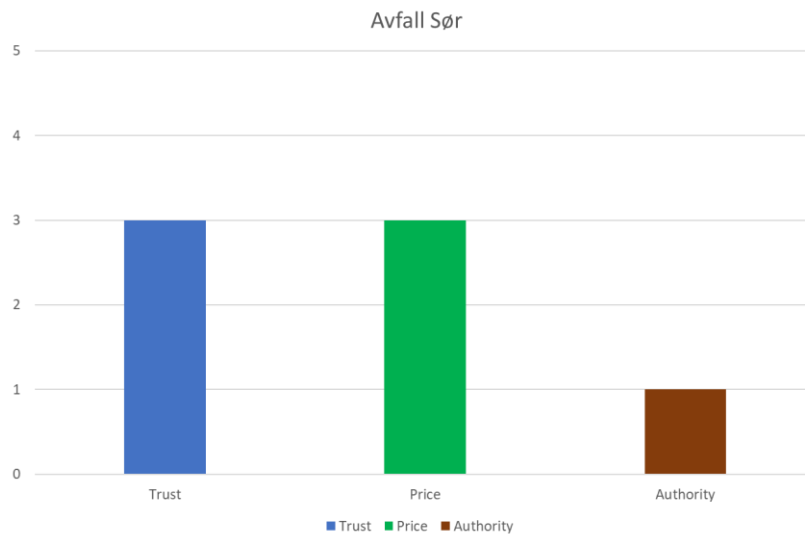
“(..) I think that maybe a combination of the three should be good. I believe in trust and spreading a positive message, but that you also need authority and price as well.”

Furthermore, he stated that their material recycling rate is at 51%, and that it has been at this level for some time.

“We currently have about 51% material recycling rate (...) we have seen some improvement, but not enough. Efforts must be made to increase the residual waste sorting level.”

Avfall Sør's relationship with the consumer is largely influenced by trust. They work with various social initiatives, contribute to building norms, and allocate significant resources towards communication and educating residents. They use a system based on a PAYT-scheme, but also use a flat fee for the bins and renovation services. Thus, there are incentives for the ECTS to recycle. However, according to the representative, they do not consider the incentives to be particularly beneficial for the recycling rate since he stated that “many use it as a pillow”. Also, the representative mentions that they have considered alternative options for utilization of price for the future.

Nonetheless, he acknowledges that it is positive that the consumers who are good at source sorting can save money doing so. Furthermore, the representative explains that they possess fundamental authority to exercise their power, such as refusing waste collection or placing stickers and similar items on garbage bins. At the same time, they acknowledge that they could potentially report certain violations or issue fines, but in practice, it is rarely done due to various reasons. The representative makes it clear that Avfall Sør believes in building trust and providing positive feedback rather than utilizing authority.



4.2 Oslo

Characteristics of the system:

- 700,000 inhabitants and 350,000 subscriptions, 80% is in apartment buildings.
- Households sort plastic, residual waste, and biowaste in separate bags but the same bin. Shared containers for glass & metal and paper & cardboard
- Optical sorting facility
- Curbside recycling and environmental stations.
- Pick-up for paper every fourth week and residual waste once a week. In apartment buildings, it is not uncommon with 2-3 pickups a week.
- Utilizes a fee-based system which can vary according to the size of the bin.

4.2.1 Trust

The representative states that there is no single type of consumer to address in their waste management strategies, given the range of inhabitants and

households in Oslo. Their insights from surveys reveal that trust levels between the consumers and the waste management services are quite high. They have also found that waste separation is impacted by media reports and societal trends, highlighting the negative trend of mistrust.

“Well, there isn't really one type of consumer we can relate to. This includes everyone living here, in all districts. We have some insights because we conduct a lot of surveys on trust in us and on waste separation in general, and I think consumers have quite high trust in us. We also try to trust them to sort their waste and do as we wish. This varies a lot, and it can change based on media reports about plastic in the ocean or similar bad news. A report from the people's enlightenment a couple of years ago had a big thing about recycling whether it worked or not, and after that, we noticed quite quickly that trust went down.”

In terms of consumer segmentation, they have categorized consumers into different groups, such as those who believe in and practice recycling ('Convinced'), those who recycle because they are told to ('Dutiful'), and those who do not care about recycling ('Don't care'). Oslo believes this is important to know how to target the right individuals and improve average behavior. They also found that consumers who own their bins typically show better sorting habits compared to those who share a bin.

“A group called convinced. These are people who sort what they should and believe in recycling. A group called dutiful, who also sort what they should, but to a greater extent do it because they are asked to, and then there are those at the other end who don't care. 10% who don't care. We see a difference between those who own their own bins and those who share. Much better sorting from those who own their own bin. If you have a family with children who do not sort, it will have a significant impact as they generate a lot of garbage, but for an older couple of "convinced" who do not generate so much garbage but sort correctly, it will matter less since it is not such a large volume. We need many "convinced" to outweigh those who don't care and generate a lot

of garbage. Those who are good at waste separation create less garbage than those who are bad. “

In terms of building trust among the inhabitants regarding their recycling system, they believe transparency is key. Initial implementation involved extensive campaigns to familiarize the public with the system. Now, it's important to communicate the reasons behind recycling and to demonstrate the results of their efforts.

“At the start of implementing today's system, there was a lot of focus on familiarity and trust through campaigns. There were large attitudinal campaigns, brochures in the mail, and commercials on TV and in the cinema. For trust or familiarity with the colored bags, how to sort simply. In recent years, we have seen that the media and society turn towards why one recycles and not just how, and then trust must be built in a different way. The most important thing for us then is to be transparent in what we do and not lie or hide anything. We have to build trust by showing results. It's also about not creating mistrust because the consumer is looking for reasons not to have to sort at source and if mistrust is created, we are in trouble. About every other year we send out a brochure in the mail to all households, but there is a battle for attention in the municipality of Oslo since several agencies want to put out information.”

Regarding social norms, they consider education a powerful tool for shaping behavior. For example, teaching about recycling to fourth-grade students, who can then influence their parents, is seen as a potent form of social pressure. They have also explored more localized efforts, such as a successful project in Romsås, though budget constraints have limited the ability to replicate this type of initiative.

“We have 5000 fourth graders learning about recycling. It's part of their curriculum for sustainable development. It's the best social pressure we have since they influence their parents. Working with social norms is much more difficult in Oslo due to a large difference in

demographics (...) we have also looked at the possibility of working more locally in city districts. We had a project in Romsås a couple of years ago. We were in Romsås for 2 months, where we knocked on doors and had events. The project was successful during the months we were there, but whether the project could be replicated and rolled out was voted down due to the budget. “

4.2.2 Price

The only incentive in the system lies in the fee structure for waste disposal, where they can pay less if they have a smaller bin. The fee a resident pay is determined based on the size of the bin they have and not on how often the bin needs emptying. Therefore, if a resident produces less waste, their annual fee will be lower. Conversely, if a household constantly overflows their bin, sanitation workers report this in the system, and the customer is contacted to consider switching to a larger bin. This system encourages people to think about their waste generation and adjust their disposal habits accordingly, promoting waste reduction and recycling.

“Your fee is calculated based on what type of bin you have. The less you throw away, the less you pay per year. “

Conversely, if a household constantly overflows their bin, sanitation workers report this in the system, and the customer is contacted to consider switching to a larger bin. This system encourages people to think about their waste generation and adjust their disposal habits, accordingly, promoting waste reduction and recycling.

“The fee is independent of how often you need emptying and is based only on the size of the bin. If you have 3 of these buried containers and you suspect that you only throw enough to fill 2, then one can be shut down and lead to a lower fee. If we see that a household has very little waste or has overfilled their bin, the sanitation worker enters it into the system and the customer is contacted to change the bin.”

Additionally, they are a part of the cardboard lottery where the ECTS can recycle cardboard, put their name and cellphone number inside, and possibly win cash rewards.

“(...) we also have the cardboard lottery where they can win cash up to a 100,000kr.”

4.2.3 Authority

The representative describes that waste management is governed by the Pollution Control Act and the Waste Regulations. According to these, each municipality is individually responsible for managing the waste of its inhabitants. Each municipality also has its own specific regulations for waste management, which they create themselves.

“It's the Pollution Control Act and the Waste Regulations. The Waste Regulations place responsibility with the municipality. Each individual municipality is responsible for its inhabitants. Each municipality also has its own regulation for waste management in Oslo, which it designs itself.”

If someone disposes of waste incorrectly (wrong bag, wrong bin), they aren't breaking a law but are instead violating a regulation. The usual consequence for this is that they are notified that they need to improve their recycling habits. In cases of non-compliance, an additional fee can be imposed, but this hasn't been enforced during the representative's tenure. This fee is determined based on the cost to the municipality to rectify the mistake. In practice, fines aren't given out. If the wrong items are thrown into the bin (for example, bricks and a TV), the common response is that the waste is not collected.

“If you throw away trash in the wrong bag and the wrong bin, you are not breaking a law per se, but a regulation. As of today, the consequence will be that we notify that recycling needs to be improved. If it is not complied with, we can impose an additional fee, but this has not happened during the 7.5 years I have been working here. The fee is

the sum of how much it costs the municipality to correct the mistake. Fines are not given out in practice. We really don't have a good system for it. We do not give fines because we do not open bags and check the contents, but if someone throws a lot of bricks and the TV into it, we will not take the trash. The most common consequence is that we do not pick it up."

4.2.4 Summary

In Oslo, the material recycling rate is at about 40% according to the representative.

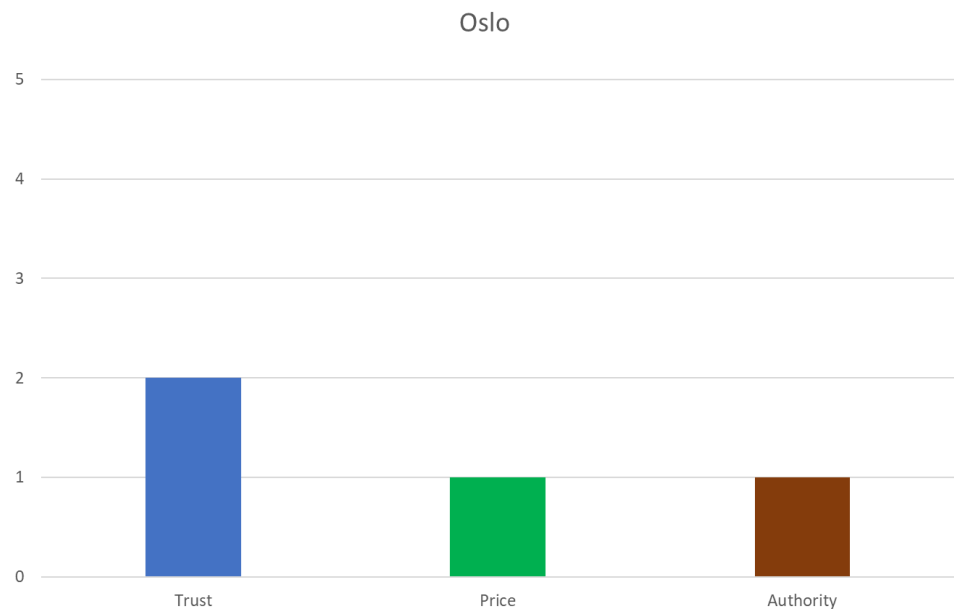
"(...)we have about 40% material recycle rate now, and it has been stable at this level for some time."

Lastly, the representative expresses support for more stringent regulation on waste management when presented with our research question. Both at the national and local level. However, he acknowledged the political challenges associated with such measures, as it is not popular among voters to introduce penalties and stricter recycling rules.

"Yes, I am very in favor of that. I am very in favor of finding a balance between intervening against individuals and finding a balance in how invasive one can be. When it comes to regulation, both nationally and locally, I believe that there is a lot to be done on the waste side. Unfortunately, it is not exactly a vote winner to focus on tightening up sanitation in the country. It's not popular among voters to be the government that introduces punishment and recycling."

Surveys in Oslo reveal that the trust between the municipality and the ECTS is quite high and can be explained by the extensive work the municipality did in the start phase of the current system. The relationship is today more focused on not creating mistrust in the ECTS and the system therefore focuses on transparency and positive media coverage. More active measures taken by the municipality is the choice to push recycling knowledge through the school

system, but due to budget constraints, they have more of a passive attitude towards trust as a mechanism. As far as price goes, the municipality does not use price more than what we see as the minimum. The price is only differentiated based on the size of the bin and not on how often the bin needs to be emptied. It is therefore cheaper for those who produce less waste but not used much as an incentive. It is not possible to refuse emptying. Authority as a mechanism is almost not present at all as there are some regulations present but nothing being enforced. The only form of authority used is refusing to pick up the waste if there is something significantly wrong recycled.



4.3 Hallingdal Renovasjon (Hol, Ål, Gol, Hemsedal, Nes, Flå og Krødsherad)

Characteristics of the system:

- Utilizes a fee-based system which can vary according to the size of the bin.
- Households sort residual waste, plastic, organic waste, glass & metal, and paper & cardboard in individual bins.

- Approximately 36,000 subscribers for household waste, whereas one-third are permanent residents and two-thirds are cabin residents.
- Curbside recycling, waste collection points and environmental stations
- Bins emptied every two weeks

4.3.1 Trust

The manager was asked in the beginning about his view on the consumer. To this, he responded that they do not have a uniform answer to this and that they have not created any segments for their customers. However, he feels that there are different individuals within the various scales, ranging from those who do not care to those who are highly invested.

“We don't have a particularly precise answer to that, we haven't created any customer profiles, but we do experience an increasing desire to sort waste. However, there is a portion of the population that doesn't have any basic desire to sort waste either. This is more prevalent in rural areas, and here there are probably quite a few people who strongly believe that garbage should be burned.”

Since Hallingdal Renovasjon consists of one third households, and two thirds' cabins and huts, working with trust in the population is a hard job according to the general manager. When asked about how (or if) they work with building trust amongst the ECTS, he mentioned some of the work they have been doing, and also, highlighted that the media in recent years has created some unrest.

“(...) Yes, to some extent we do, but it's not very significant. Most of the work that has been done is in response to the unrest caused by media and similar sources, and the population has become uncertain about the effectiveness of waste sorting. So, we have been working on transparency, showcasing the progress of the system and the benefits of waste sorting. This includes campaigns, spreading information, and providing details about collection schedules and such.”

Additionally, when asked about any initiatives to engage with the public, such as in schools, workplaces, or associations, the manager stated that it is not currently a priority due to limited resources. Instead, they clarified that their primary focus is on allocating their resources towards other areas.

“No, we don't allocate many resources to that. We invest significantly fewer resources in initiatives related to trust compared to larger cities. We have a relatively lean administration. Our focus is primarily on core tasks and what happens after we collect the waste(...) We have a large geographical area and relatively few subscribers, so our strong focus is on logistics, and engaging with consumers simply isn't a top priority. Approximately 98% of our efforts are dedicated to waste management, while the remaining 2% are allocated to other matters.”

Despite the unrest amongst the ECTS in recent years and the little resources spent on engaging with them, the manager believes that their campaigns have been effective, and that they still have their trust. In short, he thinks that the inhabitants trust that their waste is being properly managed. However, he also added that there are certain deviations.

“(...)I would say that the overall answer is yes, but of course, there are individuals who have no trust in anything, but they are more of an exception.”

When asked about his trust in the ECTS with regards to recycling effort, capability, and adherence to guidelines his response was that it is somewhat weak. He pointed to the fact that they have a difficult demography, with both elderly, cabins, and people with different norms than what they might have within large cities.

“We have quite low trust that people behave appropriately (...) There have been cases where people have collected all sorts of waste in a common bag and dumped it in the general waste at the recycling stations (...) rural areas where garbage has often been viewed simply as garbage, without much consideration for climate challenges,

circular economy, and the like. My parents-in-law are a good example of that.”

Furthermore, the manager stated that cabins and households are both full subscribers and pay the same fee. However, cabin-owners need to bring their garbage to a garbage return point. Also, he noted that these return points are quite available and, and that they currently have 180 of these. Also, noting that these have been upgraded in recent years to allow for more source sorting. Despite the fact that cabin owners have full subscriptions and access to recycling points, his impression is that on average waste sorting is worse among cabin owners compared to homeowners.

“(…)This is not something that we have spent much time investigating, but my gut feeling is that yes, households are generally better at waste sorting. There is less willingness among cabin owners in this regard. In quantitative measurements in terms of volume, there is a higher rate of sorted waste among those who have curbside collection compared to those who have to bring their waste to designated points.”

To follow up on the difficult demography, the manager was asked if they have targeted campaigns, information, or other measures to reach these ECTS. He responded that they try to reach them with various communication-tools but acknowledged that this is not a top priority.

“(…) mainly work with communication, but not too extensively. It's a challenging demographic to reach. We rely on local media coverage to highlight and address any incidents that demonstrate "this is not acceptable" and similar messages.”

Lastly, the manager answered that although he does believe it is positive to create social norms, mutual trust and other social factors, he highlighted the potential difficulty in creating and maintaining it.

“Social norms can indeed be quite important, but admittedly difficult to establish. Building social norms requires an active role, which we currently do not have.”

4.3.2 Price

Regarding the pricing structure for subscribers, the general manager stated that it is a straightforward system, emphasizing that cabin owners are considered regular subscribers as well.

“We have a very simple pricing structure that solely revolves around the waste management fee. I would also like to clarify that cabins are considered households in this case, and they are required to pay the fee as well. The majority of them have the same size of waste bins, so it can be regarded as a fixed fee for the most part.”

As Hallingdal Renovasjon does not have a variable fee on weight or number of pick-ups (which is more similar to a PAYT-scheme), the manager was asked if there are any other incentives for the ECTS to encourage better recycling. In response, he noted that there are no obvious incentives, but highlighted that the government will be raising the CO₂ fee, which will increase the cost for the system to dispose of residual waste. Consequently, this will impact the consumer fee as it is influenced by the actual cost incurred.

“No, currently it doesn't. However, the government has introduced a CO₂ tax on the incineration of residual waste, and the increased cost will be passed on to the consumer. So one can say that there is a shared economic incentive for sorting and reducing the amount of residual waste. It's possible that when this tax comes into full effect, we may need to consider structural changes in the fee system, where the actual amount of residual waste per household is taken into greater account.”

With this answer in mind, he was asked whether he would consider a PAYT-scheme when the CO2 tax is implemented. He would not say for sure but regarded it as a possible solution. Furthermore, he emphasized the unfairness if the fee is spread out equally on all the ECTS, given that there are several of them that try their absolute best to source sort and avoid too much residual waste.

“That is definitely something we have considered looking into more closely. It would certainly solve the issue related to the unfairness of equal distribution. Additionally, it aligns with the principle of the polluter pays. However, there are multiple factors at play beyond just the CO2 tax, so a comprehensive analysis needs to be conducted.”

4.3.3 Authority

Regarding authority, the managing director mentioned that they have a local waste regulation in place that applies to all owner municipalities, and that it has the same requirements as the national regulations. Furthermore, he explained that this is essentially the authority they have, but it doesn't work perfectly in practice.

“We have resolved it by implementing a local waste regulation that is consistent across all owner municipalities. This regulation aligns with the national requirements. In a way, this is the authority we utilize. One can also discuss how well it functions, but currently, it is the only practical authority we have.”

Furthermore, when asked if they enforce this in practice, he stated that they do not.

“ (...) the simple answer here is no. In this case, it is the municipalities that set the requirements, and we do not impose any enforcement of this authority.”

The manager was asked to elaborate why they do not enforce these rules, to which he highlighted the issues with filing a report to the police. Also, he underscored that this is not necessarily looked upon as such a big problem.

“It is not considered a significant enough problem to take action in this manner. So, if you are caught incorrectly sorting waste here, it practically has no consequences whatsoever. In theory, we could report an individual for improperly sorting residual waste, such as hazardous waste, but the burden of proof would be on us, and we would likely not get anywhere with it.”

Furthermore, he was asked whether he believed it would be beneficial for them to appear more strict (i.e., surveillance, access control) . To this he responded positively and mentioned some of the projects they have been testing. However, he underscored that a breach to regulations, caught on camera or not, would not necessarily lead to sanctions, fines or police reports. That it is intended as a sort of nudge (Thaler & Sunstein, 2008) rather than strict enforcement.

“I believe it would work well. In fact, we are currently running some pilot projects on this, so we have been testing it out to some extent. It involves having environmental stations with improved technology, such as access control using individual key cards for each household, and the possibility of implementing camera surveillance, among other measures. The idea is that this can create external pressure to do the right thing, even though, in practice, it probably would not have consequences for those who still violate the law (at present).”

Lastly, he was asked his professional opinion on whether the imposition of more strict rules and regulations could be beneficial.

“I believe that basic regulation is absolutely necessary going forward, meaning more use of authority. It is difficult to establish a good and efficient waste management system without it being mandated. If you drive too fast in Norway, you receive a fine; if you drink in public

places, you can receive a fine. Currently, there are practically no real consequences for poor waste sorting.”

4.3.4 Summary

According to the manager, Hallingdal Renovation has a material recycling rate of about 32%.

“(...) it is a bit over 30%”

In the end, the manager was presented with our research question and was asked to take into account what we have discussed and gone through. When asked about how he envisions this relationship should be governed, he replied that it should be a combination of the three.

“I think a balanced composition of all of them is ideal.”

At the same time, he mentioned that he feels there should be a fundamental regulation in place that grants it more authority to enforce violations.

“A fundamental regulation is, in my opinion, completely necessary, with more use of authority. It is difficult to achieve a good and efficient waste management system without it being mandated.”

The manager mentioned that his strategic approach going forward would likely involve combining a system with increased surveillance in the form of access control and video monitoring, along with a system that can provide feedback to customers.

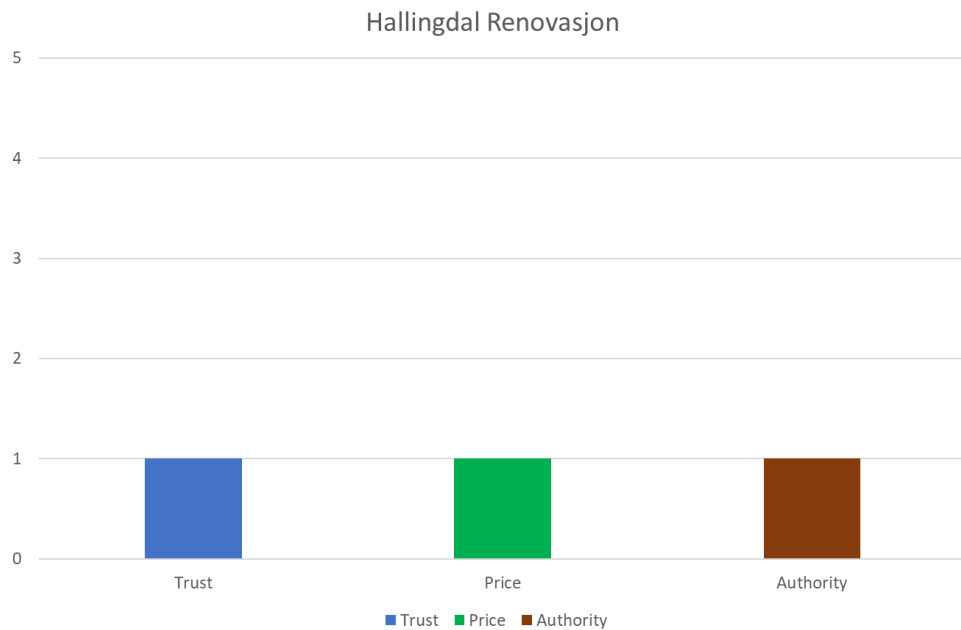
“-A combination of this system with surveillance, access control, and similar measures, along with an individually tailored user interface where one can see how environmentally friendly, they are compared to their neighbors, can create some competition and the like.”

As a final note, he was asked if he believes that a fully optical sorting facility is ideal for municipalities moving forward.

“-One is completely dismissing the consumer and stating that there is no trust whatsoever in proper waste sorting. Additionally, it is very expensive.”

According to the leader, Hallingdal Renovasjon is relatively administration-light and admits that they allocate most of their resources to logistics and operations. They have taken some measures and campaigns to build trust in the system and to address the mistrust that has been spread in the media.

Furthermore, it has been emphasized that they face challenges in reaching a difficult demographic, including both cabin owners and permanent residents. They have also struggled with societal norms and attitudes regarding waste. They have a simple pricing structure based on the size of the bin and currently have no direct incentives for residents. Authority is something they practically utilize very little, although they have the option to refuse collection of bins.



4.4 Avfallsservice AS (Lyngen, Storfjord, Kåfjord, Skjervøy, Nordreisa og Kvænangen)

Characteristics of the system:

- Utilizes a fee-based system which can vary according to the size of the bin.
- Households sort residual waste, plastic, organic waste, glass & metal, and paper & cardboard in individual bags, and then placed in a bin.
- Approximately 6,000 subscribers for household waste
- Curbside recycling, waste collection points and environmental stations
- Optical sorting facility
- Pickup every 2nd week

4.4.1 Trust

Avfallsservice was asked initially about their view on the consumer. The representative stated that it was somewhat varied and that they have a relatively challenging demographic to reach out to.

“It varies a lot. We have some who are very dedicated, while others simply don't care. There is still a prevailing attitude that everything ends up in the same drain. For most people, it's just about getting rid of a problem, namely waste. Even though we try to inform people that everything we throw in the trash bin is recycled to some extent, it's not always easy for this information to reach them.”

The representative from Avfallsservice AS highlighted reliability, openness, and the ability to deliver a stable service as important factors in gaining the trust of the residents.

“We strive to be reliable, precise, and deliver a stable service. We also aim to be as good and transparent as possible, conveying important information. “

Furthermore, he talked about specific initiatives they undertake to strengthen trust and social norms, including giving tours and providing training to school classes and other community groups, as well as sponsoring environmental certification to the schools. They also work on promoting the message that recycling makes a difference and telling a compelling story.

“(...)we also have school classes visiting, and we invite various community groups(...) We strive to create compelling narratives about why source sorting is effective. We have also sponsored schools to obtain environmental certification and incorporate these practices into their curriculum.”

Avfallsservice has recognized the need for continuous work with communication and recently decided to hire a communications advisor full time. Formerly, this has just been project-based work.

“We have hired a communications advisor to help us improve the dialogue between us and the consumers.”

The representative elaborated on one of their hands-on measures, which resulted in a great increase in recycling rate at the short term but underscored that it did not last for very long highlighting the need for continuous work.

“I believe that continuous encouragement is necessary. I paid a 4th-grade class to accompany us on a full collection route, around 350 subscribers, and they went door-to-door distributing merchandise and educational material, explaining recycling and why it was important, etc. In the first 6 months, the sorting rates skyrocketed, but when we conducted a waste audit after about a year, it had returned to what it was before.”

When asked if he believes that the ECTS trusts in the system and that their waste is properly disposed of, he replied with a clear yes.

“Yes, I do”

Then, the question was flipped, and the representative were asked whether they have trust in the ECTS. He stated that it varied due to low recycling rates, but that they believe the average ECTS tries to some extent to exhibit good recycling behavior.

“It does vary somewhat. We observe how customers are doing, and through pick analyses and similar methods, we have been able to identify individual users who are very poor at sorting. However, these outliers are in the minority. We do feel that the majority of people have a conscience and a desire to contribute to source sorting, and even though it may not always be 100%, they do demonstrate a certain willingness.”

Further, the representative was asked to explain the poor recycling rate. He explained that they have a significant amount of elderly, and that the population still lives by the old way of doing things.

“We are worse than the national average in terms of sorting. Much of that can probably be explained by demographics. We have a significant elderly population, which means they have a slightly different consumption pattern. Many of them still live in the old days where they simply threw everything in a common black garbage bag.”

The representative said that they have no targeted campaigns or measures to reach them. That they are too difficult to reach, and that they must put their resources and focus elsewhere.

“No, we don't have that. We simply experience that either they sort their waste or they don't care, and we can't change them. If we want to make changes, we probably have to start with a younger generation. For example, at my home, the children are almost more concerned about recycling than I am.”

4.4.2 Price

The pricing structure of Avfallsservice is mostly based on a flat fee, according to the representative. Furthermore, he stated that this fee will vary depending on the recycling rate but underscored that it is mostly made up by external costs.

“Here we have a fee system. This fee naturally increases when there is poor recycling performance, so it serves as an incentive in itself. However, since we have a relatively small number of subscriptions, the fee is mainly associated with external costs from the customer's perspective, such as vehicles, facilities, etc. Customers have the option to pay for a larger bin if needed.”

The representative was then asked if there are any other monetary incentives for the ECTS to recycle properly. He mentioned a lottery in which the ECTS can recycle cardboard and have a chance to win money. Also, he noted that they used to conduct analyses of household waste and distribute prizes if it was well sorted.

“We also participate in the cardboard lottery, where you can win money by sorting beverage cartons and writing your name and number inside. We have actually had several winners from this. When people and organizations win, the mayor often comes and presents the check, creating some buzz around the winners. This creates a form of incentive. A while ago, we used to physically check people's bins as well, and if it was well sorted, we would distribute lottery tickets. However, it's difficult to assess the overall impact of these initiatives.”

Lastly, he expressed concern for the new CO₂-fee, combined with the potential issue regarding standardization for collection and procedures, he believes it will become incredibly expensive for the ECTS.

“If they regulate it so that we have to collect and renovate like every other big city (...) we have 8 people living on an island with the same rights for renovations as others (...) so we risk that the waste fees in the district will be completely unreasonable compared to a large city, for example.”

4.4.3 Authority

According to the representative, Avfallsservice has guidelines for their subscribers but are not aware of any authority to enforce them with fines or sanctions.

“In our waste management regulations, we have rules for how waste should be sorted, but we don't have any authority for direct sanctions other than not emptying your bin, as far as I know. There has been a general discussion in the industry about introducing fines for poor sorting. It seems that many are reaching the point where they believe that nothing else works. However, the worst consequence is that we simply refrain from collecting the bin.”

However, they do have the possibility to use other forms of authority (e.g., notes on bins, or refusal to pick them up). Also, he noted that there has been talks about introducing fines among the waste management companies in Norway.

“The way we exercise authority, I assume, is by implementing transparent waste bags that may make customers hesitate to dispose of items incorrectly. Alternatively, we have a new driver who has mapped the entire area and identified those who are not good at recycling. He is very proactive in putting stickers, skipping bin collections, and so on. It

will be interesting to see what he achieves after working here for another six months and the impact it has.”

Furthermore, he was asked about his professional opinion regarding the possibility of issuing fines/penalties for incorrect waste sorting. In response to this, he expressed a positive stance but stated that it was not a measure he was eager to enforce in practice. He believed that the existing possibility of issuing it was sufficient.

“(...) you don't want to impose fines for anything, but generally in society, if you break the law, you receive a fine for it. So it's like if you break the law or violate the rules, there should perhaps be some form of penalty or fine, right? (...) fines may be an effective measure, but it could be sufficient to just have the possibility of being able to issue them.”

4.4.4 Summary

Avfallsservice, according to the representatives, has a material recycling rate of about 37-40%.

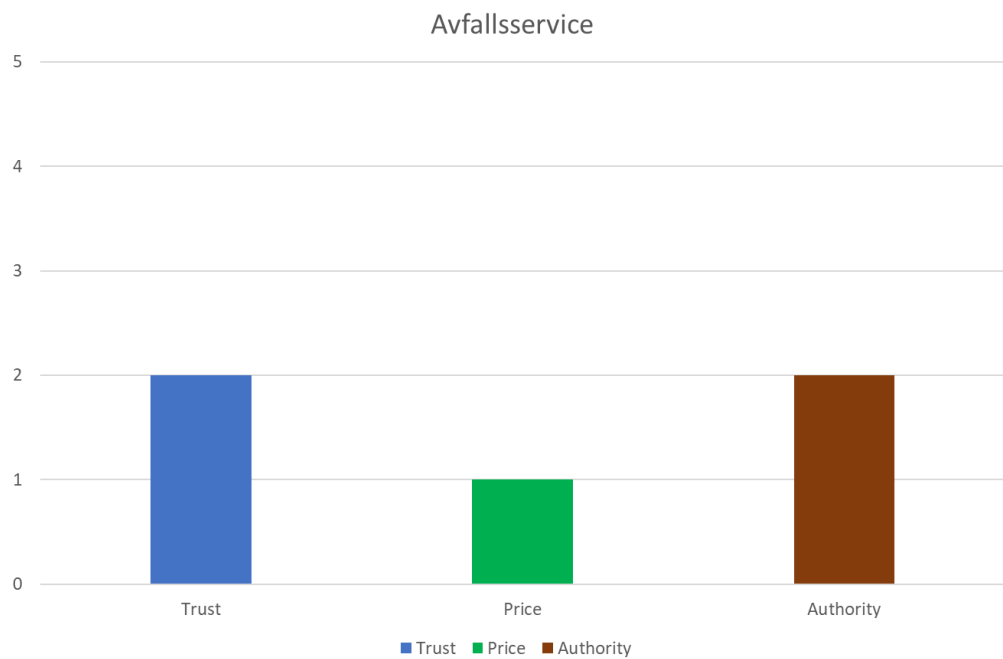
“We have about 37-38% up to 40%. So there is work to be done there.”

Finally, the representatives were presented with our research question, along with an explanation, and were asked to consider what we had discussed in the interview. They were then asked for their viewpoints on this matter. They responded that they consider a combination to be the optimal solution, with a sort of fundamental regulation that allows for the possibility of imposing sanctions/fines.

“I believe that the carrot works better than the stick. I think that for many people, some form of fine could work, but not necessarily actually

giving the fine. It's more about having the possibility. So perhaps a combination of all these mechanisms along with some basic regulation.”

The waste management service has a significant number of elderly individuals and directs its resources towards reaching the younger generation. Through education, sponsorship of certifications, tours, and encouragement, they strive to engage with the ECTS. The pricing structure is simple and based on the size of the bin. They do not enforce authority through fines or similar means, but they have recently hired a driver who actively attaches warning stickers to those who do not recycle properly.



4.5 ReMidt (Trøndelag & Møre og Romsdal)

Characteristics of the system

- Utilizes a fee-based system which can vary according to the size of the bin
- Households sort in 4 different bins. Glass & metal, residual waste, food waste, paper & cardboard. Plastic is left in a separate transparent bag.
- Seventeen municipalities in Nordmøre and Trøndelag with approximately 130,000 residents. That is about 68,000 subscribers.
- Curbside recycling, waste collection points and free to use environmental stations
- Large area with relatively few inhabitants
- 70-80,000 cabin residents. Approximately 30,000 cabin subscriptions.

4.5.1 Trust

The representative was first asked about his view on the consumer. To this, he responded that they have various types of consumers. He emphasized that there are consumers at all levels and that there are consumers who actively participate in the system. Furthermore, the representative noted that he experiences that the most accessible option often overrides the conscientious choices.

“We have a few who are very engaged, doing everything they can and constantly pushing us in the right direction. And then we have the majority who are quite neutral, they do as they are told, some shrug their shoulders, some frown, and some smile, but without any major fuss. We perceive very few people who think it is utter nonsense to sort (...)However, often the easiest way will trump the conscientious way.”

The representative interviewed described how trust is primarily built through action and visibility. The limited exposure that residents have to their services - mainly during their 2-4 annual visits to recycling stations and quarterly invoices -- calls for alternative methods of communication. They utilize local

and regional media, though competing for attention can be challenging. They also use social media and integrate their message into the school curriculum. Specifically, fourth-grade schoolchildren spend a week learning about sorting waste and visiting recycling stations, which can influence their parents' habits at home.

“First and foremost, we believe that trust is built up through what we do and what they see. We use local and regional media quite actively to spread the good message. But we fight quite hard for space in the media, against the local newspaper on things we either do wrong or that are not perceived as correct or where it is. We try to actively use social media platforms. We have very many fourth graders in the 17 municipalities who, during a year, work a small week with the theme of source sorting and visit the recycling stations. They have it linked to their learning plan which involves visits to the recycling station and some presentation of an innovative solution. We believe that this week is very important since the children have influence on their parents, and parents care about what the children say and mean.”

The representative acknowledges the misconceptions and rumors among residents about waste management, such as the confusion around plastic and residual waste being mixed and burned. They are confident, however, that the majority of the public trusts the system and is generally trying their best to comply.

“The overall impression is yes. But just before the interview, I received an email from a distressed resident asking if it is true that plastic and residual waste are mixed and sent to Sweden for burning. There are some misconceptions going around. That is of course wrong, but some people think that. We do not experience that it is the vast majority, we believe that people have quite a lot of trust in the public in general. We are a nation of great trust, and that also applies to the service we provide.”

One significant challenge in trusting the consumer is the complexity of the system. Sorting plastic correctly, knowing how clean it should be, and handling other materials like textiles and cardboard all create difficulties for the average consumer. There are ambiguities that need to be clarified to ensure proper waste management.

“We wish we could say the customer is always right (...) however, we trust that people are doing as well as they can. I think that's a good starting point. There are always some outliers at both ends. That's the way it is when you have the entire population as a customer base. Mostly, we experience that we trust people, but we see that the system can be difficult. It is difficult to sort plastic correctly. (...) so I think that part of the challenge is that the systems are somewhat difficult.”

The influence of social norms and pressures is acknowledged as a significant factor. It's becoming socially unacceptable to deny climate change, and most people tend to follow the crowd. Hence, social pressure could be used to increase the recycling rate.

“It has become uncool to deny climate change and I think that, whether we want to admit it or not, we are herd animals, so most of us tend to follow the crowd. I believe that social pressure could be quite significant. We love to do as our neighbors do. It's not cool to stand out.”

In terms of change, the representative observes that more people are concerned about recycling and reuse now than 5-7 years ago, resulting in increased use of recycling stations. However, it's not clear if this change is a result of the new four-bin system or a natural progression of societal values.

“I'm not sure if I can say that this change in attitude is due to the new enforced system. That is, from the 2-bin system to the 4-bin system, or if it happened naturally. I think I can say that many more people are concerned about reuse and recycling. And we probably see that trend has increased at all our recycling stations, or most of them, we have a container or room where you can put things for reuse. In general,

people care more about the environment now than they did 5-7 years ago. I think it's partly to do with society.”

4.5.2 Price

The representative discusses the pricing system and incentives used to encourage better waste management. The pricing system is structured such that fees are linked to the size of a resident's residual waste bin. The smallest bin incurs the least fee, and the pickup is once a month. Different arrangements apply for cabin or holiday homeowners, with prices varying depending on the location.

“Our entire pricing system is based on a flat fee for the differentiation of the residual waste bin. So that means we pick up residual waste once a month. If you manage with the smallest bin, you pay the lowest fee. This applies to permanent residents, for those who have a cabin, we have a slightly different arrangement.”

This system encourages residents to produce less residual waste, and those who produce more have to pay more, implying they are not sorting their waste well and contributing more to pollution. The representative acknowledges the drawbacks to this system in situations where high amounts of waste are unavoidable, such as with families with young children using diapers, a material currently classified as residual waste.

If you produce a lot of residual waste, you must pay more. You're probably doing a worse job of sorting and contributing to more pollution. This can be a bit unfortunate at certain stages of life, both at the beginning and end of life with the diaper problem. The diaper takes up space and is currently considered residual waste. So that stage of life might cost you a little more when it comes to waste fees. But otherwise, you can influence a lot.”

Despite these circumstances, they assert that most residents could manage with the smallest bin size. Pick analysis in Norway reveals that a significant portion

of residual waste could have been sorted. Some incentive schemes exist to motivate better waste management. Residents who share a bin with their neighbor can have a 15% fee reduction. However, the pickup analysis also shows that recycling rates are lower when bins are shared. There is another 15% discount for those who manage food waste through composting.

“Pickup analysis, like most pickup analyses in Norway, shows that there is a frightening amount of residual waste that could and should have been sorted out. So, we know that most of our residents could have managed with the smallest option. We have a couple of schemes. You can reduce your fee by 15% if you share a bin with your neighbor. And then we also make sure that you have a little less space than if you have your own bin. Pickup analysis shows that when you share them with others, recycling becomes a bit worse. Those who handle food waste through the composting process also get a 15% discount.”

The representative also mentions that residents are not charged for delivering waste to recycling stations. This practice has led to increased waste delivery to these stations, but no decrease in waste amounts at homes. They believe that waste that used to be discarded elsewhere is now being brought to recycling stations.

“You don't have to pay when you come to the recycling station. We see significantly more waste at the recycling station per inhabitant than people in a municipality that charges. We see that the amount of waste has not decreased at people's homes, but that we receive considerably more at the recycling stations. We believe the waste was there before but that it has been changed so that people come to the reuse stations instead of throwing away elsewhere.”

Regarding the subscription price, the entire fee is connected to the size of the residual waste bin. They do not have a fixed fee, but the cost is differentiated based on the bin's size.

“Our entire fee is linked to the size of the residual waste bin. So we do not have any fixed fee at the bottom and then differentiated up, and we entirely differentiate according to the size of the residual waste bin.”

4.5.3 Authority

The representative shifts focus to discussing the authority that their organization has in relation to waste management. They mention sanitation regulations that apply to all 17 municipalities they oversee. These regulations provide the core guidelines on how waste sorting should be conducted and the responsibilities of residents.

“We have sanitation regulations which are identical in all 17 municipalities. That's the sanitation regulations. That's the law we mainly adhere to and guide us. It states how the sorting should be and the duties of the residents. We have worked a lot with it because we believe it is important that it is the same in all municipalities so that we can operate the same in all the municipalities we operate in.”

Despite the complexities of managing different municipalities, with varying costs associated with waste collection and recycling, they strive to offer the same price for all residents. The representative states that a national standard would simplify operations and ensure nationwide equality. However, their authority doesn't extend to implementing this.

“It's about streamlining and logistics and downstream. And we have worked with price regulation. Which strictly speaking is decided in the municipal council every year. We believe there should be the same price for all residents. It has not gone completely smoothly because the cost of collection and recycling is slightly different in a city like Kristiansund than it is in Midtre Gauldal municipality where people live in the most wonderful nooks and crannies. It would have been easier for us with a national standard so that we could treat all customers the same and have equality nationally. We do not have the

authority for that, but at least we have gathered all the municipalities so that it should be the same.”

In terms of enforcement, if residents sort waste improperly, a note is left on their bin requiring improvement. For cases of excessive residual waste, the resident is asked to improve sorting or increase their bin size. However, they have no authority to impose fines.

“If you have a lot of pollution or impurities or incorrect sorting in cardboard or plastic or glass and metal or food, then you get a note left on your bin. The next time we collect, we must see an improvement on this. The only thing we really do with residual waste if we see that you repeatedly have a lot of residual waste, that is, with your bin being full or you put out an extra bag. We have an offer that you can put out an extra bag of residual waste which you are then billed for. If we see that you do it repeatedly, then we notify and ask if you can improve your sorting, or we recommend that you increase the size of your bin, simply to make it as cheap as possible for you. We do not have the authority to issue fines today.”

While the representative sees value in having the authority to issue fines, they also express concern that this could conflict with their organization's ethos of keeping a positive relationship with residents.

“I think it would have been okay to take advantage of that opportunity, but at the same time it contradicts a bit of what we stand for, and that we say we need first and foremost to get people on the team with a smile. Not everyone responds with a smile when you say, here you get a fine from us. However, maybe just the possibility of giving one would suffice.”

They've also experimented with surveillance cameras connected to a guard service to monitor and intervene in cases of improper waste disposal. While this approach had some initial success, its long-term effectiveness diminished as people began to ignore the warnings. The representative notes that they're

uncertain about the overall benefit of this strategy, both for their reputation and their economic efficiency.

“We tested surveillance cameras that were connected to a guard service. People sat around the clock and talked to you, and if you come to deliver wrong or leave something outside the container. Was very effective for a while and then people stopped caring. They just pulled the hood over his head and then parked the car a little further away. So we had a short-term effect. Disappointingly little effect. We are a little unsure how beneficial it is for our reputation and how beneficial it is for our economy.”

4.5.4 Summary

Asked about their perspective on which of trust, price incentives, and authority is the most effective in managing the relationship between the system and the consumer, the representative suggests that a combination of all three may be most effective. They also emphasize the importance of societal trends and norms, expressing the desire for more focus on national arrangements to streamline processes.

“I wish I could say that trust was the most effective, but I don't necessarily think so. I don't think that authority is necessarily the way to go. I think it can get people to some extent do what we want. Maybe to a greater extent, but I think that you then get a bunch of angry people. So I think you need a combination of everything. I also think a lot of this is about trends in society and a bit about what is cool and not cool. I think it would have been very wise to have more of a focus on national arrangements, and to standardize regulations.”

The representative seems to support the idea of standardization across Norway for waste management solutions, believing it would streamline processes and likely improve recycling rates. He mentions that the diversity of solutions currently in place is partly due to different downstream solutions—what happens to the waste after it leaves their facilities—and this depends on each

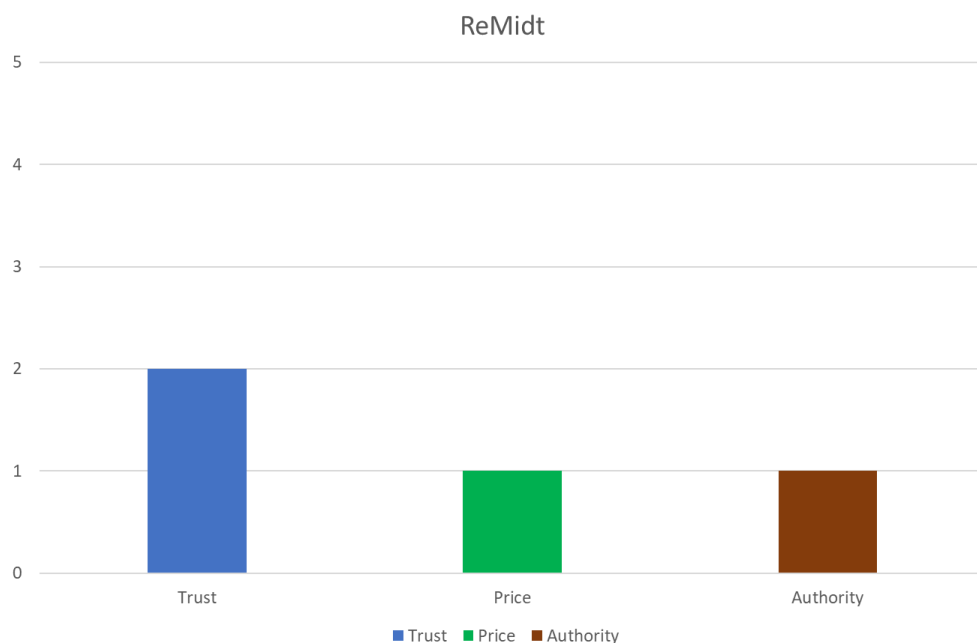
municipality's resources and strategies. Standardization could mitigate this variability, making it easier to implement consistent waste management practices and policies across the country.

“That would have been fantastic. That's part of the reason why there are different solutions today. It's partly about downstream solutions. In other words, what happens to the waste when it leaves our gate? It is up to each one to ensure good downstream solutions. Environmentally friendly, but also economical. It's clear that there can be slightly different solutions from municipality to municipality. We have many examples of a standardized service offer. I'm pretty sure that if we can say, but this is how we do it in Norway, that would also have been a good argument for us. Then we come back to the authority issue.”

The representative states that the recycling rate has remained relatively stable and hasn't seen any significant changes or improvements since he started. However, there has been noticeable progress in food waste recycling, which was introduced in 2016. This improvement has contributed to an increase in the overall material recycling rate. There has also been an increase in the recycling of glass and metal packaging after providing bins for these materials at home. Despite these improvements, changing people's behavior remains a challenge. The representative expresses the belief that substantial changes in recycling rates will likely require the aid of technology, specifically machines that can separate waste.

“We are at a little over 30%. For us, it has been quite flat. There has unfortunately not been a noticeably big change. What is the biggest difference is precisely the food waste in 2016. So, there we have seen a clear improvement. It helps to increase our material recycling rate, and we also see that we have been able to slim down residual waste and thus increased the material recycling rate for glass and metal packaging. When people got bins for it at home. It's difficult to change people's opinions. We view it a bit like if we are to make substantial changes in our results, we need the help of technology. Get machines that separate the trash for us.”

The representative expressed trust as a mechanism rooted in visibility and media coverage and mentions the competition for attention is difficult today. ReMidt integrates their message through school curriculum and social media, but no other active measures are taken. A weakness mentioned is how the complexity of the system makes the consumer untrustworthy in the eyes of ReMidt as the recycling knowledge is too low for the ECTS. The representative looks at social norms and pressure as the reason trust is built between the ECTS and the reverse system. The system encourages the ECTS to produce less residual waste by having different prices for the different sizes of bins. To further encourage the ECTS to recycle, the price is lowered by 15% for those who manage their own food waste with composting and a further 15% if they share a bin with a neighbor, resulting in an overall smaller bin per household. As for authority, the 17 municipalities have the same regulations to keep a uniform authority for the ECTS managed by ReMidt. The regulations act as a guideline and show the responsibilities of the ECTS. ReMidt does not use fines as a tool to enforce regulations as they do not have the authority, but mentions a softer form of leaving notes on the bins where recycling efforts are lacking. They have also experimented with surveillance earlier but did not see a cost benefit as the consumer managed to bypass the cameras over time.



4.6 Fosen Renovasjon (Trøndelag)

Characteristics of the system:

- Utilizes a fee-based system which can vary according to the size of the bin.
- Households sort in 3 different bins. Residual waste, food waste, paper & cardboard. Plastic is left in a separate transparent bag. Glass & metal at waste collection points.
- Food waste every 14 days, residual waste and paper & cardboard once a month. Plastic is collected with paper & cardboard.
- Seventeen municipalities in Nordmøre and Trøndelag with approximately 25,000 residents. About 11.000 subscribers, and 5,000 are cabin residents.
- Curbside recycling, waste collection points and free to use environmental stations.

4.6.1 Trust

The representative was first asked about his view on the consumer. To this, he responded that they have consumers across the entire spectrum.

“We probably have the whole line from very interested to the ones we would expect a lot from, but do not care enough to use any effort. We see that most of our consumers are good at recycling on average and also a group that simply does not care. There are some customers that ask for the details to be sure that everything is recycled correctly with a lot of interest in recycling. We probably have the whole range.”

Furthermore, he discusses the measures taken to engage residents and foster trust and active participation. They mention the use of direct communication through notes on bins and occasional mailings, acknowledging that capturing people's attention is becoming more challenging in the digital age.

“We do work a bit with information and have employed someone who will have that task now. The consumer is becoming more and more difficult to reach because of the competition with everything else that's happening on everyone's phones. Still we send some information in the mailbox, because the competition is less. What we have the most faith in is the note that we hang on the bin. It is directly to the customer and thus a greater chance that it will be read.”

For educational initiatives, they offer schools the opportunity to visit recycling stations and provide insights on waste management. The representative admits that historically, they haven't dedicated significant resources towards building trust, but it's a growing focus area.

“We have sent out invitations to schools so they can contact us in relation to what suits their teaching and come to recycling stations, join a tour and there we inform them about what happens with the waste. We probably don't use a lot of resources on that and we have not historically used much time on it. So that's more of a focus now.”

Customer surveys are conducted to gauge satisfaction levels, and the results indicate that the majority of residents trust that their waste is being managed appropriately. While they joke in the office about not fully trusting customers' sorting abilities – pointing out a significant amount of residual waste that should have been sorted – they nonetheless acknowledge the challenges consumers face, particularly with different types of plastics.

“We do conduct surveys on customer satisfaction, so we have pretty good figures on it. Overall, customer satisfaction is high. We also look through the waste to see what comes in. So, we do have the answer regarding the waste. But then, it is also difficult for consumers to test what type of plastic it is. So we jokingly say in the office that we should never fully trust the customers. There's still a lot in the residual waste that should've been sorted out, which we aim to do. It's one of the main arguments for why we, in Trøndelag, continue to work on a post-sorting plant. Trondheim has had plastic sorting since the mid-90s, and we're

now at about 6-7 kilos per resident, while the total is 26 kilos per resident. Despite Trondheim having run numerous campaigns, the levels have only increased marginally.”

4.6.2 Price

The representative explains that their economic incentive system is designed to promote recycling. Residents are charged based on the size of their residual waste bin - smaller bins attract lower fees.

“We have a fee system that follows the residual waste bin, so if you have a small residual waste bin, it's cheaper.”

Looking ahead, they consider the strategic implications of the EU's requirements for a 65% recycling rate and an incineration fee on residual waste. They note the challenges associated with a flat fee, given that it would unfairly burden those who are sorting and recycling effectively. The potential solutions they mention include a post-sorting facility or a differentiated price based on customer behavior, either via payment per emptying or payment by weight, a PAYT system. If an incineration fee is introduced, they believe it would necessitate further action.

“(…) especially the co2 fee, where it becomes difficult to have a flat fee simply if you do not have a post-sorting facility. Then it will cost too much per inhabitant. It then becomes unfair if everyone has to pay the same price because those who sort poorly and generate a lot of garbage will account for many times the cost. There are then two alternatives I see. Either a post-sorting facility, or to differentiate the price based on customer ability (...) If you throw away a lot of residual waste, it should cost you a lot. If an incineration fee is introduced, there is no longer any doubt that something needs to be done.”

4.6.3 Authority

The representative discusses their approach to the use of authority to promote better recycling habits. They utilize a feedback system by placing notes on trash cans, which are targeted at households that are either doing an exceptional job at sorting their waste or perhaps not sorting correctly.

“There are different deviations. We run some campaigns from time to time, such as what we are probably going to do this summer where those who have very little food waste in their food waste bin receive a note stating whether you are very good at sorting or maybe you are throwing away incorrectly.”

While they do have the power to impose sanctions or fines, this is not used extensively. Rather, they might send invoices for extra bags if the bin volume is exceeded, or have a conversation with households that consistently overfill their bins.

“Yes, we do have the authority to give fines, but we don't implement it to a large extent. Extra bags are put forward if they exceed the bin volume, then we send an invoice for the corresponding amount we have to pay to dispose of the extra residual waste. If the bin is overfilled time after time, we will have a conversation with the household. After the conversation, we encourage them to switch to a larger bin. If not, then we invoice.”

There's some enforcement related to collection points, especially in shared living situations where a common collection point might be mandated. However, if a resident throws everything into the residual waste bin, the only consequence is that they have to pay for the size of the bin. The representative suggests this is a challenge in terms of exercising authority, as they're trying to motivate customers rather than imposing strict rules.

“An example of what we enforce is in relation to turnaround places and such. The regulation states that we can require some people to have a common collection point and then the next instance for customers is the

complaints board. We see in other companies that they do not have the authority to decide on the customer's collection point and must go through the municipality, which takes a long time to get through.”

However, they don't rule out the potential benefits of a more stringent system. While they believe that information and encouragement are crucial, they also think that stricter regulations might be beneficial, provided they are targeted correctly.

“The information to the customers should not always be thank you for sorting so nicely. I'm not averse to taking a different tone if someone does not sort their waste. I think it's an interesting thought to have stricter national requirements as long as it is correctly targeted at those concerned. It's about ripping off the plaster when introducing a new bin. People will always react but most will quite quickly adapt.”

4.6.4 Summary

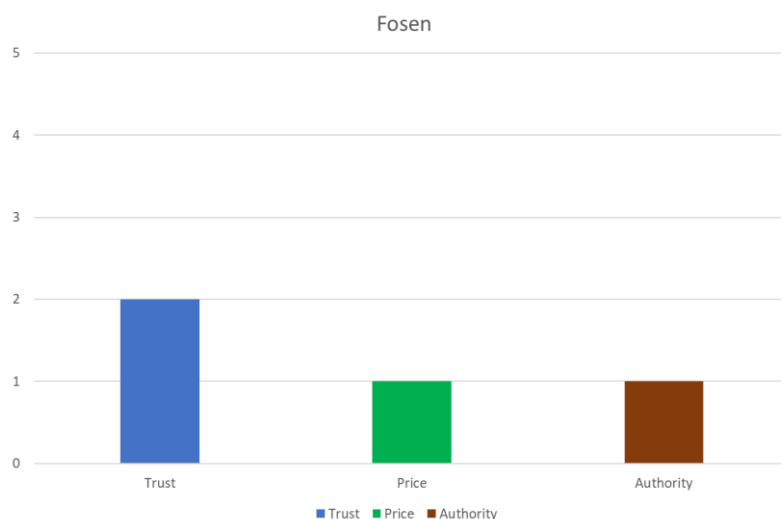
On a final note, the representative talks about the balance between the three mechanisms of norms, trust, and authority. They feel there should always be a combination of the three, but currently, authority is underutilized. They emphasize the importance of providing free delivery at recycling stations to increase the recycling rate.

“Well, I think there must always be a combination of the three. Yes, they all work in their own way. I think authority is used a little too little. I also think that free delivery at recycling stations is an important part of increasing the recycling rate. In the countryside, some people have the alternative of burning garbage or throwing it down a slope, so that part speaks for us having free delivery. With free delivery, it will be a better alternative than doing something else with it, but if the delivery is not free, it will end up elsewhere. Although there will always be some small construction companies who sneak something through for free.”

The representative reports that their material recovery rate is just over 40%, an increase from just over 30% thanks to the introduction of source sorting for food waste. This transition to +food waste sorting was gradual and faced some challenges due to issues with containers and moist waste. However, they've been continually working to improve it.

“The sorting rate for material recovery is now just over 40%. It had been just over 30% for many years, but we introduced source sorting of food two years ago and moved over to just over 40%.”

The representative from Fosen discussed how the task of reaching the ECTS is getting harder because of how easily everyone can be reached and how Fosen is getting drowned in too many actors. They therefore mention their education initiative as the most important initiative to push out knowledge and gain the trust of the ECTS. There is not anything else Fosen highlights as trust building initiatives. Price as an incentive is only present in differentiating prices based on bin size, but nothing more. As for authority the company uses notes that they leave on the bins of ECTS that either recycle exceptional or maybe not sorting correctly. The representative highlights how the company wishes to motivate the ECTS and not impose strict rules and regulations. He does however see the potential benefit of a stricter system as long as the regulations are targeted correctly and mentions how the company uses invoices if the waste is overfilled multiple times.



4.7 Overview

Renovation Company / Municipality	Trust	Price	Aut	Material recycling rate	*Effective governance?
Avfall sør	3	3	1	51%	No
Oslo	2	1	1	40%	No
Hallingdal Renovasjon	1	1	1	32%	No
Avfallsservice AS	2	1	2	40%	No
ReMidt	2	1	1	32%	No
Fosen Renovasjon	2	1	1	41%	No

*The determination of whether it is effective governance or not is based on the material recycling rate.

Furthermore, the development of this rate in recent years has also been taken into account (e.g., a significant yearly improvement, stagnation or decrease in recycling rate)

5.0 Discussion

The study was based on the premise that a recycling behavior gap exists (Jalil et al., 2016; Flygansvær et al., 2021), and the authors aimed to examine how to effectively govern the relationship between the reverse supply chain and the ECTS to achieve sustainable recycling behavior. The foundation for governing this relationship was established through the three control mechanisms of trust, price, and authority (Bradach & Eccles, 1989).

In our examination of how the relationship between the end-consumer-turned-supplier (ECTS) and the reverse supply chain can be effectively governed, several key factors emerge that are critical to promoting sorting efficiency and encouraging sustainable recycling behavior. These include the role of price,

trust and authority, and balancing the mechanisms to govern the relationship with the ECTS, and the possible move towards post-sorting facilities.

The purpose of the discussion is to analyze and interpret the findings obtained in the study, specifically examining their alignment with our research. By critically assessing the data and their implications, and reviewing them in relation to existing literature, this section aims to provide a deeper understanding of how to govern the relationship between the ECTS and the reverse supply chain, and contribute to the validation or refinement of our formulated hypothesis.

Trust

In present society, trust is often viewed as a crucial mechanism to encourage responsible behavior (Haugland & Torger, 1994). However, despite its prominence in the literature, our findings suggest that the effectiveness of trust in promoting source sorting is debatable, particularly given the demanding nature of recycling and its low ranking on many individuals' priority lists (Stoknes, 2015; Thaler and Sunstein, 2008).

The results indicate that trust is the most prominent mechanism among the majority of waste management companies. When it comes to managing the relationship between the system and the consumer, there has been a primary focus on the trust mechanism. Literature emphasizes the importance of the trust mechanism in facilitating and promoting sustainable behavior (Mintz & Kurman, 2019; Flygansvær et al., 2021; Pentayya, 2013; Pedersen, 2020). However, the results also show that trust alone is not sufficient to achieve the desired efficiency goals.

Economic transaction theory (Williamson, 1985) and relational contract theory (Macneil, 1980) recognize that trust often develops within an already established relationship, where price and authority mechanisms have played a role in transaction governance. It is emphasized that repeated positive experiences and fulfillment of obligations form the basis for building trust.

Furthermore, that trust can function as a governance mechanism that complements and strengthens other mechanisms (Haugland & Reve, 1994), and it can play a crucial role in improving collaboration and enabling long-term mutually beneficial relationships (Bradach & Eccles, 1989).

In Norway, a fundamental contract between the waste collector/municipality and the ECTS that involves a price mechanism and a form of authority through the establishment of guidelines. However, these guidelines have not been particularly enforced, and there has been little to no sanctions or repercussions if the ECTS does not uphold their part of the agreement. Meaning that despite knowing that the behavior from the ECTS is flawed through waste analysis, and hence a “breach” of contract, there is no real consequence for them. Especially with the poorly sorted residual waste which requires more time and resources to analyze. Since repeated positive experiences and fulfillment of obligations form the basis for building trust in a relationship, the very foundation, according to both economic transaction theory (Williamson, 1985) and relational contract theory (Macneil, 1980), is broken.

Despite this, trust has been a primary mechanism from the beginning. There has been a focus on building trust in the system, informing about processes, creating transparency, and encouraging sustainable behavior. One of the goals has been to establish shared norms within the population. Waste collectors have attempted to make source sorting as easily accessible and achievable for the consumer as possible. However, as the results indicate, this is not sufficient to ensure good recycling behavior. Waste collectors are aware that consumers do not recycle as well as they claim or as well as they should, without employing many other means besides trust-based governing mechanisms.

Both Avfall Sør and Oslo Municipality have conducted consumer surveys and received responses indicating that the majority of consumers trust that waste is being handled correctly by the waste collectors. Similarly, all the other four waste collectors also feel that they have the trust of the majority. Hence, it is evident that mistrust is not the reason for poor recycling behavior. When the

interviewees were asked about their trust in the ECTS, it varied, as their analysis shows that recycling is not as good as it should be. Normally, in an economic inter-firm relationship, sanctions would be imposed or there would be a threat of replacing the underperforming company. However, the relationship between waste collectors and consumers is mutually dependent, and waste collectors rely on consumers as much as consumers rely on them. Therefore, much of the mitigating strategy used has been to increase efforts with the trust mechanism. More information, nudging, and other social measures have been implemented, but they have not significantly improved the situation.

Furthermore, Mintz & Kurman (2019) highlighted that effective public awareness and cooperation is crucial for successful and cost-effective recycling programs. Also, their findings underscore the need for culturally adapted messages to enhance pro-environmental behavior within communities, hence highlighting the challenges in standardizing and employing trust as an effective mechanism. From our result we also see that the heavy utilization of the trust mechanism can be resource intensive. Renovation companies like Avfall Sør and Oslo spend a considerable amount of resources to promote trust. An example of this is the pilot project Oslo conducted in Romsås. The representative explained that this yielded good results during the first two months when they were still present and promoting it, but they did not have the budget to investigate whether this effect persisted after they withdrew.

An additional challenge to using trust as a mechanism is the need for multiple information channels to foster a balanced perspective (Pentayya, 2013). Moreover, the absence of trust can be destructive to a recycling system, necessitating constant maintenance and reinforcement. Pedersen (2020) notes that while trust can contribute to long-term sustainability, it must be carefully managed and not relied upon as the primary tool for promoting responsible behavior.

Existing literature shows that a certain utilization of trust should be present for it not to be disruptive (Jiesper Pedersen, 2020). Our research findings align with this perspective, as ReMidt and Hallingdal Renovation both score low in

recycling rates and trust efforts. The representative from Hallingdal argues that they have a challenging demographic to reach and highlights the fact that they have low administrative capacity, resulting in a trade-off between effectiveness and resource demands. However, Avfallsservice faces similar challenges with difficult geography and few subscriptions, but they demonstrate that their work on building trust has yielded results in terms of the material recycling rate. This supports the claim that a certain level of trust is necessary for an effective system.

Furthermore, we also see that the effectiveness of the mechanism can plateau. In the interviews Avfall Sør and Oslo reported that there has been little to no significant increase in the material recycling rate in recent years. This suggests that despite ongoing efforts and the allocation of resources towards implementing this mechanism, its effectiveness appears to have limitations. There seem to be diminishing returns when the investment in the mechanism increases above a certain level.

Avfall Sør provides an example of this with a campaign they conducted on composting food waste, which initially yielded very positive results, but the outcomes started to diminish over time after the "hype" faded. Several of the representatives mentioned observing a clear change in behavior during the campaign but found it challenging to sustain this effect once the campaign ended. This phenomenon is not uncommon in behavioral psychology, where there can be a distinct behavior change at the beginning of major campaigns or news coverage, but the interest wanes as time goes on (Stoknes, 2015).

Incorporating our findings with existing literature, we confirm that a fundamental level of trust mechanism is essential to promote sustainable recycling behavior. At the same time, it also shows that there are diminishing returns, meaning that high resource investment does not necessarily result in equally high long-term effects. It is clear that the trust mechanism needs support from other governance mechanisms to achieve a higher level of efficiency in waste sorting.

Price

The literature states that incentives can be powerful tools for promoting appropriate behavior (Kamenica, E. 2012). Our literature review reveals several alternatives for incentivizing proper recycling behavior, but Pay-As-You-Throw (PAYT) is the most prevalent among them. According to research, the correct implementation and execution of a PAYT system can lead to improved source sourcing (Morlok et al., 2017). However, the literature is inconclusive regarding whether it will result in a general decrease in waste generation (Batllell & Hanf, 2008; Werf et al., 2020).

The results indicate that the price mechanism is rarely used. Very few respondents incentivize proper behavior other than offering a variable fee based on the size of the waste bin. According to Alzamora & Barros (2020) this is one of the forms a volume-based PAYT-system can be designed. However one can argue whether a variable fee based on the size of the garbage bin would provide an incentive to generate as little residual waste as possible, the price difference between them is often so small, about 1000kr difference per year, that it does not provide sufficient incentive. Also, several representatives mention that the majority of households have the same size of bin (120-340 liters), and considering the relatively low rate of material recycling, this seems to be sufficient even for those who are not proficient at source separation.

Other than that, a couple of respondents mention having a lottery for cardboard recycling, and Avfallsservice states that they have also distributed lottery tickets in the past when they found well-sorted waste during collection analysis. However, the authors argue that these measures are not sufficient to claim that they effectively incentivize proper recycling behavior, as they are only minor gestures. Hence, all but Avfall Sør scores a 1 out of 5 on the price-mechanism.

Avfall Sør is the candidate that has a payment structure most similar to a PAYT system. Here, individuals pay ECTS every time their residual waste and food waste bins are emptied. The economic incentive lies in the possibility of achieving a lower price by increasing the source separation of their waste, resulting in minimal residual waste, or by having cleaner food waste. This system can be characterized as a volume-based PAYT-system (Alzamora & Barros, 2020).

According to the literature, a PAYT-system has the potential to increase source separation among the population (Morlok et al., 2017), and other researchers believe it can also lead to a reduction in waste generation as it becomes more expensive to dispose of larger amounts of waste (Batllell & Hanf, 2008). However, the results indicate that Avfall Sør is not equally convinced of the system's effectiveness. They are uncertain about the exact effectiveness of this implementation and do not consider it a clear strategy going forward to improve source separation.

“(...) it is very flexible and convenient for those who want to save some money, but can also be a complacency for those who don't care (...) we will investigate this model, and see if we should switch to something else (...) the recycling rate has been improved, but it is not easy to attribute this improvement to either the variable fee (...) or other factors”

At Avfall Sør, the average cost for their customers is approximately 40 NOK per emptying, according to the representative. As the representative made it clear that it does not appear to be a particularly strong incentive, they were asked why they don't choose to increase this cost to create an even stronger incentive. The representative stated that they did not consider this a good alternative, as they suspected it could create significant problems with the media, the public, and, in the worst case, lead to increased illegal dumping of waste and similar issues.

These concerns have also been raised in the literature by Heller & Vatn (2017), who found that illegal dumping of waste increased after the implementation of

a PAYT system. However, the representative from Avfall Sør also mentions that the population is often resistant to significant changes in the beginning but tends to adapt over time. The literature also supports this, with studies such as Emmanouil et al. (2022) indicating that public support for environmental taxes and fees can increase through exposure. So it is difficult to definitively determine whether such an increase would only lead to negative consequences or if it could be accepted over time.

Despite Avfall Sør being the only one currently implementing the price mechanism, several representatives see it as a possibility in the future. They have been informed about an increased CO2 tax, and now they have to explore other alternatives than flat fee-based solutions to make it fairer for the ECTS, following a 'polluter pays principle,'.

“(...) However, the government has introduced a CO2 tax on the incineration of residual waste, and the increased cost will be passed on to the consumer (...) It's possible that when this tax comes into full effect, we may need to consider structural changes in the fee system, where the actual amount of residual waste per household is taken into greater account.” -Hallingdal representative

Despite the announcement of this tax increase, none of the other five had a clear plan on how to properly incentivize through variable fees. The representative from Hallingdal, for instance, acknowledges the need for a change in the fee system, but presents no concrete strategy. Hence, an increased utilization of the price mechanism may be a necessity for these waste management companies in the future.

Authority

From the results, it is evident that authority is rarely used consistently among all waste management companies. Some representatives exercise authority by refusing to collect the garbage bin if it is poorly sorted, while others use

stickers or similar methods to inform consumers that the sorting is inadequate, serving as a kind of warning. Upon further inquiry during the interviews, it becomes apparent that this often applies to waste that is visibly poorly sorted, such as plastic packaging in the glass and metal bin or a significant amount of glass in the food waste bin. The representatives mention that they do not open the bags of residual waste to examine the sorting. Thus, one can assume that authority is exerted on what is easily observable, while the residual waste typically remains untouched and can therefore be relatively poorly sorted, which is also evident in the recycling rates among the six representatives.

"(...) that in the residual waste bin, there is 50-70% of raw materials or other items that could have been sorted at the source is the biggest challenge now. (...) and now we need to extract more value from the residual waste to increase material recycling. We need people to make a greater effort in sorting." -Avfall Sør-

The comments from Avfall Sør underscore a significant concern in the recycling process: the residual waste bin. They note that 50-70% of items within the residual waste bin could have been sorted elsewhere. As Avfall Sør utilizes both the price and trust mechanisms, this finding indicates the need for more utilization of authority to increase the material recycling rate.

However, as noted, there seems to be a lack of effective enforcement of sorting regulations. Even when faced with poorly sorted residual waste, waste management companies are not exercising their authority to control the situation effectively. This is primarily due to their current practice of not inspecting or opening the bags within the residual waste bins. This implies a lack of investigative actions to enforce recycling regulations, making their control over the recycling process weaker. It is natural to assume that this is a time-consuming and resource-intensive process, and therefore not a priority at present. However, the comments from Avfall Sør, as well as the material recycling rate among the renovation companies, prove that it is a necessity. It is

also evident that consumers likely do not consider having poorly sorted residual waste as a violation of guidelines or a serious offense due to the frequency of poorly sorted residual waste.

Thus, Avfall Sør's statement substantiates the notion that the control mechanism of authority is not being sufficiently utilized in the current system. It indicates a need for waste management companies to exercise more authority, perhaps through more stringent enforcement of sorting rules, to improve recycling and subsequently increase material recycling.

If one looks at the literature, the impact of increased authority through stringent laws in the context of recycling has not been much covered, but some research has been conducted. Viscusi et al. (2023) discovered a consistent relationship between recycling laws and recycling rates, suggesting that recycling laws have a significant influence. States with stricter recycling laws tend to exhibit higher recycling rates compared to those with less stringent laws. Additionally, studies have indicated that states with stringent laws and deposit policies have higher recycling rates for paper, cans, glass, and plastic, as well as greater recycling rates for plastic bottles (Viscusi et al., 2013; Viscusi et al., 2014).

Despite this, many of the waste collectors we interviewed stated that they prefer the “carrot over the stick”. They have reservations about more drastic measures such as issuing fines or significantly increasing the price level of the residual waste bin. They highlight the possibility of illegal dumping of waste, the breakdown of the relationship they have invested a lot of time and resources in building, and fear that it may do more harm than good.

However, research has revealed a correlation between recycling laws and recycling norms, as households that actively engage in recycling or reside in states with stricter recycling laws are more likely to express dissatisfaction with neighbors who dispose of recyclable materials in their trash (Viscusi et al., 2011; Huber et al., 2018). This suggests that while increased authority may cause temporary harm to the relationship and trust-building process, it can still have a positive long-term reinforcing effect on norms within the population.

Also, Brown & Johnstone (2014) showed that support for such new systems increases with experience. This was also the case in Kristiansand, where the representative explained that the population was skeptical and dissatisfied with the fee per collection at first, but it eventually improved over time. Several representatives have mentioned that new system implementations are often met with some resistance but eventually settle over time.

According to the literature, implementing stricter authority might not imply a complete breakdown of the relationship. Moreover, it suggests that the ECTS are adaptable, and that the support for a new system seems to be increasing over time. It is important to mention that none of them have properly tested the long-term effects of increased authority, so the fear is currently based only on speculation.

Furthermore, Fluet & Mungan (2022) observed that when an actor feels that their actions are being observed, social norms and pressure strongly influence behavior, and the need for authority is not as significant. They also found that in situations with low levels of observation, stricter and more explicit authority is necessary. If we draw parallels from this theory to the situation of waste management companies, bins such as glass & metal, food waste, and cardboard & paper are highly observable, and therefore, the use of authority is less necessary. However, residual waste, on the other hand, is less observable and requires a more explicit authority, as suggested by Fluet & Mungan (2022). Therefore, it is paradoxical that they consistently use more explicit authority to check the other bins while leaving the residual waste untouched.

Nevertheless, there are differences among our representatives and their collection methods. Some have optical sorting facilities and therefore use a single bin for all waste, with sorting done through labeled bags rather than separate bins. The point illustrated above, however, is still applicable to this type of collection, as the residual waste is mostly sorted in white bags in a communal bin. It is worth mentioning that Avfallsservice recently implemented transparent bags for residual waste and believes that this can contribute to increased sorting. This is in the early stages, so the representative had no results on the impact of this change.

Furthermore, there is also a significant difference between the cities and municipalities in Norway both in size, demography and population. There are cities and municipalities with relatively dense populations and a high degree of anonymity, as well as municipalities with fewer residents and relatively low anonymity. The research suggests that trust in the form of social norms and pressure may play a greater role among users when there is greater visibility in the population, and that stricter laws may have stronger effect in larger cities. However, paradoxically, it will be more challenging to maintain and empower authority in larger cities with more anonymity. For instance, in Oslo, with its many residential blocks, it would be more difficult to hold individual consumers accountable for poor recycling practices. Here, one could consider alternative solutions for exercising authority, such as having the housing cooperatives themselves take responsibility for ensuring proper recycling.

As economic transaction theory (Williamson, 1985) tells us, there should be a fundamental governance through the use of price and authority for a relationship to develop. As mentioned earlier, the relationship between the system and ECTS largely begins and operates on trust, as evident from the results. Furthermore, the waste management companies and consumers are mutually dependent on each other, and therefore it is not possible to replace the consumer in this case despite poorly sorted waste. Thus, it is clear that a stricter use of authority should be considered to support the price and trust mechanisms in order to create a more sustainable and well-functioning system. Regarding the significant investment in trust and the fear of jeopardizing it with a stronger grip, this is a trade-off that needs to be evaluated. As the literature mentions, a clearer authority in the long run does not necessarily need to result in a complete breakdown of the relationship with the consumer. It is not unreasonable to assume that the population would have responded negatively to an increasing level of authority that requires them to invest more energy and time in recycling. However, based on the literature and the respondents' own answers, it is not unreasonable to assume that this is something the ECTS could have adapted to over time either.

Governance

Trust is the most prominent control mechanism utilized by the waste management companies we interviewed. It is a low-risk, low-reward control mechanism within waste management governance. It poses minimal potential backlash from consumers compared to other mechanisms, such as price and authority, which can elicit stronger negative responses. However, while trust-building efforts are generally well-received, our results indicate that they often yield modest improvements in recycling behavior.

At the end of each interview, we asked all the representatives, based on what we had discussed, what they believed could be effective governance. To this, the majority of them expressed a suspicion that a combination of mechanisms could be optimal.

“(...) I think that maybe a combination of the three should be good. I believe in trust and spreading a positive message, but that you also need authority and price as well.” -Avfall Sør representative

““I think a balanced composition of all of them is ideal” - Hallingdal representative

“Well, I think there must always be a combination of the three. Yes, they all work in their own way. I think authority is used a little too little.” -Fosen representative

They recognize the importance of employing a balanced utilization of control mechanisms, yet they do not act accordingly. This further reinforces the earlier point that the trust mechanism represents a low-risk, low-reward approach, highlighting the presence of risk aversion among waste management companies in Norway.

Significant investments in trust, both financially and in terms of time, do not appear to generate satisfactory returns, as evidenced by consistently low recovery rates. Based on the insights gathered from the literature, findings, and discussion, we have formulated the following proposition:

To prioritize trust as a control mechanism is not sufficient to effectively govern the relationship between the ECTS and the reverse system. A more balanced governance approach, incorporating greater utilization of price and authority mechanisms, is necessary.

This proposition highlights the need for a comprehensive approach that incorporates trust, price, and authority as interconnected control mechanisms. It emphasizes the importance of balancing these mechanisms to achieve effective governance and address the challenges associated with the ECTS-reverse system relationship. By utilizing price and authority mechanisms, this proposition aims to enhance source sorting efficiency and promote sustainable waste management.

We argue that the key to achieving a higher recycling rate hinges on a more balanced approach to governance. Avfall Sør, achieving a recycling rate of 51%, offers a prime example. With scores of 3 in trust effort, 3 in price effort, and 1 in authority, Avfall Sør demonstrates a more balanced approach compared to other renovation companies. However, their representative still identifies residual waste as the main issue, indicating that hurdles remain despite effort being more evenly distributed in the control mechanisms.

Further, other regions exhibit lower recycling rates and less balanced utilization of the control mechanism. For instance, Oslo, with a recycling rate of 40%, scores 2 in trust, 1 in price, and 1 in authority. Hallingdal Renovation and ReMidt, both with a recycling rate of 32%, score 1 in trust, 1 in price, and 1 in authority, and suffers from underutilization of governance itself.

Avfallsservice AS, despite scoring 2 in both trust and authority and 1 in price, mirrors Oslo's recycling rate of 40%. The newly implemented authority-driven actions at Avfallsservice AS have yet to reflect in their recycling rate, suggesting that the effects of such strategies may require time to materialize as the actions done have only recently been implemented.

Furthermore, when questioned about future strategies to reach this target, the renovation companies primarily proposed minor projects that are unlikely to bring about significant improvements. However, besides minor projects, several renovation companies are considering a state-of-the-art post-sorting facility. This means that there is less need for source sorting at the ECTS-level, as sorting will be done by a machine at the facility. The main argument for such a facility among the representatives was that it could have the potential to significantly improve the material recycling rate.

However, we argue that post-sorting facilities themselves can be a double-edged sword. While they might improve overall recycling efficiency, they may also inadvertently discourage sustainable behavior among the ECTS, as they would no longer be required to source-sort their waste to the current extent. The representative from Hallingdal Renovasjon underscored the fact that it shows a complete disbelief in the ECTS and their ability to source sort, and that it is expensive as well.

A sorting facility would likely be more beneficial in connection with the three largest cities in Norway. Implementing such a facility in Finnmark, for example, would involve sorting a minimal amount of waste and would need to be strategically located between the cities up there to have an effect. This raises the discussion of whether it is sustainable to transport waste over long distances, who would bear the cost, and it also opens up the discussion of different practices in different cities. What message does it convey when all the major cities in Norway have such a facility and hence a low focus on source sorting, while smaller cities are required to use 5 bins for waste sorting? Such facilities, as mentioned, may have a significant impact on the recycling rate. However, they should be implemented with great care.

Further, we argue that the fact that several of the waste management companies have contemplated implementing post-sorting facilities suggests that they recognize the current governing style may not be efficient. Further, implying that the existing level of trust between consumers and the system is damaged. The lack of coherence in the responses regarding long-term strategies, coupled with the diversity of the proposed solutions, illustrates a prevailing

unawareness about how to achieve the national target of a 65% recycling rate. Thereby, strengthening the argument that there is a need for more utilization of price and authority.

We suggest that viable options may be the establishment of national standards and regulations, and the inclusion of additional authorities in the process. A national standardization of what waste to source sort is something the representatives acknowledged could help. Also, a national regulation which allowed for the waste management companies to enforce more authority is something several of the representatives welcomed

Additionally, a carefully implemented weight based PAYT-system can potentially have a strong effect on source-sorting efficiency when the CO₂-fee increases. With the increasing price on emissions, the fee for waste collection will also increase. This increase in fees can be best utilized by implementing variable fees on waste, thereby incentivizing the ECTS to properly sort their waste. However, with regards to waste generation, literature is inconclusive as to whether it affects waste generation in general or not (Dahlen & Lagerkvist, 2010; Morlok et al., 2017).

These measures integrate elements of price and authority controls, and we argue that these can potentially offer a comprehensive, balanced solution that offsets the shortcomings of a trust-dominated system.

However, the notion of increasing the utilization of price without challenges. On the one hand, measures such as the 'polluter pays principle,' could potentially drive a more fair payment system and increase incentives for the ECTS to recycle properly. On the other hand, it can have a negative impact initially, and can also lead to illegal dumping from those who produce the most waste (Heller & Vatn, 2017).

Further, relying too heavily on authority could deter some consumers, potentially reducing overall participation in the recycling process. For instance, despite the potential benefits, the establishment of a more strict national regulation also carries considerable risks and challenges. For one, the introduction of more stringent regulations could potentially lead to 'compliance

fatigue' among the ECTS, ultimately discouraging their participation in the recycling process (Reuters, 2020). Excessive regulatory oversight might foster a sense of resentment, undermining the very trust that is crucial to successful recycling programs. Also, implementing national standards may cause problems for systems that are not capable of adhering to the new standardization. As our results have shown, there is a major demographic and geographic difference between the various reverse systems across Norway, and a one-size-fits-all strategy may require significant resources to implement.

Moreover, implementing national waste management regulations presents a challenging proposition for political parties. While such regulations may be beneficial for effective waste management, they may not be a popular policy among voters. Waste management, although critical, is often not a top-tier issue for most voters who may be more focused on topics like the economy, healthcare, and education. Political parties may not be eager to incorporate national waste management regulations into their campaign platform due to the risk of voters perceiving such actions in negative taste.

However, literature also claims that stringent laws have an effect, and could also help support and enhance the effect of the other governance mechanisms (Viscusi et al., 2023; Emmanouil et al., 2022; Fluet & Mungan, 2022; Williamson, 1985). For instance, in the PAYT-system, there are opportunities to cut corners or evade responsibility unless clear authority is exercised to monitor and hold all participants accountable. We argue that the increased utilization of authority can also reassure residents that everyone is doing their part for the environment, and that everyone is subject to equal guidelines and held equally accountable. This can help create a fair system where all residents are on equal footing. Demonstrating how governance mechanisms can be integrated to enhance each other's effectiveness (Bradach & Eccles, 1989).

Furthermore, we argue that implementing such regulations on a national level might help, to some extent, exempt the renovation companies themselves from the blame or dissatisfaction from the ECTS seeing as it is a regulation passed by the government. Therefore, this might not harm the relationship between the system and the waste collector as much as it potentially could have.

Considering that most representatives mentioned that their main concern with exerting more authority was related to damaging the relationship with the consumers, it could be of great help if this is implemented at the top level and applies to everyone living under Norwegian law. Furthermore, it may help strengthen the theory that exposure can lead to acceptance and strengthen positive social norms (Emmanouil et al., 2022 ; Viscusi et al., 2011; Huber et al., 2018) considering it applies to all Norwegian inhabitants.

“(...) you don't want to impose fines for anything, but generally in society, if you break the law, you receive a fine for it. So it's like if you break the law or violate the rules, there should perhaps be some form of penalty or fine, right?” -Avfallsservice representative

6. Conclusion

The theory of governance within and between firms and systems is well-known and well-studied. However, it has not been used in the literature to explain the recycling behavior gap among the ECTS. In this thesis, we apply economic transaction theory and governance theory to understand how to reduce the gap between intention and action among the ECTS through effective control.

As participants in a reverse system, we can also refer to ourselves as ECTS. Based on literature and our own experiences, the authors have initial insights into how this relationship is governed and have a suspicion that it was inefficient and unbalanced. Literature states that relationships are initially governed through formalities such as price and authority, and that trust is something that is built over time. In contrast to this, the governance of the relationship between the ECTS and the reverse system starts and continues primarily with trust as the main mechanism.

From our findings, we confirm that governance relies heavily on trust and that this is not effective in increasing the material recycling rate and promoting sustainable recycling behavior. The findings add weight to our assertion that to prioritize trust may not serve as a sufficient control mechanism. Additionally,

our research reveals that the renovation companies are uncertain about how to achieve the EU target of 65% material recycling and indicates a growing inclination among stakeholders to explore alternative strategies. This tendency signals an increasing awareness of the limitations of a system that is overly dependent on trust. While trust plays an undeniable role in the relationship between the ECTS and the reverse supply chain, over-reliance on it appears to be a limitation in the current system.

The authors discuss how the control mechanisms of trust, price, and authority should be utilized to effectively govern the relationship. Drawing from literature and our findings to address the research question, we argue that effective governance necessitates a departure from trust-centric strategies and adopting a greater utilization of price and authority. Additionally, we propose an integrated approach that combines these control mechanisms in a balanced manner through a PAYT-system and the implementation of national regulations and increased enforcement of authority, fostering enhanced source sorting efficiency and promoting sustainable recycling behavior. It is important to note that this does not imply a complete abandonment of trust, but rather an approach which acknowledges the fundamental limitations of solely relying on the mechanism. Furthermore, an approach that empowers waste management actors, who are disadvantaged in this relationship, to have greater control and influence over the outcome, as manifested in the material recycling rate.

6.1 Theoretical Implications

This thesis expands the existing theoretical landscape in several meaningful ways. At the core, the research illuminates the nuanced roles of trust, price, and authority as control mechanisms to govern the ECTS-reverse system relationship within the context of recycling and waste management. By providing a detailed examination of these mechanisms, it contributes a novel perspective to governance theory, deepening the understanding of how these mechanisms operate within the reverse supply chain and influence the behavior of the end-consumer-turned-supplier (ECTS).

Moreover, the findings offer valuable insights into the recycling behavior gap and its relation to the role of the ECTS. By providing a comprehensive analysis of this relationship, the thesis enhances how to govern the relationship between the reverse logistic system and the ECTS. The detailed examination of the interplay between trust, price, and authority in shaping recycling behaviors delivers a more nuanced understanding of these complex dynamics.

In addition, the research emphasizes the relatively minimal application of sanctions within the recycling governance. This observation highlights how governance within the context of reverse logistics systems differs to the theory of governance between economic actors. This could lead to a rethinking in governance and control mechanism theory, prompting further examination of the conditions under which sanctions can effectively influence behavior.

Lastly, the thesis offers substantial contributions to theory on sustainable behavior change. By exploring the intricate relationship between the ECTS and the reverse supply chain and the factors that govern recycling behaviors, the research adds depth to the understanding of how to design interventions that successfully promote sustainable practices. This sophisticated understanding of the complex interplay of trust, price, and authority, presented in this thesis, sets a fertile ground for future research in the area of sustainable behavior change.

In these ways, the thesis not only adds new insights to the existing literature but also opens exciting avenues for future theoretical exploration.

6.2 Managerial Implications

The approach to improve recycling rates and achieve the EU's target of 65% recycling by 2035 requires strategic, long-term planning and an effective balance of control mechanisms.

Firstly, the adoption of standardized national waste management and implementation of national regulations is of importance. Despite the challenge in gaining political support, policy makers and waste management organizations should continually advocate for this. They must emphasize the long-term benefits for both environmental conservation and economic prosperity. A clear, nationally standardized system and implementation of national regulations would improve current regional inconsistencies, and would help renovation companies enforce their guidelines, leading to a potential increase in the overall recycling rates.

In parallel with this regulatory standardization, managers in waste management companies should critically reassess their governance. Over-reliance on trust, as the prevailing strategy, appears to yield suboptimal results. A balanced blend of trust, price, and authority mechanisms could lead to improved recycling practices and an increase in sorting rates. Trust retains a vital role in maintaining customer relationships, but the current over dependence on it results in lower recovery rates than other alternatives.

The key to this balanced strategy is strengthening trust-building efforts while also emphasizing authority and price. To make sure everyone follows waste management practices, we suggest exercising authority as needed. Even if direct intervention is occasionally required, the presence of an authority can prevent unwanted behavior. Managers should effectively communicate this dual approach, fostering trust and exerting authority to consumers. In doing so, they highlight the shared responsibility for effective waste management.

Furthermore, with the reported increase in CO₂ emissions, a PAYT (Pay-As-You-Throw) system would contribute to making the price more equitable for consumers by adhering to the polluter-pay principle. At the same time, such a variable fee on residual waste would incentivize appropriate behavior. This

also requires a good and balanced approach to governance, utilizing trust to inform and encourage system usage, and authority to ensure that everyone follows the same rules and safeguards the integrity of the system.

Given the EU's recycling target, it's clear that isolated projects and short-term strategies are insufficient. Long-term strategic planning is required. Waste management companies should contemplate significant investments in technology, infrastructure, and public education programs to encourage source sorting. Collaborations with policy makers to support beneficial regulations and standards should also form a key aspect of their strategic planning.

By combining national regulations and standardization, PAYT-systems, enforcement measures, and strategic long-term planning, waste management companies can make substantial strides toward achieving the recycling targets set for 2035.

6.3 Future research

Future research should be directed towards further analyzing the potential influence and impact of standardized national waste management regulations on recycling rates. A comparative examination of countries that have already implemented such standards can provide valuable insights into the outcomes of such regulatory measures. This research could serve as the foundation for modeling the possible impact of similar regulations within the Norwegian waste management context.

Additionally, the exploration of the balanced control mechanisms of trust, price, and authority in waste management practices remains a vital area for further study. The aim would be to determine which balance of these mechanisms can yield optimal recycling rates, and how changes or shifts in one mechanism can impact the effectiveness of the others. Detailed empirical investigations are required to fully understand the intricate dynamics among these three key mechanisms.

Simultaneously, a thorough examination of the most effective strategies for implementing authority enforcement measures, while maintaining public trust and cooperation, is needed. Research in this area might involve studying successful case studies from different contexts or countries and theoretical investigations of the psychological and sociological factors that shape responses. This knowledge could prove invaluable in developing authority-based mechanisms that enhance recycling rates without negatively impacting public trust.

Furthermore, further research should be conducted on the impact of a PAYT system on waste generation. In addition to this, a closer examination is needed to determine the optimal characteristics of such a system in Norway in order to achieve maximum effectiveness

Lastly, it is apparent that more minor initiatives may not generate the substantial improvements in recycling rates necessary to meet the EU's target by 2035. Therefore, an examination of long-term strategic planning and investments is needed. This investigation should identify what forms of strategic planning, and the nature of investments, produce the best outcomes. Such research would contribute to an understanding of how to prioritize and allocate resources in the long run to support recycling goals.

Through a comprehensive examination of these interconnected aspects, future research could significantly contribute to the development of effective, sustainable strategies to improve recycling rates.

6.4 Limitations

Sample Size: The sample size for this research was limited to six renovation companies. While this provides insight into diverse geographic locations and waste management systems in Norway, it does not necessarily represent the entirety of municipalities in the country. Hence, the findings from this thesis may lack transferability to the wider context of Norway.

Research Design: While the qualitative design utilized in this thesis has the advantage of providing in-depth insights, it does not capture the quantitative aspects of waste management, such as measuring the exact impact of different recycling strategies. A mixed-methods approach, combining quantitative data with qualitative insights, could be beneficial in future research for a more comprehensive understanding.

Reliance on Self-Reported Data: The data gathered through semi-structured interviews relies heavily on the personal perceptions and experiences of the respondents. This introduces potential bias, as participants might portray their programs in an overly positive light, or they may not be entirely familiar with all the operational details. Future studies could seek to validate the self-reported data with other objective sources of information. Furthermore, as several of the renovation companies have not disclosed their material recycling rate publicly, we rely on the information they provided in the interview.

Interpretation Bias: Inherent in any qualitative research, there's a potential for the researchers' biases to influence how they interpret and represent the information collected during the interviews. Mitigating this bias could involve steps like having multiple researchers independently analyze the data, or involving other stakeholders in the analysis process, ensuring a more balanced interpretation.

Lack of Longitudinal Perspective: The research provides a snapshot of the situation at a specific point in time, and does not consider the potential impact of dynamic changes such as policy revisions, technological advancements, or societal attitude shifts towards recycling. Future research should consider a longitudinal design, tracking the evolution of waste management strategies and their impacts over time. This would offer a more comprehensive understanding of the complexities and dynamics of recycling management within municipalities.

Lack of existing literature: The current literature on trust, price, and authority within the waste management field, particularly in relation to consumer - reverse system relationship, reveals a notable gap. Specifically in terms of

providing comprehensive and concrete definitions and operationalization of the control mechanisms. This presented a limitation to our thesis as we had to extrapolate and refine definitions from available literature. The limitations we faced underscore the need for more rigorous and context-specific studies in this field.

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Appendix

Interview guide

- What is your perspective on the consumer? (Willingness to recycle, trust, knowledge, etc.). Characteristics of the consumer.
- How do you measure and evaluate the effectiveness of your recycling program?
- How has the recycling rate of the population changed while you have been working there? (Recycling trend).

Trust:

- a. How do you build trust among residents regarding the recycling system?
 - Do you feel that residents trust that their waste is being handled correctly?
- b. How much trust do you have in the consumer? (Recycling rate, recycling habits)
 - Why or why not?
- c. How significant do you think social norms, social pressure, and mutual trust between the consumer and the system play a role in recycling behavior?
 - Have you observed a change in the population's attitude towards recycling in recent years?
- d. What measures are in place to engage residents in promoting trust, creating norms, and encouraging active participation in the recycling system?
 - Are there any initiatives in educational or workplace settings - social initiatives or campaigns?

Price:

- a. How is the pricing structure for waste management and recycling services determined?
 - *** Does the cost associated with poor recycling fall on the municipality, or is it reflected in higher waste management costs for consumers?

- b. Are there any financial incentives in place to encourage residents to recycle?
- c. How has this pricing (and any incentives) affected the recycling rate and general waste reduction efforts?

Authority:

- a. Are there any laws in place that give you the authority to enforce recycling rules?
 - If so, what fines and/or sanctions are involved?
 - If so, is this implemented in practice? Why or why not?
- b. What mechanisms/authorities are in place to monitor compliance and enforce recycling rules?
- c. How do they contribute to improving the recycling rate?

Miscellaneous questions:

- What (other) measures has the municipality implemented to increase the recycling rate among residents?
 - To what extent has this influenced the recycling rate?
 - Data?
 - In light of everything we have discussed, which mechanism is most prominent in the specific municipality? (Trust, price, or authority)?
 - What future developments do you anticipate for waste management in your municipality?
 - How do you envision recycling rules, norms, and similar aspects in the future?

NOTE:

[These questions are only meant as a guidance and depending on the flow of the conversation.