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Investigating Producer Responsibility Organisations for WEEE

Case Study of Nokia
in Finland, Sweden and the UK

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Abstract

The WEEE Directive requires the producers to fulfil e-waste compliance according to the extended producer responsibility (EPR) principle. In order for producers to comply with the requirements nationally, collective compliance schemes were formed. Usually the manufacturers join together and form producer responsibility organisations (PROs) which take the responsibility for organising the waste management of products entirely, and allocate costs to the producers fairly, as well as report to the national governments.

The main aim of this thesis is to contribute to an understanding on the selected aspects of PROs from the manufacturer's point of view, by highlighting the similarities and differences in case countries Finland, Sweden and the UK. Specific focus is on the potential for manufacturers to influence the actions of PROs. The thesis maps out the WEEE PROs and the operating environments for the multinational mobile phone manufacturer Nokia. Other producers, municipalities, recyclers and authorities are also considered when viewing the competitive multi-stakeholder system.

In order to find out whether the PROs and producers uphold common goals, and whether information is transparent, multiple agent framework by Waterman and Meier (1998) based on agency theory was evaluated in each of the case countries. The national EPR systems were estimated with regard to responsibilities suggested by Lindhqvist (1998). The findings show how the producers' opportunities to influence their PRO's decision making processes are seen by both stakeholders. It is further evaluated whether a consensus exists between the producers and the PRO's views on the WEEE management. Moreover, the thesis found that important aspects for reaching the consensus were shared opinions about economic and physical responsibility, transparent information and the set-up of the PRO.

Keywords: Producer Responsibility Organisation (PRO), Extended Producer Responsibility (EPR), Waste Electrical and Electronic Equipment (WEEE), Nokia, Agency Theory

Executive Summary

The WEEE Directive (2012/19/EU) in Europe has made the producers of electrical and electronic equipment (EEE) responsible for managing the future waste of their own products since 2005, and also to be collectively held accountable for the waste electrical and electronic equipment (WEEE) generated before that. In order for the EEE industry to comply with the WEEE Directive's requirements nationally, collective compliance schemes have been formed. These national collection schemes were founded through many different mechanisms in order to gain benefits of scale and to suit different producers and product groups. Usually the manufacturers join forces to acquire these benefits and form producer responsibility organisations (PROs). The PROs typically take the responsibility for organising waste collection from specified collection points, coordinating and managing the logistics and recycling of the waste and fairly allocating costs for this to the producers, as well as reporting to the national governments which in turn report to the European authorities. In 2007 there were nearly 130 WEEE PROs in Europe. (Mayers, 2007).

The set-up in different countries for the WEEE PROs varies a lot; in some countries there is only one responsible PRO whereas others full competition between the PROs prevails, whereby the manufacturers can choose which one to use. The main aim of this research is to understand deeper about the selected aspects of WEEE PROs from a manufacturers' point of view, by highlighting the similarities and differences in Finland, Sweden and the UK which were the three case countries examined. A special emphasis is placed on the potential for manufacturers to influence the actions of PROs. This thesis maps out the WEEE PROs which the multinational mobile phone manufacturer Nokia uses in these three countries, in order to understand the diversity the PROs in different countries, both in theory and practice. Other producers, municipalities, recyclers and authorities will also be considered when viewing the competitive multi-stakeholder nature of the system.

In order to answer the problem outlined above, the following research questions were defined:

RQ1: What are the current set-ups of the WEEE PROs and how do they contribute to the differences in manufacturer–PRO relationships?

- *What are the legal requirements for the product take-back and information provision, and are they in line with actual practice?*
- *How does the structure of a WEEE PRO affect the manufacturing companies' opportunities to have influence on the PRO decisions and actions?*
- *How do the operations of WEEE PROs correspond to the expectations of the manufacturer?*

RQ2: How do the other stakeholders affect the WEEE management system in the case country?

Different extended producer responsibility (EPR) programmes set different requirements for the producers. Following the categorisation of the responsibilities suggested by Lindhqvist (1998), the thesis first compares the national WEEE responsibilities in each case country to those in the other countries. Another theory used in this thesis is agency theory, also known as principal-agent theory; and specifically a multiple-actor scenario proposed by Waterman and Meier (1998). The theory examines and combines multiple-agent studies before summing up several scenarios. As variables this thesis uses information and goal conflict vs. goal consensus. Eight potential scenarios proposed by Waterman and Meier (1998) were evaluated in each of the case countries.

The research findings showed that *economic responsibility* in all of the case countries is allocated to the producers in line with the WEEE Directive. The producers are obliged to respond to the economic liability on their own but they are also given the option to join a common scheme and to transfer the economic responsibility to a PRO. Costs for the producers in the PRO very concretely affect the relationship between the actors. Producers expect to see value for their fee payments and if the prices increase excessively they can either change the PRO, or in some cases, bring the price issue to the attention of the board (specifically in PROs where producers are the proprietor members).

Physical responsibility varies slightly between the case countries. The principle these countries have in common is that the producers are primarily responsible for organising the physical collection, treatment and recycling of the waste, and then pay up accordingly. The physical responsibility is very much in the interest of each stakeholder. It became apparent that the producers and the PROs share the goal of collecting the required quantities and more wherever possible. In a principal-agent setting, the consent over physical responsibility was the biggest consensus the producers and the PROs in each of the countries had in common.

In all of the cases the stakeholders are obliged to report the WEEE data forward. *Information* was a significant element in the principal-agent evaluations. Information sharing, transparency and the activeness of the parties in utilising the data were assessed in all cases. In each separate case country the message from the manufacturers was the same: Information supply from the PRO is currently sufficient even to the extent that the producer does not have time or even the interest to review all of it.

When other elements were taken into account in the principal-agent setting between the manufacturers and PROs, the *ownership structure* became of one of the key fundamentals where the producer's opportunities to influence the decision making in the PRO were evaluated. In Finland and Sweden Nokia was one of the founding members of its PROs, whereas in the UK the company merely purchases service from a private actor. In the two Nordic countries the manufacturers are still owner members of their PROs and hence were included in the decision making processes by design.

During the interviews it also became evident that *other stakeholders* have influenced the WEEE management system in the countries in question, and simultaneously the operating scenario between the producers and PROs. Other stakeholders in this study include recyclers, authorities, and municipalities. In all the countries the stakeholder groups were consulted on the establishing of the WEEE legislation, and the dialogue has been open between government authorities and the other actors. Especially in the Nordic countries the interaction between all the stakeholders is very informal and for instance the threshold to contact other actors for a discussion relating to the WEEE issues is very low. In the UK the different parties do not have as direct a way of communicating with each other.

The WEEE PROs have found a balance after operating for seven years since the transposition of the WEEE Directive. They are now aiming to form the best practices in the field of e-waste management. Despite the differences in the foundations of the PROs and the current operating systems, at the end of the day the principal-agent relationship is rather similar in each of the case countries. The PROs provide information to the principals in a transparent manner, and it is up to the manufacturers themselves to what extent they use it, or not. Thus, the Scenario 6 by Waterman and Meier (1998) was the most dominant. In this scenario the principal and the agent hold a goal consensus and share all the relevant information. In several cases the producers were not keen to familiarise themselves with all the data available, and hence it could be thought that the information asymmetry defined in the Waterman and Meier

(1998) Scenario 7 occurs. A majority of the producer interviewees were of the opinion that they have outsourced their WEEE responsibility to the PROs and therefore they expect the PROs to manage the process fully without producers interfering. The main expectation of the producers from the PRO was the assurance of legal compliance; they saw it being fulfilled and thus were satisfied.

It is recommended that at least the current status of the WEEE and PRO related activities is maintained by Nokia. Increasing the awareness of WEEE issues internally can enhance the common aims of the company with regard to waste prevention and eventually even advanced change of design the products. Academic research on PROs is currently rather scarce and more research is required in order to get a fuller view of the issues in different settings and with different types of producers.

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Abbreviations

EC	European Community
EEE	Electrical and electronic equipment
EoL	End-of-life
EPA	Environmental Protection Agency
EPR	Extended Producer responsibility
EU	European Union
EuP	Energy-Using Products
EÅF	Elektronisk Återvinning I Sverige Ekonomisk Förening – A Swedish PRO
HP	Hewlett-Packard
ICT	Information and communication technology
IPR	Individual Producer Responsibility
MTB	MobilTeleBranschen – The Swedish mobile phone industry branch organisation
NIEA	Northern Ireland Environment Agency
PCS	Producer Compliance Scheme
PRO	Producer Responsibility Organisations
RoHS	Restriction of Hazardous Substances
SEPA	Scottish Environment Protection Agency
WEEE	Waste electrical and electronic equipment

1 Introduction

This chapter will give a short overview on the thesis by explaining the background and then presenting the problem definition of the topic. Based on the problem setting the thesis objective and research questions are formed and introduced in chapter 1.3 after which the research methodology with case study approach and data collection analysis are described. The limitations and scope of the thesis are presented before the whole thesis' disposition.

1.1 Background

Information and communication technology (ICT) equipment has grown rapidly during the two last decades. The mobile phone industry is one of the fastest growing businesses as phones have become commodities that more consumers have access to. Mobile phones have become much more than just devices for making phone calls. They are used as cameras, Internet browsers and game consoles among other functions (Arce, 2007; Tojo, 2004). The total sale of mobile phones worldwide was 1.8 billion devices in 2011 equalling an annual increase of 11% in sales (Gartner, 2012). This sets challenges for the mobile phone manufacturers to meet the producer responsibilities for the growing device volumes in their end-of-life phase. (Tojo & Manomaivibool, 2011)

Like many other electrical and electronic equipment, mobile phones contain several precious metals that need to be directed to correct waste streams in order for them to be captured for recycling. Also, hazardous treatment processes require extra caution at the end-of-life phase specifically for the avoidance of the hazard to human health or the environment. The concerns have commenced political actions in the European Community (EC) to control the growing waste streams from household consumption through different Directives. The Directives have been among the first European environmental laws that are based on *extended producer responsibility* (EPR) which aims to make the producers responsible for their own products' end-of-life (EoL) (Kroepelien, 2000). One of these is the Directive on Waste Electrical and Electronic Equipment (WEEE). It is one of the main aims of the EC to enhance the environmental and sustainable development by changing current patterns of behaviour and consumption. The aims of the Directive are designed to be reached by "the reduction of wasteful consumption of natural resources and the prevention of pollution" and it is aiming towards that by setting a framework for waste prevention, recovery and safe disposal (2002/96/EC, 2002).

Since 2005 the producers of electrical and electronic equipment (EEE) have been responsible for managing the future waste of their own products they put on an EU market by the WEEE Directive. Simultaneously the WEEE also brought a collective responsibility to the EEE industry for the products sold before 2005. In order for EEE industry to comply nationally with the set collection and recycling targets several different collective compliance schemes were formed. These national collection schemes were founded through many different mechanisms in order to gain scale benefits and suit different producers and product groups. The manufacturers may join together to acquire benefits of scale and form ***producer responsibility organisations*** (PROs), but also different waste management companies can provide different national collective producer compliance scheme (PCS) services. Other associations are also common; waste management and logistics companies could also provide compliancy services which can serve as agents for the producers' waste handling through establishing PCSs. PROs are created for arranging the pick-up of the waste from designated retailer or public waste points, treating and recycling the waste correctly and reporting the results to the national governments (Mayers, 2007).

1.2 Problem Definition

Amongst other requirements, the WEEE Directive sets requirements for collection and recycling that need to be achieved by the producers. There were 129 WEEE PROs operating in Europe in 2007 (Mayers, 2007). They are each operating under the national legislation that is formed according to the EU Directive. The set-up for the WEEE producer responsibility organisations between countries varies a lot; in some countries there is only one responsible PRO whereas in others there is competition between the PROs, and the manufacturers can choose between them. Competition occurs between the PROs to keep up their compliance and especially collect enough WEEE to meet these compliance requirements.

Over 10,000 producers in the IT, telecommunication equipment and consumer electronics industry that put products on the market in Europe are responsible for managing their waste collection with over 80,000 different municipalities with multiple collection points around Europe (Mayers, 2007). A situation where the manufacturer has the freedom to choose between various WEEE PROs can actually be a true challenge. For a manufacturer – like Nokia – which is operating in each European country, this means an immense task of finding at least 27 of the most suitable WEEE PROs out of all the 129 possible ones.

The pressure to find solutions for the sustainable management of growing waste streams and their reduction is still present and EPR can provide useful policy tools in engaging the producers genuinely in the waste prevention aims. However, research about concrete means of manufacturing companies to comply with the EPR based regulations has not been broadly researched. The implementation of the Directive varies in different European countries which each bring their own challenges to the field (Mayers, 2007). In particular due to the large amount and diversity between PRO practices around Europe, they have not been widely researched. The lack of precise research shows the need for this study. Nokia as a multinational mobile phone producer is in need for this kind of a study, not only in theory but very much in practice as well. The company is trying to cope in the diverse field of PROs in different countries in order to meet all the requirements of the different stakeholders while simultaneously striving to choose the PRO to its own benefit where ever feasible.

This study looks at different operational aspects of WEEE PROs in different countries. The special interest lies in the relationships between the actors – especially between the PROs themselves and the case company Nokia. Other producers, municipalities, recyclers and different authorities will be also considered when viewing the competitive multi-stakeholder environment of the field.

1.3 Objective and research questions

The main aim of this research is to contribute to a good understanding on the selected aspects of PROs from a manufacturers' point of view, by highlighting the similarities and differences of three case countries. This is carried with a specific focus on the potential for manufacturers to influence the actions of PROs. The thesis maps out the producer responsibility organisations for WEEE that the multinational mobile phone manufacturer Nokia is dealing with in order to understand the diversity of the different PROs for WEEE in different countries both in theory and practice. The growing responsibility requirements on the electrical and electronic equipment industry require more focus from the producers on EPR. By signing up with different PRO or PCS (producer compliance scheme) Nokia is transferring its responsibility to them and thus is responding to the legal and social requirements according to WEEE.

In order to analyse the background for the current state and find out the possibilities for manufacturers to influence on their PROs the following research questions have been developed:

RQ1: What are the current set-ups of the WEEE PROs and how do they contribute to the differences in manufacturer–PRO relationships?

- *What are the legal requirements for the product take-back and information provision, and are they in line with actual practice?*
- *How does the structure of a WEEE PRO affect the manufacturing companies' opportunities to have influence on the PRO decisions and actions?*
- *How do the operations of WEEE PROs correspond to the expectations of the manufacturer?*

RQ2: How do the other stakeholders affect the WEEE management system in the case country?

In this research I try to understand if and how the PROs start to work as independent agents and how the company should actually interact with them. The PROs fulfil the responsibility of various EEE producers, including producers of mobile phones, collectively, but in the end it is the manufacturer which needs to take responsibility to fulfil the requirements individually. The aim is to map out the practicalities in the responsibility structure. Hence, it is interesting to point out the actual structure and set-up of different WEEE PROs in different countries. An underlining question is, what kind of possibilities the producers actually have when it comes to influencing the PRO's decision making and actions they belong to and how product related feedback to producers is managed. The legal requirements and theory can vary from the practice; hence it will be necessary to view carefully both aspects when it comes to the product take-back in practice, information provided and agreements between the actors. It is also relevant to find out how an individual producer can interact with the other stakeholders including the PROs, recyclers and municipalities. Competition over the waste is increasing and the changing e-waste flow patterns are making the end-of-life mobile phone collection even harder for the manufacturers that have annual collection targets. As well as this 30-50% of e-waste is collected outside the manufacturers' collection systems for reuse and recovery elsewhere – through formal and also informal channels of export (Castrén, 2012; Salehabadi, 2012).

1.4 Methodology

1.4.1 The case study approach

This thesis is conducted as a multiple-case study using three different PROs from different countries as the cases. However, the study has another case perspective as well; it is done specifically from mobile phone manufacturer Nokia's point of view. This is called an embedded multiple-case study (Yin, 2003). In this kind of study the cases can be analysed on the individual level, on country specific PRO level in this thesis, and later on by pulling the findings together on a common level; from Nokia Europe's point of view.

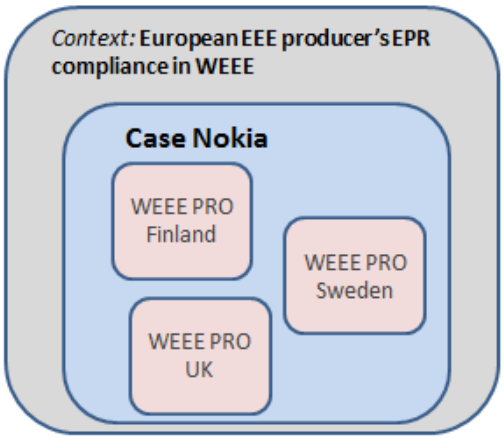

Figure 1-1. Embedded multiple-case design developed by the author based on Yin (2003).

All together the study is a comparative research within the multiple-case study. Comparative research evaluates the differences and similarities between entities; in this matter national PROs as case studies. In this specific instance the cross-national comparisons takes a central role. The examination of similarities meant application of a more general theory and a search for more universal patterns. Comparing also the differences between the case PROs also has its benefits: revealing distinctive aspects of a particular case could otherwise have been almost impossible to detect. (Mills, 2008)

It has been argued that case selection is one of the most critical problems in comparative research. Even when the case PROs were chosen and the selection was seemingly objective in order to find relevant data, they might have contained also irrelevant data or smaller sub-cases that can affect the results. In the three chosen PROs in this thesis the diversity in the national characteristics cause some data variance. In order to be able to ensure the measuring validity of this cross-national comparison, the construct equivalence is ensured. Construct equivalence refers to when the measures between the case characteristics are categorised and measured similarly. (Mills, 2008).

In this study the individual case WEEE PROs are observed from the same points of view. In doing so, I start by mapping out the national legal frameworks that have the WEEE Directive as the bottom line. After this, the PROs' set-up is opened up. This is done by interviews and reviews on PROs own materials that are provided to external stakeholders. PRO set-up includes specifications about the form of the PRO, waste collection management, logistics, as well as the recycling itself. The competitive environment is also analysed; this includes mapping out the competing producers, government authorities, municipalities and recyclers that are operating in the same recycling markets as the PROs, and through them influencing the manufacturers themselves.

The PROs are initially formed by the producers themselves. The producers are the main stakeholders but the actual governance of the PROs is conducted by third party independent actors that represent the PRO. Due to the diversity of electrical and electronic device producers that belong to the PROs the individual interests may vary significantly. The PROs are attempting to respond to all the needs of their members, but finding a golden mean for example between a white good manufacturer's needs and a mobile phone manufacturer's needs can turn out to be challenging. If the manufacturers do not have a strong enough

connection to the PRO there is a potential risk that it starts to operate according to its own preferences instead of the owning manufacturers' preferences. (Castrén, 2012).

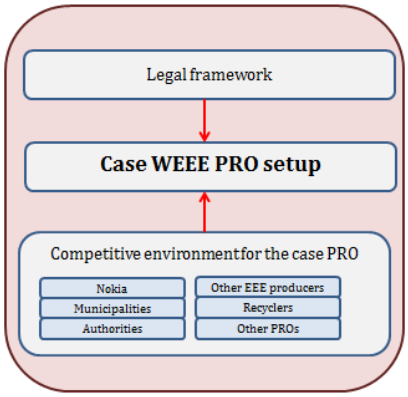

Figure 1-2. Country specific WEEE PRO research frame.

This thesis was conducted with three specific cases that were bound together in the case of Nokia at European level. The study follows Yin's (2003) replication approach to multiple-case studies. First the underlining theory selection was developed while making the literature review, after which the cases were selected and the data collection protocol designed. After this, each of the individual case data collection is conducted separately and the individual case reports presented. The next step is the presentation of the cross-case conclusions specifically from Nokia's point of view which itself was aiming to answer the first research question. The four last stages in Yin's (2003) model are combined in the discussion section where the cross-case analysis is conducted and discussed as well as recommendations given to the case company concerning the findings. Future research is also considered at the end of the thesis.

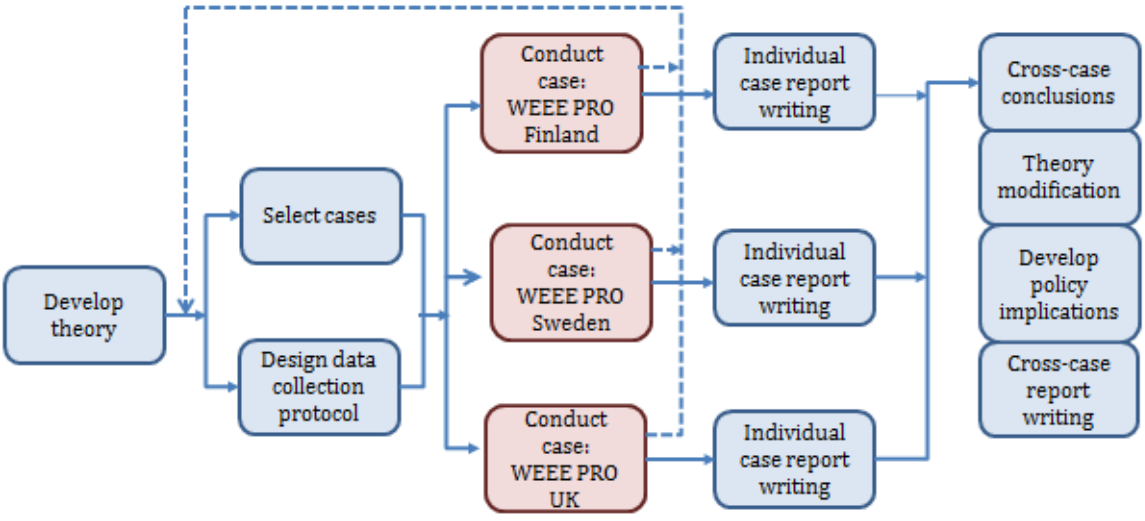

Figure 1-3. Case study method for multiple-case WEEE PRO research adapted from Yin (2003).

1.4.2 Data collection and analysis

The research questions addressed in this thesis are approached using qualitative research methods. The main elements of the study and the primary data source are the interviews that were conducted within the case company and also with the other stakeholders, including the specific PROs. The study will be strengthened with the secondary data, inter alia literature review and material reviews from the relevant stakeholders' web pages, legal texts as well as academic literature. The interviews are going to be conducted mostly via telephone and email inquiries.

Several semi-structured stakeholder interviews were conducted in the study. Data from different literature sources are also used including previous academic research, legal frameworks as well as the PROs' own external communication. Multiple data sources were used in order to ensure the data reliability (Yin, 2003). The 29 interviewees formed an important part of the study, as they were providing reflections on the relationship between the official information and real life practical experiences. In the study there were interviews of environmental representatives from Nokia responsible for national WEEE issues, representatives from different PROs, WEEE specialists from recyclers and municipalities as well as responsible WEEE authorities. Furhtermore, other EEE manufacturers were interviewed in order to get different perspectives inside the PROs. A list with detailed information of the interviewees can be found in the Appendix I.

After a comprehensive data collection from the academic literature and different external information materials as well as interviews, analysis was done in order to reach the conclusions and also to ensure the data validity. By establishing causal relationships between the data and finding possibilities to generalize, both internal and external validity of the study were reached (Yin, 2003). The data was analysed through the EPR responsibility theory by Lindhqvist (1998) and multiple principal-agent scenarios by Waterman and Meier (1998). Both of these frameworks are presented in chapter 2 of the thesis. The first step is to analyse each case country separately and at the end the cases will be compared with each other in a cross-country analysis section.

1.5 Limitations and scope

The study is focusing on the WEEE PROs specifically from the manufacturer's point of view, concentrating on the EEE industry. This study is conducted as a case study for mobile phone manufacturer Nokia and hence the company is under closer examination throughout the thesis. In addition to the review of the current situation the study investigates the relationships between the manufacturers and the PROs. The European WEEE Directive has several modes of implementation in each country and the operating environment for a multinational company like Nokia varies as well. The company has to cope in different ways in each country and thus three cases were chosen for closer inspection: Finland, Sweden and the UK. The cases are chosen to represent different types of national PRO systems in order to be able to compare different features.

Nokia is involved with several PROs through its products. In addition to the WEEE the company is also responsible for the end-of-life management of packaging waste as well as batteries. Where mentioned, others than WEEE PROs are mentioned only in brief and on a general level in this thesis and elsewhere excluded in order to keep the focus on the WEEE. By having the specific scope on WEEE it is possible to get a good understanding about specific characteristics within the studied PROs.

Research about extended producer responsibility has been done since the 1990's. Nevertheless only a little research exists on the PROs that were established in Europe. This forms the research gap that this thesis is aiming to confront. This presented its own limitations as the lack of previous similar cases meant lack of possibilities to reflect on the findings. However, this also gave some freedom to choose the research methods and focus areas.

Other stakeholders that are included in this study are recyclers, municipalities, governmental authorities and competing PROs as well as other EEE producers. These were included due their close relationship and cooperative chain with the PROs' operations in WEEE management. Retailers were scoped out from the study. They are mentioned as stakeholder group in the WEEE Directive, but were earlier left out as official stakeholders of the system in several countries through strong lobbying of the retail sector, for instance in Finland. The retailers however are an interesting group and a separate study could be conducted later especially now that the WEEE Directive recast is giving more emphasis on them.

The data collection happened inter alia through interviews. The personal opinions and biased viewpoints of respondents could have affected the results of the interviews. However, by having a wide range of interviewees the data validity was improved. The data collection period during the summer holidays affected the reachability of the intended interviewees. This however was not too critical as the interview period was lengthened over the main summer months and the respondents were reached either before or after their holidays. Another limitation can be seen in the accessibility of the small and medium size producers: These producers represent the most passive group in the PROs and hence were not reached even for this study.

1.6 Disposition

The structure of this thesis is following:

Chapter 1 introduces the topic and the objectives of the thesis. Research questions and the methodology are presented here also.

Chapter 2 provides a literature analysis on extended producer responsibility, WEEE and producer responsibility organisations in general and specifically in the case of mobile phones. Also agency theory is presented in this chapter.

Chapter 3 is giving an overview of the case company Nokia.

Chapter 4 is presenting the PROs for Nokia in three European case countries. In each of these the national legislation, general PRO set-up as well as s competitive environment are portrayed. The first research question is addressed here.

Chapter 5 goes more into detail on the case company Nokia and the mobile phone industry. The findings from chapter 4 are pulled together and reflected through the company's operating environment.

Chapter 6 is a cross-case analysis in more detail and the chapter discusses the implications of the research questions.

Chapter 7 concludes the thesis and outlines PRO interaction recommendations for the case company as well as presents suggestions for the future research.

2 EPR for EEE, Producer Responsibility Organisation and Agency Theory

This chapter presents the theoretical framework for this thesis based on the literature review. Subjects are extended producer responsibility, European WEEE Directive and other WEEE issues as well producer responsibility organisations. These are reviewed in order to get a comprehensive understanding upon the theory and EU regulation on the thesis topic. After these the agency theory is introduced and by combining the above mentioned areas, the thesis framework is formed.

2.1 Extended producer responsibility

Extended producer responsibility (EPR) was introduced in the early 1990s as a means to improve environmental performance of products and their supporting systems. The concept places some responsibilities on the producers for the environmental impacts of the products at their end-of-life stage (Fleckinger & Glachant, 2010; Wiesmeth & Häckl, 2011).

The EPR concept was introduced by Lindhqvist in 1990 whose formal definition for the concept has been expressed as follows:

> *"Extended Producer Responsibility is an environmental protection strategy to reach an environmental objective of a decreased total environmental impact from a product, by making the manufacturer of the product responsible for the entire life-cycle of the product and especially for the take-back, recycling and final disposal of the product. The Extended Producer Responsibility is implemented through administrative, economic and informative instruments. The composition of these instruments determines the precise form of the Extended Producer Responsibility." (Lindhqvist, 2000)*

The means to EPR programmes is to shift the indirect environmental costs at the product end-of-life, waste management costs, from local authorities and taxpayers back to the parties that are responsible for bringing the product on the market. Especially in OECD's (2001) definition, the concept is specifically focusing on the end-of-life stage of a product. (Grimes, Cahill, & Wilson, 2011; Kroepelien, 2000; Lindhqvist, 2000).

EPR as a waste management measure was first taken in use in Germany, Austria, Belgium and France in the beginning of the 1990's. Their national policies were used as a guideline for the following EU WEEE legislation which is today implemented in different ways. The member state specific practices vary from mandatory regulations to voluntary agreements between authorities and manufacturers and voluntary industry actions. EPR has become an increasingly popular policy concept in solving waste management issues when it comes to specifying both physical and financial responsibilities. These responsibilities have taken the forms of prioritising waste prevention measures over end-of-pipe solutions, promoting life cycle thinking and a shift to a goal-oriented approach. Part of EPR programmes goal-oriented approach is to offer incentives to the producers for making changes at source by reducing use of primary resources, to promote use of secondary materials and to make initiatives for product design change in order to reduce waste. It is expected that EPR programmes enhance these actions as well as recycling. EPR looks for integrating the environmental characteristics of products and production processes throughout the product chain (Fleckinger & Glachant, 2010; Grimes et al., 2011; OECD, 2001; Tojo, 2004).

Wiesmeth and Häckl (2011) state that EPR is trying to find a holistic solution towards upstream producers. However, they underline that the research should also focus on the

consumer behaviour, as the individuals' demands often affect the product design which will eventually affect the product end-of-life management as well. The upstream producers have started looking for the possibility of designing downstream infrastructure that would benefit the manufacturers' efforts in the end-of-life management. Producers are meant to be incentivised to better upstream solutions in design by including feedback from downstream infrastructure like recycling. In her research Tojo (2004) states that in order to advance upstream changes the implementation of downstream infrastructure should be efficient. Tojo breaks down the different elements of the activities in a framework for downstream infrastructure for an EPR programme.

The EPR programmes also aim to address inadequacy in the existing waste management systems and to improve them. For instance separation of toxic substances from a bigger waste stream requires expertise and knowledge that cannot be reached in the basic municipal waste systems. Hence, the programmes are often including private actors in order to ensure better efficiency in the practices like in logistics for transportation, safe and correct separation and recycling technologies. The establishment of product group specific collection and recycling systems supports the objectives of closing material loops. This is seen as a possibility by the manufacturers to be more involved and to gain the materials of the discarded products in their own upstream processes. Moreover this aims to increase the manufacturer's awareness of the whole end-of-life process of a product and in the optimal case also make it influence the design phase. The consideration of the whole process, all the way from the design phase to the end-of-life, is differentiating EPR from an ordinary take-back system (Lindhqvist, 2000; Tojo, 2004).

Different EPR programmes set different responsibilities for the producers and this will be reflected upon in the coming chapters where the case country EPR's for WEEE are reviewed. The differing responsibilities can be set in different categories: economic responsibility, liability and physical responsibility as well as informative responsibility and they have been defined as follows: (Lindhqvist, 1998).

> *"**Liability** refers to a responsibility for proven environmental damages caused by the product in question. The extent of the liability is determined by legislation and may embrace different parts of the life-cycle of the product, including usage and final disposal.*
>
> ***Economic responsibility** means that the producer will cover all or part of the costs for e.g. the collection, recycling or final disposal of the products he is manufacturing. These costs could be paid for directly by the producer or by a special fee.*
>
> ***Physical responsibility** is used to characterise the systems where the manufacturer is involved in the actual physical management of the products or of the effects of the products. The manufacturer may also retain the **ownership** of his products throughout their life cycle, and consequently also be linked to the environmental problems of the product.*
>
> ***Informative responsibility** signifies several different possibilities to extend responsibility for the products by requiring the producers to supply information on the environmental properties of the products he is manufacturing."*

The case EPR systems will be viewed by categorising the responsibility in accordance with the definition above in order to clarify the main responsibilities given in the respective national legislation. The three most suitable categories for this study that will be used are the economic, physical and informative responsibility.

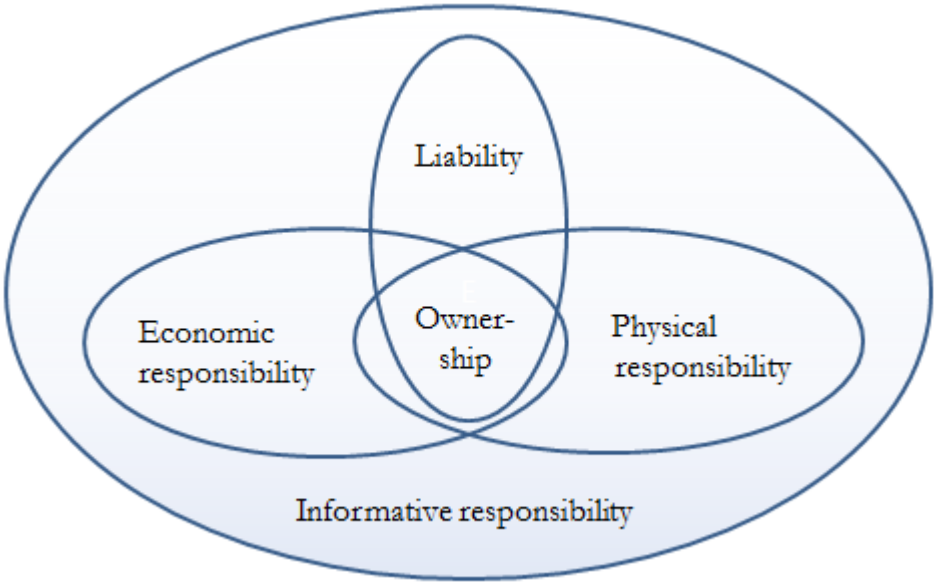

Figure 2-1. Models for Extended Producer Responsibility after Lindhqvist (2000)

2.2 EU Directive on WEEE

The European Union (EU) has set legal requirements for producers in each member state when it comes to EPR. The producers of the following products are responsible for organising and financing the collection and recycling of the products at the post-consumer phase: vehicles (2000/53/EC), batteries and accumulators (2006/66/EC) as well as waste electrical and electronic equipment, WEEE (2002/96/EC). The introduction of EPR in EU waste Directive (2008/98/EC) requires a whole life-cycle consideration from the EPR point of view.

The EU Directive on WEEE (2002/96/EC) came into force in 2003 and in 2012 a recast was introduced (2012/19/EU). The Directive from 2002 established a framework for the prevention, recycling and recovering of waste electrical and electronic equipment at the end-of-life stage of a product. The Directive's underlining element is the integrated product policy (IPP) and the goal of making producers responsible for the management of their own products at their post-consumer stage. The producer is responsible for taking all necessary actions to follow the waste hierarchy (2008/98/EC). The inducement of the Directive is the cost allocation requirement that entails the producers to be financially responsible for the waste from their own products (Mayers, Peagam, France, Basson, & Clift, 2011; Roller & Führ, 2008).

The European Commission expressed in December 2008 expressed that the targets of the WEEE Directive were not sufficient: only one third of the electrical and electronic waste was collected and treated properly. The illegal trade of the waste was seen as one of the biggest problems and the collection target of 4kg not sufficient. The Commission decided to revise the WEEE legislation in order to decrease the e-waste disposal and increase the correct

treatment of the remaining waste. The aim of the WEEE Recast is also to enhance the administration of the legislation by reducing bureaucracy and combining it to the newer policies of chemicals and product marketing (Commission, 2012).

A significant change was the change of the collection levels; the four kilograms was changed to a perceptual target. The Commission proposed a new mandatory more challenging target of "equal to 65% of the average weight of electrical and electronic equipment placed on the market over the two previous years in each Member State. The recycling and recovery targets of such equipment would cover the re-use of whole appliances and weight-base targets would increase by 5%. Targets are proposed also for the recovery of medical devices". This sets an ambitious target to the producers. The targets are stricter in member states that have a high rate of EEE consumption. The new WEEE Directive (2012/19/EU) was published 4 July 2012.

Overall, the WEEE Directive was established due to the need of solving insufficient municipal waste practices. The waste streams of EEE were growing quickly and the disposal of the WEEE itself was more expensive than the rest of municipal waste streams in general. The streams were observed to be more complex than the regular municipal waste by including several hazardous and harmful materials and components causing potential environmental and health risks. Furthermore WEEE contains several valuable and reusable materials such as gold and copper. This revealed the need for a system that prevents the loss of them in discarded WEEE (Kuehr, Deepali Sinha, Huisman, & Widmer, 2011).

The Directive covers appliances that work with electricity. There are ten different WEEE categories that are defined in the Directive's Annex I (see table 2-1). However after the WEEE Directive Recast's transitional period in 2018 new categories that are presented in table 2-2. will be taking place. In the WEEE Directive EEE is defined as *"equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields and designated for use with a voltage rating not exceeding 1 000 volts for alternating current and 1 500 volts for direct current"*. Furthermore, the definition of WEEE includes *"all components, sub-assemblies and consumables which are part of the product at the time of discarding"*.

Like most EU waste Directives, WEEE Directive is also defining minimum requirements that the member states need to adhere to in setting their mandatory collection and recycling targets. Nevertheless, as basis of the Directive is Article 175 of the European Treaty, the WEEE Directive allows the states implement the guidelines stricter within the countries (Kuehr et al., 2011).

Table 2-1. Electrical and electronic equipment waste categories taken into account by the WEEE Directive until 2018

WEEE Category		Examples of products which fall under the category
1	Large household appliances	Large cooling appliances, washing machines, large appliances used for cooking and other processing of food
2	Small household appliances	Vacuum cleaners, irons, toasters, coffee machines
3	IT and telecommunications equipment	Cellular telephones, other phones, PCs, laptops, notepads, printers, calculators
4	Consumer equipment and photovoltaic panels	Radios, televisions, video cameras, other recorders, musical instruments
5	Lighting equipment	Fluorescent lamps, high intensity discharge lamps, low pressure sodium lamps
6	Electrical and electronic tools (with the exception of large-scale stationary industrial tools)	Drills, saws, tools for welding, tools for mowing or other gardening activities
7	Toys, leisure and sports equipment	Video games, sports equipment with electric or electronic components, electric trains or car racing sets
8	Medical devices (with the exception of all implanted and infected products)	Radiotherapy equipment, cardiology, dialysis, nuclear medicine, laboratory equipment for in-vitro diagnosis
9	Monitoring and control instruments	Smoke detector, heating regulators, thermostats
10	Automatic dispensers	Auto dispensers for hot drinks, for solid products, for money. All appliances which deliver automatically all kind of products

Source: Directive 2012/19/EU.

Table 2-2. Electrical and electronic equipment waste categories taken into account by the WEEE Directive from 2018 onwards

WEEE Category 2018 (after the transitional period)		Examples of products which fall under the category
1	Temperature exchange equipment	Refridgerators, freezers, air conditioning equipment, heat pumps
2	Screens, monitors, and equipment containing screens having a surface greater than 100cm2	Screens, Televisions, LCD photo frames, monitors, laptops, notebooks
3	Lamps	Straight fluorescent lamps, compact fluorescent lamps, LED
4	Large equipment	Washing machines, clother dryers, idsh washers, electric stoves, musical equipment, copying equipment
5	Small equipment	Vacuum cleaners, microwaves, irons, toasters, clocks, calculators, video recorders, smoke detectors, thermostats
6	Small IT and telecommunication equipment (no external dimension more than 50cm)	Mobile phones, GPS, pocket calculators, personal computers, printers, telephones

Source: Directive 2012/19/EU.

Examples of the main requirements for the member countries set by the WEEE Directive are the collection targets, environmentally sound management for waste treatment, recycling and recovery targets as well as setting monitoring and financing framework. By establishing collection targets, the EU wants to ensure that a specific percentage of the WEEE is collected and that the consumers can return the appliances at their end of lives in order for them to be treated correctly. The WEEE Directive is formed as a part of a package of different EU laws that all require the producers to manage and finance the end-of-life treatment of the product according to specific frames and targets. Also these Directives aim at guiding the product development direction as well as already set some material bans for the products that can be put on the market. For electronic equipment these material bans are done by a separate Directive: Restriction of Hazardous Substances (RoHS). In the other Directives these bans are included in an Article. Product specific requirements are also set by the Energy Using Products (EuP) Directive (Grimes et al., 2011; Kuehr et al., 2011).

One of the main aims of the WEEE Directive is to promote producer responsibility by encouraging the design and production of EEE towards reparation, potential upgrading, reuse, disassembly and recycling. The Directive requires free take-back at least for household WEEE and sets recycling and recovery targets. In order to give a proper effect for the producer responsibility, each producer is responsible for managing the financial burden of his own products put on market. Member states have to ensure that "each producer provides a guarantee when placing a product on the market showing that the management of all WEEE will be financed…". This obligation may be executed either individually or by joining a collective scheme offered by a PRO that is introduced later in chapter 2.4.

2.3 EPR in European WEEE Programmes

In the European region Switzerland was arguably the first country establishing an EPR law for WEEE. The law was specifically for the recycling of white goods and this started a Swiss Recycling Guarantee Programme in the 90s. Also Norway, another non-EU country, started with an own regulation for WEEE and the industry set up a PRO for household WEEE in order to ensure a free take-back and an environmentally sound waste management system. The EC Directive obliges all the member states to implement the WEEE programme in their national legislation. However, it is clear that the EPR systems differ across Europe due to among others contrasting opinions on the legitimacy of different stakeholders as well as local industries and general household waste infrastructure and economic development phase (Grimes et al., 2011; Manomaivibool, 2011)

In their study Grimes et al. (2011) classify eleven different EU countries' compliance and finance mechanisms for the current EPR system on WEEE and packaging. The EPR introduction is challenging with thousands of manufacturers and waste collectors agreeing on common methods for cooperation in order to ensure that waste collection occurs as planned. The authors conclude that where local authorities have been charging for household waste management, the WEEE EPR systems have more likely been established on the existing waste management systems. In this situation the cooperation and communication between the stakeholders has been more successful when setting various types of responsibility. Thus, when local authorities were engaged in the national systems through EPR implementation processes and where clear roles between them and producers were established, the results of the EPR implementation processes were significantly better than in the cases where local authorities had vague participation in the processes.

Other important factors for a functioning national WEEE system implementation are "i) the establishment and operation of national EPR systems; ii) consultation on aspects of system design, including contractual agreements, financing mechanisms systems for co-ordination

and communication; and in some cases, and iii) enforcement activities" (Grimes et al., 2011). However, Grimes et al. (2011) also point out the UK as an example of a less effective communication and coordination between the producers and the local authorities, as they do not have an obligatory role in the national EPR system. The lack of transparent communication and clear rules has caused a challenging and less effective system with even long-term effects (Grimes et al., 2011).

Overall, the WEEE targets are not as stringent as planned in the first place when viewed from EPR perspective. Like mentioned above it is argued that IPR has been lost in the transposition of the Directive. It was replaced by a "pay-as-you-go" mechanism where the financing for old product collection was charged from the new product manufacturers. Also the obligation for the retailers to take old products back free of charge has not been fully operational, and the responsibility has largely been left for the municipal collection systems. This has caused some complaints on the national level from particular producers who bear the heaviest financial burden of the WEEE. Each member state has implemented the Directive in different ways on the national level, which causes differences in obligations such as collection requirements, recycling and recovery goals and treatment methods. Also the financing models and reporting requirements vary as much as there are member states. (Manomaivibool, 2011; Sander et al., 2007; van Rossem, 2008)

The design of different compliance systems for WEEE varies a lot and it is noteworthy that harmonisation of these systems is missing, according to recent research. The classification of household WEEE compliances can be divided to single national compliance systems or competing collective systems (Manomaivibool, 2011; Sander et al., 2007). The single national compliance systems usually include a national producer responsibility organisation that is the only responsible actor for WEEE in that country and only opportunity for the manufacturer when it comes to complying with the legislation. Whereas in countries with competing collective systems there are several compliance schemes run by multiple PROs that offer solutions to the producers. These service providers will be described more in detail in the following chapter.

2.4 Producer Responsibility Organisations, PROs

PROs are organisations that are formed collectively by the producers in order for them to meet their EPR responsibilities. These consortiums manage the national EPR solutions on behalf of its members when they do not want or are even not capable of taking care of the responsibilities individually. When a portion of producers has formed an organisation, it may either replace the local authorities' traditional role by taking a full physical and financial responsibility of the EPR management of its members, or it will move as a middle party and commonly on behalf of the manufacturers pay the local authority to take care of the collection responsibilities. A producer can also establish his own waste collection and recycling system by collecting the old products while distributing new, but as most of the EEE products are distributed to the consumers via retailers, this is relatively rare. (Mayers, 2007; OECD, 1998)

In the case of a single national compliance system, the PRO is basically the operator in the field, often supported by dominating trade associations from the targeted industries. It is possible to have more than one PRO for a specific EPR product group (WEEE, batteries, packaging, etc) in a country. As example there can be many PROs covering the same product groups and competing for producers or there can be PROs set up for only specific product groups (ICT, white goods, lamps, etc.). In this type of a system they are not competing with each other but operating for sub-sectors in industries. These single national compliance systems have mostly been created prior to the WEEE Directive and they are in use in less

than ten member countries (Manomaivibool, 2011). From this thesis case countries Sweden was as a single operator system until 2007 when the second compliance scheme came to the market.

In competing collective systems, that are existing in the majority of the European countries, the market is free for different compliance schemes that provide compliance solutions to the manufacturers and using multiple service providers. A competing collective system requires a *clearinghouse* mechanism to divide and share the responsibilities between the different compliance schemes. However, even this can be set up in different ways; in Germany the industry was doing this by itself whereas in the UK the authority took the clearinghouse role. Main reasons for the multiple actor system have been the governments' aim to avoid monopolistic arrangements and manufacturers' concerns about the missing competition (Manomaivibool, 2011; Sander et al., 2007).

The PROs typically take the responsibility of organising waste collection from specified collection points, coordinating and managing the logistics and recycling of the waste and fairly allocating costs for this to the producers as well as reporting to the national governments which in their own turn report to the European authorities. Different EPR Directives that PROs are created for are WEEE, packaging and packaging waste and batteries. In 2007 there existed approximately 260 PROs in Europe, out of which nearly 130 are WEEE PROs. Many of these national PROs have joined European level organisations where they can benchmark to each other and seek for synergies. For packaging, there is PRO EUROPE, batteries have EUCOBAT and WEEE Forum is an umbrella organisation for many national WEEE organisations. (Mayers, 2007).

The importance of PROs is increasing when more stakeholders are involved. The PROs are working in between the manufacturers, regulators, local authorities, retailers, waste collectors as well as the recyclers in the whole European area. Even though the operations, structures and reporting requirements differ between the PROs in each country, they can be described with similar functions (Figure 2-2) as they do have to fulfil the minimum requirements set forth in the EU requirements. The challenge lies in the need of coordinating these actions between the competing PROs, manufacturers and even different nations. Thus, a producer needs to view different functions carefully when looking for a national PRO to join. For instance, there are several mobile phone manufacturers distributing their products around Europe and they have to choose from the several options in the challenging markets. The manufacturers are responsible for organising the WEEE collection in over 80,000 municipalities around Europe with possibly even more collection points. A single producer, like Nokia, choosing a suitable PRO to operate with in each of the 27 European countries is facing a big mission (Mayers, 2007).

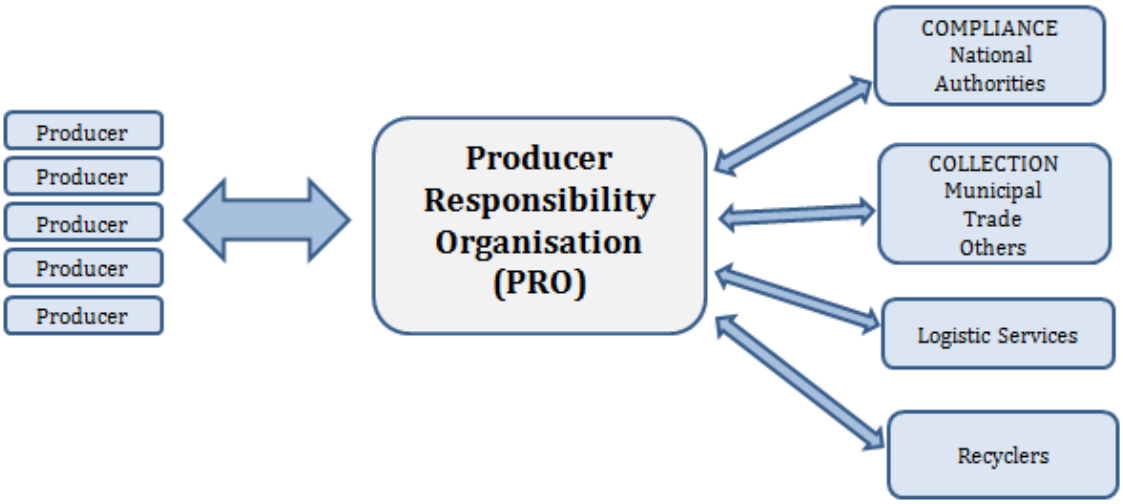

Figure 2-2. The contracting parties of PRO

There are always costs for setting up a basic structure for fulfilling the requirements of the Directives. The producers' costs of the take-back activities are either recovered by a separate visible fee from the customers or included in the product prices; sometimes reducing profit margins. For instance, in Finland, Greece, Sweden, Norway and Portugal additional recycling fees in the product prices are optional, whereas in Germany there are no visible fees at all. In some other countries, like Belgium and France, mandatory fees are set for the WEEE management. However, these kinds of visible and mandatory recycling fees can be controversial as for instance in Ireland they have been argued provokingly as "stealth tax" that make the producers just richer. It has been also claimed that high visible fees can reduce the motivation of the producers to reduce the recycling costs by re-engineering the products. It is very challenging to set a proper fee in order to cover the recycling costs and keep the stakeholders satisfied. PROs can control their financial levels by changing the recycling fees for instance to ensure competitive success in the markets or responding to the changing financial or collection requirements. (Clift & France, 2006; Mayers, 2007)

The competition possibilities with prices as well as the benefits brought by the communal synergies are giving stronger preconditions to the collective systems compared to being an individual actor. In his research van Rossem (2008) found indications that individually operating manufacturers may actually even be discriminated by the national collective systems. The main aim of the manufacturers pursuing IPR is to enhance the cost effectiveness of the overall systems by creating competition. Without any competition the producers can be in risk of losing the decision making control about their recycling solution. (Manomaivibool, 2011; Mayers, 2007; van Rossem, 2008). This will be discussed in the chapter below.

2.5 Principal-Agent Problem and the PROs

Agency theory provides a background for the above mentioned assumption of the PRO preference setting. Despite that the producers are legally the responsible actors, the decision making responsibility is transferred to the PROs. This can create a so-called principal-agent problem: While the PRO should be representing the producers' interests there is a possibility for it to start improving its own position and preferences instead. The WEEE PROs are operating with a mandate from the producers who have officially transferred the

responsibility to them. The PROs manage the collection, transport and recycling of the EEE product at its end of life and charge the producers accordingly. The producers are expecting the PROs to fulfil the compliance requirements on behalf of them. However, according to the EPR principles the producers should still be well aware of the end-of-life phase of the product and hence should not leave themselves completely out from the WEEE management. In order to be sure that the PROs that are authorized to operate on behalf of the producers really work in the desired way the producers should be conscious of their actions, maybe the producers actually should be the decision makers by being involved as the owners of the PROs. As described above, there can be a risk of the producers becoming passive after transferring the responsibility whereas the PROs can start operating according to their own preferences, but still on behalf of and mandated by the producers. In order to estimate whether this kind of scenario occurs in the case countries and to answer the objectives set for the thesis in chapter 1.4 different scenarios and the relationship between the producer and the PRO will be reflected through agency theory.

2.5.1 What Is Agency Theory?

The agency theory, also known as principal-agent problem (or model), can be used in the situation where a collaboration of several individual actors ("the principals") establish a third party ("the agent") that is supposed to advocate a common cause for them. When the agent is contracted by different actors with different interests, it meets the challenge of coping between all of them. The agent usually gains significantly more information than a single principal has, and will even keep receiving more information. (Laffont & Martimort, 2002).

Agency theory's two underlining problems are the agency problem and the problem of risk sharing which happens when the agent and the principal have different attitudes towards risk and different amount of information. The agency problem itself occurs when

i) the goals of the principal and the agent do not meet: *Goal Conflict*, and
ii) the principal can't confirm what the agent is essentially doing and if the behaviour of the agent is in line with the principals expectations: *Information Assymmertry* (Eisenhardt, 1989; Waterman & Meier, 1998).

The focus of the principal-agent research has been on determining the optimal contract, comparing the behaviour of the agent against the outcome expected by the principal. A common approach in principal-agent research is to use a subsection of agency variables. Examples of these are information systems and outcome uncertainty to predict whether the contract is outcome- or behaviour established (Eisenhardt, 1989).

The agency theory goes back to 1932 when (Berle & Means) found out the need of separating the factors of ownership and control in public corporations. Later in the 1970's the economists started to test the theory more widely in risk sharing scenarios by adding the different aims of cooperating parties in them. For instance Jensen and Meckling (1976) studied the relationship between the managers and equity owners and how the ownership influences the different interests. Later Fama and Jensen (1983) explored the opportunities for the shareholders to monitor the company top management through the board of directors. Eisenhardt (1989) reflects them with different propositions:

1) "When the contract between the principal and agent is outcome based, the agent is more likely to behave in the interests of the principal."
2) "When the principal has information to verify agent behavior, the agent is more likely to behave in the interests of the principal." (Arce, 2007; Eisenhardt, 1989).

In 2006 by (Vaubel) explored the principal-agent problems in international organisations. He observed that in organisations with longer chains of delegation suffer more agency problems. This came up specifically in international organisations. The research also brought up the importance of the sufficient incentives in order to make the decision making processes more preferred to the owners. Arce (2007) conducted a study about whether agency theory is self-activating. In his research he identified also scenarios for incentives, and also scenarios where they did not even exist and the contracts were based on trust. He criticised the agency theory tendency to underline the self-interest and opportunism of the managers which drives the principals to incentivising them heavily in order to keep the control. Arce (2007) concludes that also other aspects should be considered more strongly such as individual's willingness to show his capabilities and competence when viewing the agency problem.

Agency theory is similar to contingency theory (Galbraith, 1973) where the organisational symmetry and information structures are considered. However, contingency theory is not used in this thesis as it is focusing only on the optimal structuring of reporting relationships and decision making responsibilities instead of reporting and decision-making patterns resulting *from* these. Agency theory considers also for instance the potential self-interest, risk aversion and the goal conflicts that are not discussed in the contingency theory (Eisenhardt, 1989).

2.5.2 Agency Theory Addressing Multiple Actors

A majority of agency theory research is focused on the relationship between two actors. However, several of the principal-agent issues arise in situations with multiple principals for a single agent. Waterman and Meier (1998) combined theories of multiple agent studies and summed up several scenarios. They argue, that "a simple dyadic principal-agent model is incapable of capturing this dynamic interaction between multiple principals and a set of bureaucratic agents. The basic principal-agent model does allow agents to have multiple principals but generally rules out any externalities." A more dimensional model includes other interest groups. In their research the authors imply specifically bureaucratic scenarios where different state actors are principals where agent's decisions have to be made in order to please sufficient amount of them. The more principals there are in the scenario, the more likely differing goals exist. Waterman and Meier (1998) refer to research of Mitnick (1986) that describes the decision making that the agent faces when it has to choose between principal goals; whether to pick the goals that are standardised, or most basic or the ones most like their own?

The scenario with multiple principals is rather special in the principal-agent model; it has the normative element that principals are monitoring and controlling the agents although it is built around voluntary transactions. The multiple, competing principals are most likely to increase the information asymmetry on the markets. In the research of Waterman and Meier (1998) the bureaucratic problem is apparent in the case of US EPA and its stakeholders. They identify fourteen different principals for the EPA as an agent; including inter alia the president, the media and the state legislators, that are participating the policy process. This kind of setting can be transposed also for the PROs. There are all the individual producers involved as principals even competing with each other between different EEE categories, and in addition there are the authorities, recyclers and other related WEEE management actors as external stakeholders.

2.5.3 Combining Goal Conflict and Information

Waterman and Meier (1998) present a simplistic model for combining the information and goal conflict. Treating information as a variable instead of defining as a constant gives a perspective for a multiple principal scenario where both the information possessed by the agent and on the other hand information from the principal are viewed separately. The authors create different case scenarios and recommend that the scenarios should not be as unidimensionally researched as has been typically made in agency research. They conclude that "the various discrete models that have for so long dominated the bureaucratic literature are not at all mutually exclusive. They coexist in a more generalizable model of the bureaucratic process. Different circumstances (e.g., different information exchanges or different levels of goal consensus/conflict) can create different political outcomes."

Information asymmetry means simply that the agents possess more information than the individual principals. The information can be e.g. technical expertise – in this specific PRO case for example reporting requirements. Goal conflict can be viewed from the perspective of the free markets where the agents aim at making as much profit as possible whereas the principals find ways to keep the costs as low as possible. However, in bureaucratic settings this is not an issue as the main focus is on policy instead of money, and the conflict between principals and agents may not exist at all. The parties may disagree only over the policy. These can be estimated with eight different case scenarios established by Waterman and Meier (1998). These cases are based on whether the information level of the agent and principal is high or low, and whether they are having a goal consensus or conflict. Next there will be presented eight different scenarios based on the research of Waterman and Maier, in order to reflect and find the best match for the PRO cases in this thesis.

Scenarios
1-4 Goal Conflict
5-8 Goal Consensus

Principal	Information Level	Agent: Little	Agent: Much
	Much	4 / 8	3 / 7
	Little	1 / 5	2 / 6

Figure 2-3. Combining goals and information for estimation of the PROs (Waterman & Meier, 1998)

Scenario 1: Goal conflict: Principal and agent lack information. In this situation the agent and principals disagree upon policies and ideology based on the lacking information. In this scenario the information is actually not important as the decision making happens via debates and even potential opinion changing.

Scenario 2: Goal conflict: Agent has information advantage over principal. This is the traditional principal-agent scenario. In this scenario the

agent has gained excessive information compared to the principal and is able to start making its own decisions based on this advantage.

Scenario 3: Goal conflict: Both agent and principal have information. This cell of the table represents the scenario where none of the actors have monopoly on information. Here information is important and main conflicts occur when the parties are trying to beat each other's suggestions on policies for instance. An example mentioned by Waterman and Meier (1998) is the environmental dispute with Clean Air Act of 1990 in the US.

Scenario 4: Goal conflict: Principals have information, agent's do not. In this situation the principals dominate all the interactions with the agents with their technical knowledge. In this kind situation the agent serves principals just as personal staff.

Scenario 5: Goal consensus: Principal and agent lack information. Here both the parties are lacking relevant information and the principals make decisions based on ideas that are floating around. When the agent acts supportively for these kind of decisions, a weak basis for the whole set-up has been made.

Scenario 6: Goal consensus: Information asymmetry favours agent. This is a scenario where the agency is delegated with an assignment with clear objective and then left alone as long as no major disasters occur. Corrections are rare and they are not presented very often. The agents are the experts that are hired for their expertise and they operations are built around the principal's goal.

Scenario 7: Goal consensus: Principal and agent share information. In this situation the information is shared in order to achieve the common goal together. This relationship requires long-term interaction with the principals and agents. In order for the principals to participate in the processes equally with the agents, they have to develop their technical expertise over long period.

Scenario 8: Goal consensus: The principal has information but the agent does not. In this situation the principals have stronger technical expertise thatn the agent. This kind of a scenario would require rather small scale operations where the principals would operate together actively and not share all the details with the agency.

2.6 Thesis Framework

This thesis will illustrate the set-up of three different WEEE PROs that Nokia is involved with in three EU countries. First the national WEEE framework is reflected through the EPR responsibilities introduced by Lindhqvist (1998) in order to understand the operative environment for the PRO in question. The responsibilities are *liability, economic responsibility, physical responsibility and informative responsibility*. The national compliance schemes for WEEE are more thoroughly discussed in the same context.

Once the national WEEE programmes and the framework that is set for the PROs by regulations are described, the PROs themselves are examined. It was done by viewing the

operational structure, financial management, waste stream management including the interaction with other stakeholders and the compliance with the legislation. The manufacturer's opportunities to have influence on the PRO decisions and actions were examined from the interviewees in order to resolve the research question; the case PROs were evaluated from the principal-agent theory point of view along with the definition of multiple principal and agent problem by Waterman and Meier (1998) and their eight scenarios. The thesis framework is described in the figure 2.4 below.

The definitions from the Waterman and Meier (1998) study were estimated and the most suitable scenarios chosen to reflect the situation of each PRO case in the three European case countries. A PRO works as an agent for a group of producers that have mandated it to represent them. However, during the times the nature of the PROs have changed as they have settled in the markets. Specifically with several principals in question, in this case with several producers joining in the same collaboration, the risk of the agent to choose its own priorities rises. The agency theory was reflected in the analysis of this thesis.

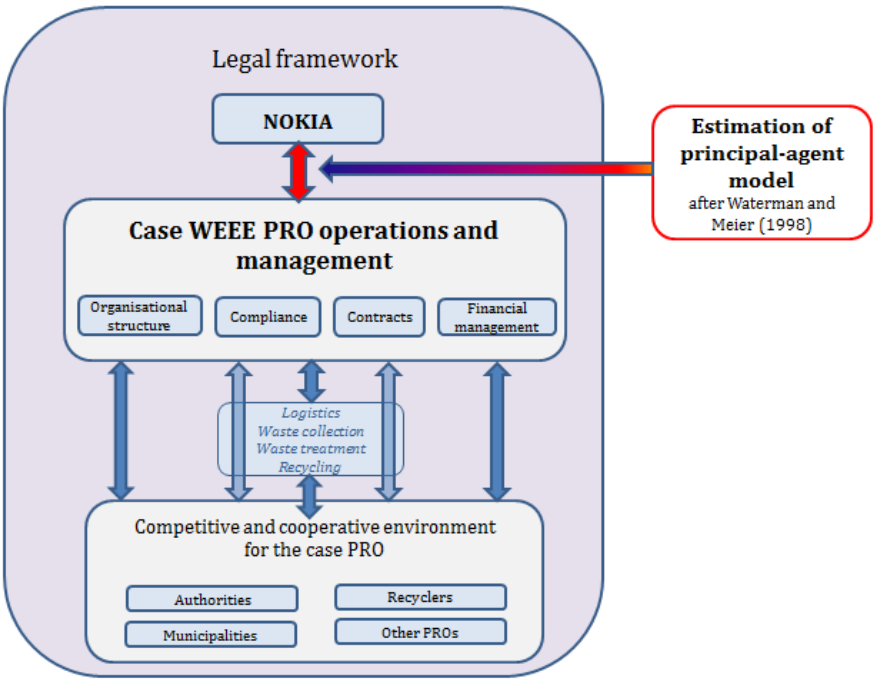

Figure 2-4. Thesis framework

3 The Case Company: Mobile Phone Manufacturer Nokia

Nokia is a global mobile phone manufacturer having sales in over 160 countries around the world and production facilities in eight countries globally. The head office is located in Espoo, Finland which also indicates the origin country of the company. 1.3 billion people use the company's products making the company one of the leading mobile device providers. At the end of 2011 the company had three businesses: Devices & Services (which includes the Smart Devices and Mobile Phones business units) that focus on smartphones and mass market feature phones; Location and Commerce which focuses on location-based services and local commerce; and Nokia Siemens Networks which is jointly owned with Siemens and it provides telecommunications infrastructure, software and services. At the end of 2011 there were 130,050 employees and the major R&D and software development sites were in China, Finland, Germany and the US. The net sales of the entire Nokia Group were 38,659 million euros (Nokia, 2011).

Nokia's strategy has been to generate long-term growth in the creation of the mobile phones. The products aim to reach the consumers everywhere demographically and geographically. The company's strategy has three core elements: " i) to win in smartphones; ii) to connect the "next billion" to the Internet and information; and iii) to continue to invest in future disruptions through long-term exploratory research into the future of mobility and computing" (Nokia, 2011).

Nokia has put effort on environmental design of the products. The product development is guided by life-cycle assessments that aim to point out the most important activities where the company can operate to contribute to environmental improvements. Each product development team has an Design for Environment specialist who is responsible for verifying that the legal environmental requirements, voluntary material and substance requirements and sustainable alternatives for material choices are implemented in the product creation (Nokia, 2011).

The company aims at increasing the mobile phone take-back rates in order to ensure the correct end-of-life treatment for the products. While operating under the WEEE Directive and its requirements Nokia underlines the challenges that the positive value e-waste such as mobile phones set. The leakages in the returning WEEE flows are significant and the company is struggling to receive all the collectable mobile phones at the end of their lives. Nokia has actively participated in the discussion of the suitable WEEE legislation in the EU and has been involved with the primary rounds of WEEE Directive Recast as well (Nokia, 2011). Through the WEEE Directive, also the PROs in Europe have become a crucial part of Nokia's European waste management responsibilities and operations along the take-back schemes. The company is a member of PROs under ERP Europe in five member states. In over half of the European countries the PRO memberships fall under WEEE Forum's schemes.

4 PROs for Nokia's Mobile Phones in Case Countries

In this chapter Nokia's WEEE PROs in Finland, Sweden and the UK are presented. Along with the PROs, the WEEE systems of each country are also described. This chapter aims to give a comprehensive picture of the three countries' systems in order to scope a basis for the findings and analysis discussed in the following chapter.

4.1 Finland

This subchapter describes the WEEE system in Finland by giving an overview on the waste law and practices specifically on WEEE. Economic, physical and informative responsibilities for the producers in the system are specified in the subchapters. After describing the WEEE system, the PRO set-up in the country is explained and then followed a by presentation of Nokia's PRO.

4.1.1 WEEE System in Finland

The producer responsibility ordinances have been used as waste policy tools since 1996. The Finnish waste management law was complemented with producer responsibility principles in covering paper products, packaging, vehicle tires, cars and electrical and electronic equipment. The new Finnish waste management act (646/2011) has come into force in Finland on May 1st 2012. The waste management law's definition for producer is the professional manufacturers or the importers of the product. The manufacturers may deal with their legal responsibilities in cooperation with other manufacturers by establishing a PRO. The producer responsibility for WEEE was set in the Government Decree on Waste Electrical and Electronic Equipment (852/2004) ("WEEE Decree") and it will be revised shortly to reflect the new waste law and the WEEE Recast.

According to the WEEE Decree the producers are the main responsible ones for the whole cycle of WEEE management; the producer shall arrange separate collection and environmentally sound treatment of the waste. The producers are further also responsible for reporting and for example also marking the products in order for the consumers to be able to recycle the appliances correctly. As the WEEE Directive was transposed to the Decree, they are basically in line with each other from their characteristics.

Economic Responsibility

The producers are financially responsible for all costs that occur from the collection, recycling and final disposal. This includes also producers engaged in distance selling. By joining a PRO and paying the recycling fees, the producers' have covered their legislated obligation. In addition to the recycling fees the producers pay the PROs a guarantee to cover half a year of financing. The PROs then organise the financial management of the physical actions.

Physical Responsibility

The Decree outlines that the producers are responsible for all activities relating to the physical actions of the end-of-life stage of the product. They must arrange for necessary separate collection and delivery of the collected WEEE to the treatment facilities. This responsibility is most often transferred to a PRO which makes the necessary contracts of the physical management with third parties such as recyclers and municipalities. According to the Decree, treatment facilities with certified environmental management systems are to be favoured. The Decree does not set a minimum target to be achieved but states that all collectable WEEE shall be collected by the producer.

Informative Responsibility

In general the information requirements in the Decree are fully in line with the WEEE Directive. For example according to the Decree, the producers shall label their products so as to indicate the producer's name that brought the appliance to the market. Also specific information that is necessary for the waste management have to be available for the product; These include the obligation for separate collection and instructions for it, indication of collection systems, the producer's own role in the product's waste management as well as the potential environmental and health effects from the harmful substances.

The producers, the PROs or the treatment facilities that are authorised to work on behalf of the producer are reporting the realised responsibilities to the Centre for Economic Development, Transport and the Environment for Pirkanmaa, "Pirkanmaan ELY-keskus" (hereafter referred to as "ELY Centre"). Despite being a regional government entity, ELY Centre is the authority for all PROs in Finland and it reports the national figures to the European Commission. The reporting to ELY Centre is most often made by a PRO on behalf of the producers.

4.1.2 The PRO System in Finland

There are five PROs for WEEE in Finland: SER producer organisation ("Serty"), ERP Finland, as well as ICT Producer Co-operative, SELT Association and FLIP Association. The latter three have jointly set up a service organisation called Elker. All five PROs are authorised by ELY Centre that is also supervising the PROs' operations and reporting. All the product groups that are defined in the WEEE Directive are represented in Serty and ERP Finland. Whilst within Elker the three PROs are set up to cover specified main product groups. The producers are free to decide to which compliance schemes they transfer their responsibilities to. Due to this, the product groups covered by different PROs can vary. Serty is the biggest when measured with the members' total proportion on the EEE market (weight/tonnes). Their producer's product groups cover mostly the big household appliances' but also consumer electronics', mobile devices and electrical tools' manufacturers and importers. Elker's PROs form the second largest PRO set-up, its members cover one third of the countries electrical and electronic market (weight/tonnes). For the ICT appliances market the ICT Producer Co-Operative is the dominating PRO in Finland (EnvironmentalAdministration, 2012; Tojo & Manomaivibool, 2011; Toppila, 2011).

As brought up above, the most common practice for the producers in Finland is to join a producer responsibility scheme in order to fulfil the legal requirements. Finland's Environmental Administration recommends that if an EEE producer puts products on the consumer markets, the responsibilities usually become so extensive that joining a PRO is the most practical solution. If the producer has appliances only for professional use (business-to-business), he can either join a PRO or take care of the waste management and reporting of the appliances by himself (EnvironmentalAdministration, 2012).

The three groups are responsible for organising the WEEE management. However, in principle the PROs buy the collection services from municipalities due to the existing collection network and infrastructure that is familiar and convenient for the consumers. In some areas also some big recycling companies have also set up collection points for the waste on behalf of producers. As the producers will have the primary right to the waste according to the Law, the municipalities are not allowed to sell the collected articles themselves. They are obligated to give the WEEE from the collection points to one of the PROs in the country according to contractual terms. Recycling companies have contracts with the PROs for the WEEE treatment. The three schemes are currently having good relations with each other and they negotiate about the collection synergies with each other. They have allocated

the collection and pick-up responsibility of specific product groups for one of the three PROs according to agreements between the PROs. (Hietala, 2012; Tojo & Manomaivibool, 2011).

The Case PRO: ICT Producer Co-operative

Nokia belongs to ICT Producer Cooperative ("ICT") that covers approximately 40% of the ICT collection in the country. Elker is a service organisation established by three different PROs ICT Producer Co-operative, SELT Association and FLIP Association. As all the operative actions are administered by Elker, it will be used as the definition for the case PRO. Elker provides ICT, SELT and FLIP jointly the economic, reporting, membership, procurement, and reporting services. Elker has an electronic reporting system for its members and also Serty is buying the reporting system services for its members from Elker. The battery and accumulator PRO Recser also buys reporting, communication and economic services from Elker (Elker, 2011).

Elker responds on behalf of its owner PROs that the collection network and the treatment are compliant with the Finnish WEEE Decree. In 2011 Elker recycled 6.000 tonnes of WEEE. SELT Association which is part of Elker, is the biggest PRO in Finland when measured according to the producer amount. Some 40% of all the Finnish producers are registered in SELT. (Elker, 2011; Tojo & Manomaivibool, 2011). Elker acts as a clearinghouse both internally for its owners (ICT, SELT and FLIP) as well as partly externally for Serty and ERP Finland. It has 340 collection points in Finland.

All the PROs within Elker are financing their operations a bit differently according to their own agreed rules. ICT collects necessary funding through quarterly fee, which is based on producers' reports of their weight of products of different product types put on the market during previous quarter. The positive value of several ICT products has caused that fees are rather low. All Finnish PROs are non-profit organisations; hence the fees are set up to cover the costs and to keep the operations going (Elker, 2011). The contracting with the producers happens through a membership application. The producer agrees the terms upon signing the application and is joined to the PRO directly. The contracts are continuous unless they are resigned.

Elker is complying with the Finnish Decree minimum requirements: all collectable WEEE shall be collected. Another requirement is the collection network that shall be easily available for consumers and open for any all WEEE products. Elker makes waste management contracts on behalf of the PROs within it and is responsible for operating the collective collection network on behalf of the producers as well. The operative functions are run by the managing director and approximately three other administrative employees. Elker's managing director's role is rather independent in executing projects. He prepares action proposals and plans after which they are approved by the board which gathers quarterly. The board of Elker consists of board members of the three PROs. The PRO boards in their turn are formed by representatives of the producers in each specific PRO. The annual meeting where the board is formed and where biggest decisions are voted for is open for all the members in all three PROs. If an individual manufacturer wants to influence the decisions or has some specific proposals, he can contact his PRO or Elker's administration that will prepare the question or the proposal for the PRO.

Elker is also the main contact to the authorities and other WEEE PROs in Finland on behalf its owner PROs. Elker also reports the annual WEEE data from the producers to the supervising authority ELY Centre. In addition to that, the contact with the authority and Elker is rather open: Elker is aiming at keeping the authority well informed also on any

information that is outside of the regular reporting requirements. Simultaneously via Elker the PROs and the producers get possibility to check interpretations of legislation and best practices when it comes to WEEE.

The information that Elker provides is distributed to the members via quarterly producer bulletins and separate emails if required. Elker is also informing the media and consumers every now and then. Specifically now with the new Waste Law there are more issues and changes of legislation to inform about. The consumers are reached in cooperation with all Finnish PROs via a webpage that gives advise concerning collection of all kind of waste related to producer responsibility. This webpage, www.kierratys.info, is guiding the consumers for recycling of paper, packaging, metal, glass, plastics, textiles, hazardous waste, batteries and accumulators and even mixed waste.

4.2 Sweden

This subchapter describes the WEEE system in Sweden by giving an overview on the waste law and practices specifically on WEEE. Economic, physical and informative responsibilities for the producers in the system are specified in the subchapters. After describing the WEEE system, the PRO set-up in the country is explained and then followed a by presentation of Nokia's PRO.

4.2.1 Legal framework for WEEE in Sweden

Sweden was one of the first EU countries having the EPR principles integrated in the legislation, some years before the 2005 deadline of the WEEE Directive. The Ordinance on Producer Responsibility for Electrical and Electronic Equipment ("the Ordinance") was introduced in 2000 (SFS 2000:208) and it was revised in 2005 to correspond and meet with the requirements laid down in the Directive (SFS 2005:209). It is strongly in line with the WEEE Directive by including the same categories for WEEE, same definitions for different stakeholders as well as different components and consumables.

The producer has the primary responsibility of the WEEE he generated until its end-of-life stage: Thus, the producer shall provide systems for waste collection, make sure that the products can be re-used of recycled, and ensure that the WEEE collection targets are met. The Ordinance is based on waste prevention principle that is involving the producer already from the upstream, planning and manufacturing, phase. This principle includes also the requirement of considering the recycling efficiencies for the products. The Ordinance aims at waste prevention, but if waste generated however, the producer should consider the product's end-of-life phase targets.

Economic Responsibility

According to the Ordinance, the producer is responsible for ensuring its financial ability for taking care of the products at their end-of-life stage. The economic responsibility for the waste handling has to be ensured through different financing systems, insurances, or blocked accounts so that even if the producer would end its business, the waste handling responsibilities will be fulfilled anyway. The producer is responsible for reporting the Swedish Environmental Protection Agency (EPA) "Naturvårdsverket" how this economic obligation is ensured.

Physical Responsibility

Since the Swedish Ordinance is in line with the Directive's aims in reducing, re-using, and recycling; the producers are responsible for ensuring the existence of appropriate collection system(s) and free of charge handling for household WEEE. The municipalities are

responsible for the transportation and recycling or disposal of household waste. The producers should also ensure that also non-household users are able to deliver the WEEE easily. In cases when the collection system is operated by the municipalities, the producers are obligated to consult them in order to ensure the collection and treatment of the WEEE is done in environmentally sound ways. The purpose of the consultation is to coordinate the producer's responsibility with the municipality's waste collection duty in the light of local conditions in the municipality.

Informative Responsibility

As mentioned earlier, the producer is responsible for provision of sufficient product information for waste handling purposes in order to ensure the environmentally sound treatment. With the purpose of this, correct information should be also provided to the consumers. This can happen via the municipalities and retailers. The producers are also obliged to regular reporting to the monitoring authority, the Swedish EPA about the product quantities and qualities put on market and how they are intended to be collected. The fulfilled responsibilities such as collection and handling rates shall also be reported to the authorities.

4.2.2 PRO System in Sweden

According to the Swedish WEEE Ordinance (2005:209), each producer bringing EEE products to the market shall register and report to the Swedish EPA. The producer can choose to join a collective system that carries the collection and treatment responsibilities on behalf of him. If producer is joining a collective system, PRO, also this has to be reported to the authorities.

The producer responsibility organisation system for WEEE in Sweden was established in by the EEE industry. It was supported by several producers in order to fulfil the responsibilities set for them by the Swedish WEEE Ordinance. This organisation, called El-Kretsen, was a dominant system for several years, keeping Sweden as a one-system country until some smaller operators came to the market. Some five years ago a small competitor Elektronisk Återvinning I Sverige Ekonomisk Förening (EÅF) came to the markets. EÅF that uses its members shops as collection points. However, majority of the Swedish WEEE producers manage their responsibilities by El-Kretsen. In municipalities where EÅF does not have collection, El-Kretsen is collecting the appliances, the products are registered and the payments divided through a clearinghouse. This is the common practice in Northern Sweden where EÅF does not have a network of shops that could collect the WEEE and where the distances are long (Naturvårdsverket, 2009; Tojo & Manomaivibool, 2011).

The Swedish model is built on the collection system where municipalities are the main actors making contracts with the PROs for collection. The WEEE collection system should enable products to be delivered to the system or to be collected by someone representing the system at least one of the places arranged by the municipality concerned for the management WEEE products. The municipality and the producer may agree on deviations from this requirement. As the distributors were not keen to collect the discarded consumer appliances themselves and the municipalities to collect them anyway, municipalities and El-Kretsen came to a mutual agreement upon the introduction of the first WEEE Ordinance in 2000; El-Kretsen organises the collection and pays for it whereas the municipalities pay for the treatment and recycling. For business users El-Kretsen has distinct collection points. All together there are approximately 1000 free of charge collection points for both, businesses and consumers from where the WEEE is distributed for treatment and recycling (El-Kretsen, 2012; Tojo & Manomaivibool, 2011).

The Case PRO: El-Kretsen

El-Kretsen is a non-profit service organisation, founded and owned by 21 branch organisations. It was founded in 2001 in order to take care of the e-waste put on market by them and to comply with the legislation. The organisation's main objective is to help the producers in this by offering a nationwide collection system. The 21 branch organisations represent nine EEE categories. Through the branch organisations the producers are actually indirect owners of El-Kretsen. The system comprises of two parts; the household WEEE system and the business WEEE system. The household collection is officially organised in cooperation with the municipalities whereas the business collection is divided between the municipalities and external transporters. The collected e-waste is transported to specific treatment plants where it is dismantled and treated environmentally sound ways (El-Kretsen, 2012). According to an informant, the PROs main tasks are preservation of the companies against misuse and mistreatment of the WEEE in order to avoid ethical and legal complications, cost efficiency assurance and financial control that ensure that the producers get their refunds from the e-waste with positive value at the end of the year.

El-Kretsen charges its members in order to cover the WEEE management and administrative costs. The members pay a quarterly fee and a weight fee that is based on the quantities they have put products on market. The price is related to the cost of treating the product. For products with positive recycling value, like mobile phones, the price is 0SEK per mobile phone sales pack put on the market. The producers join the scheme and they are all treated with equal contracts. There are over 1300 registered companies on the product side and almost 800 clients on the battery sector. The members of the board are mostly branch organisation representatives. According to the managing director of El-Kretsen, the decision making process starts in the branch organisations' boards. For instance, the board of Mobiltelebranchen ("MTB"), the branch organisation for mobile phones in Sweden, brings up issues and makes decisions in their own meetings first. The board consists of the representatives of the biggest mobile phone manufacturers and the meetings handle issues that are brought up by individual manufacturers or the branch organisation itself. After decisions are made in the MTB's board meeting, the issues will be brought to El-Kretsen's managing director who prepares the issues for El-Kretsen's board. The main aim is to reach a consensus and all the decisions are made through discussions and best practice seeking. El-Kretsen's board handles also issues brought to the managing director by individual members directly. The representative of the Mobiltelebranchen is also a member of El-Kretsen's board. El-Kretsen's organisation is based on three main functions: technical, production and economics and markets. There are 10 people working in the administrative organisation (El-Kretsen, 2012).

El-Kretsen's objective is to collect at least the minimum amount of WEEE set by the EU Directive, but according to the managing director of El-Kretsen the unwritten goal is to collect all the e-waste that's occurs. He describes that the companies' willingness to comply with the legislation is similar than El-Kretsens. The companies are also keen to go beyond the legal collection targets if possible. However, they leave the collection responsibilities and concrete efforts for the PRO to take care of. The producers are content when inconveniences don't occur and their core business operations are not affected by the WEEE compliance issues. El-Kretsen is communicating to its members on monthly basis through information bulletin emails. Extra information is sent to the members whenever special issues arise in the WEEE field. The manufacturers do their regulatory WEEE reporting through a web based system and each of them has their own log in access to the system. Through the system the members can access alsoa variety of WEEE information that is provided by El-Kretsen.

4.3 The UK

This subchapter describes the WEEE system in the UK by giving an overview on the waste law and practices specifically on WEEE. Economic, physical and informative responsibilities for the producers in the system are specified in the subchapters. After describing the WEEE system, the PRO set-up in the country is explained and then followed a by presentation of Nokia's PRO.

4.3.1 Legal Framework for WEEE in the UK

The collection and recycling of WEEE are under the Environmental Protection Statutory Instruments 2006 No. 3289 – The Waste Electrical and Electronic Equipment Regulations 2006 ("the Regulations") and the 2009 amendment to them. The WEEE Regulations are based on the EU Directive and have been in force since the beginning of 2007. (EnvironmentAgency, 2012; SEPA, 2012a; Tojo & Manomaivibool, 2011).

Economic Responsibility

The Regulations oblige the producers (importers, rebranders and manufacturers of new EEE) to finance the collection, treatment, recovery and environmentally sound disposal of WEEE according to the volumes that they have put on the market.. The producers who have financial responsibility for their waste are obliged to join a compliance scheme that is responding to the Regulations' requirements. These schemes are discussed in the following section.

Physical Responsibility

The Regulations prohibits disposal of unsorted WEEE and gives an option for that through designated collection facilities that are free of charge to consumers and specifically approved by the government. The producer's always transforms his responsibility to collect and treat to producer compliance scheme. These will be discussed below. The free take back responsibility is only on distributors who commercially supply EEE products to the customers. These distributors can be released from this obligation if they join a distributor take back scheme.

Informative Responsibility

The Regulations state that when a producer becomes a member of a scheme, the operator of the scheme is responsible for registering the producer with an appropriate authority. The producer is responsible for reporting to the producer compliance scheme the total amount of tonnes of its EEE that it has put on market annually. It has to be distinguished whether the products are sold for household or business use. After registering with the compliance scheme, the producer receives a registration number that has to be informed to anyone who sells the products.

4.3.2 Producer Compliance Schemes

The PROs in the UK are operating officially as Producer Compliance Schemes (PCSs). The PCSs offer administrative and practical services to the EEE producers in order to meet the Regulations' requirements. Within 28 days of bringing the product to the national market, the producer must join a compliance scheme. The PCS takes on the legal obligation to finance the collection and treatment costs of the member's portion of WEEE. Basically this means that the PCS registers the producers, collects and clears the household WEEE that is returned to a designated collection facility it has a contract with and then submits it to

approved treatment facilities. These treatment facilities report the recycling statistics back to the PCS in order for them to fulfil their producers' allocated responsibilities. According to the Government the PCSs must co-operate with each other in order to achieve the aims of the Regulations (BIS, 2009; SEPA, 2012a; Tojo & Manomaivibool, 2011; Valpak, 2012).

The annual collection obligations for the PCSs are calculated each year. The ones that represent household EEE are given collective responsibilities that are based on their members' market shares and the estimated levels of WEEE. The non-household products are measured based on their sales. The Regulations oblige the PCSs to enhance the identification of re-usable products through different systems in order to enhance product re-use, as prioritised in the EU Directive. The schemes are allowed to make contracts and collect WEEE on behalf of another scheme in order to reach the collection targets providing that the arrangement is reported to the monitoring authorities. PCSs are allowed for some trading of evidence for correcting minor unexpected excess or shortage from the target. This however should be kept marginal and carried out only for the corrections caused by the difficulty in PCSs predicting the obligations precisely (BIS, 2009).

According to Valpak, by the end of the first phase in the UK WEEE Regulations (2007-2009), more than 75% of the producers had joined a distributor take back scheme in order to respond to the free take back obligations. In the UK the main recycling centres for WEEE are the Local Governments and Councils. The monitoring authorities of the PCSs are The Environment Agency (in England and Wales), Scottish Environment Protection Agency (SEPA), and the Northern Ireland Environment Agency (NIEA). Anyone can apply to work as a PCS if their operational plans are sufficient and approved by the supervision authorities. Currently there are 37 different PCSs in the UK (SEPA, 2012a, 2012b; Tojo & Manomaivibool, 2011; Valpak, 2012).

Table 4-1. List of approved compliance schemes for WEEE in the UK in 2012

Schemes approved by Environment agency		Schemes approved by Scottish Environment Protection Agency	Schemes approved by Northern Ireland Environment Agency
A Novo PCS	Nilwaste	Dataserv Compliance Services	All WEEE Compliance
A1 Compliance	Northern Compliance Limited	ElectrolinkRepscot Ltd	WEEE 3R Ltd
Accerio WEEE Scheme	Recolight	S3 Interactive Ltd	
Advantage Waste Brokers Ltd	Recycle Telecom Producer Compliance Scheme	Valpak Scotia	
B2B Compliance	RENE AG	WEEE Compliance UK	
B2BWEEE	REPIC	WEEE Link	
Budget Pack	Transform		
CCR RELECTRA	Valpak		
Comply Direct	Veolia ES WEEE Compliance Scheme (UK) Ltd		
DHL WEEE Compliance	WE3 Compliance		
Econo-Weee	Waste Electrical Recycling Compliance Scheme		
environCompliance	WEEECarre		
ERP UK	WEEEComply		
Interievin	WEEELight		
Lumicom Compliance Scheme			

Source: (SEPA, 2012b)

The Case PRO: Valpak

Nokia's PCS/PRO in the UK is Valpak Producer Compliance Scheme ("Valpak"). The Scheme was established already in the 1997 when it started with the packaging waste regulation requirements expanding later on WEEE regulation and regulation on waste batteries and accumulators. A representative of Valpak tells that the company was originally established by producers; however, following a management buyout in 2012, Valpak is now a private company. In addition to compliance scheme services, the organisation offers also carbon reduction commitment – energy efficiency scheme, REACH compliance advisory and environmental permitting advisory. It has been an approved WEEE Producer Compliance Scheme operator since 2007 (Valpak, 2012).

For WEEE compliance services Valpak offers the producers calculation of their WEEE management obligations, support and advisory on WEEE data submissions. The organisation works with a range of local authorities and specialist WEEE treatment operators in order to ensure correct recycling and collection options for the customers. According to an interviewee Valpak's member contracts have standard Terms and Conditions which apply to all members of their WEEE compliance scheme. The manufacturers pay membership fee

that is based on the turnover of the company and the recycling fee. The UK WEEE system works on the basis of a 100% market. This means that producers are required to finance the collection and recovery of their market share of the total amount of WEEE collected. This market share is calculated by comparing the amount of EEE declared by a producer in a category with the total amount of EEE declared in that category by all UK producers. To calculate the recycling fee Valpak forecasts how much WEEE is collected per tonne of EEE placed on the market in the UK for each category, and the cost of collecting and treating that amount. This cost is known as a levy rate and is applied on a per tonne basis to the total tonnage of EEE each producer declares that they place on the market (on a category by category basis). Nevertheless, according to the informant from the UK Nokia, the tonnage rates are negotiable. As Nokia has been a long term client for Valpak, the price has become very competitive and the company prefers to continue the contract especially because of that.

According to the Valpak informant the decisions regarding the balancing of producer responsibility are made by the government and set in the Regulations. The organisations involved in the producer responsibility system must then follow those legislative requirements. Each PRO, however, is responsible for its own business decisions. When inquired about the member activity, the respondent told that when responding on consultations to government proposals, for example on amending the UK WEEE regulation, Valpak invites feedback from their members and try to weigh this up as fairly as possible. They also discuss policy changes in detail with a selection of members who form the Valpak Advisory Group, which meets 3 to 4 times per year. These sessions allow Valpak to fully understand the implications of proposals on a variety of industries; thus influencing how they respond to discussions.

5 The Views of the Stakeholders and the Analysis

This chapter represents the findings from the stakeholder interviews. The relationship and cooperation between Nokia and its PRO in each case country is first described after which other interviewed stakeholders' responses upon their relation with PROs are reported. At the end of each country specific chapter an analysis is done in order to get a comprehensive understanding of the case country's state.

5.1 Finland

In this chapter the information on Nokia Finland representative's experiences with the PRO are combined to the PRO representative's statements in order to achieve an understanding of the current relationship of the actors. All together the goal consensus and information supply from agency theory point of view are evaluated in the set-up as well. Furthermore other stakeholders' responses upon their relationship with PROs are presented before the country-specific analysis.

5.1.1 Nokia and ICT Co-Operative

Nokia is one of the founding members of its PRO ICT and therefore has been a natural choice of PRO for the company ever since. Nokia became a part of the initiating "Awareness group" in 2004 when the Federation of Finnish Technology Industries branch organisation invited the EEE producers, recyclers and other stakeholders to join the preparations for the becoming WEEE Directive. Since then Nokia has been involved with the PRO in question. According to the Finnish representative of Nokia, ICT has fulfilled the requirements of the company and there has not been need to consider changing to another PRO in Finland. However the situation has not always been as pleasing from Nokia's point of view: After the establishment of the PROs in mid-2000, the whole WEEE PRO sector was still searching for the best practices. The prices were very high and the producers were not satisfied with them. Due to disagreements between the competing PROs the common operating practices in the WEEE management field were hard to agree upon. Influence of the personal opinions came up with nearly all the interviewees from all the Finnish stakeholder groups. However, today the situation has settled and also Nokia is content with the current management.

According to the Finland's Nokia representative, the general goals of ICT are in line with the company's goals. Nokia is requiring certain transparency in the PROs actions and this has been on a good level. The information supply from the PRO has also been sufficient; not least due to the Nokia representative sitting in the ICT board. Upon inquiring about the opportunities to influence on ICT's decisions and actions, Nokia is at the top end of having the possibilities for influencing the PROs decisions specifically because of the board position. Elker's representatives also confirm this as they are operating in a close relationship with the PRO boards.

Nokia reports the EEE volumes to ICT on quarterly basis. The reporting happens through an online reporting tool that is managed by Elker. This tool also provides additional information regarding WEEE issues. According to an interviewee, this tool is reportedly sufficient. Currently, obsolete mobile phones are waste with positive value, meaning that Nokia does not actually pay for the recycling. Nokia has received back only historical overpayments from ICT but the situation with the positive waste value is revised constantly due to the increasing values of e-waste in general. This far the collected amounts are still too small to generate payback on continuous basis.

5.1.2 Other Stakeholders

In this case study, other stakeholders include; supervising authority, recyclers, municipal waste operators, other PROs and other representatives of producers. Each of these stakeholders has had influence on the current WEEE management system in Finland.

Other manufacturers' representatives that were interviewed from Canon and Samsung were interviewed in order to get more perspectives upon the issue of the manufacturer's opportunities to influence in the PRO. The message from them was very similar to what Nokia is experiencing with their PRO. The interviewee from Canon is an active member of the PRO ICT as well as a member of its board. Canon has been involved with the PRO since its establishment and along with Nokia, was part of the Technology Industry's "Awareness" working group. The Canon representative reports their possibilities to influence the PRO's activities as very good, not the least because of being a member of the board. Canon receives information easily through the meetings but also from the online system where the reporting is done. The goals of the PRO are in line with the goals that are set at the European headquarter of Canon and the Finnish representative does not have any difficulty matching the company's need to the Finnish PROs code of conduct. The main ambition for the company, however, is to comply with the legislation as cost efficiently as possible and without interfering too much with the core business.

The interviewed representative from Samsung Nordic gave an alternative viewpoint to the case where the manufacturer is not a member of the board in the country in question. In Finland Samsung is a member of Serty. The person responsible for the Finnish compliance is located in Sweden hence offering another perspective on the issue. The activity of Samsung is not on the same level in the Finnish PRO as it is in Sweden. Nevertheless, the representative of the company described the opportunities to have influence on the decisions and actions being rather good despite not being Finnish. He reported that the language barrier reduces the high activity in the PRO but emphasised the lack of difficulty when it is needed to bring up issues. For instance Samsung had brought requests for reporting improvements which had been heard and executed accordingly. The information supply is also very good, and like the fellow representatives from Nokia and Canon, the Samsung representative has an easy access to a wide information database through the online reporting and information platform. The main aim of the company is to comply with the national legislation and this is reported as successful and convenient.

The **supervising government authority** ELY Centre is the main channel between the European Commission as well as national government and the actors in the WEEE management field in Finland. The ELY Centre is in closely connected with the different PROs operating in the country. Each of the PROs is initially approved by the ELY Centre that goes through the legal applications of the PROs. One of the main requirements is that the rules within a PRO need to treat all the producers equally. In addition to supervision the ELY Centre is advises the manufacturers and gives opinions and statements upon inquiries. As the PROs represent the manufacturers directly in most cases, the biggest interaction happens between the PROs and the ELY Centre. During an annual feedback session with each of the PROs comments and suggestions about the annual operations of the PRO are reportedly given. In conjunction the PROs may bring suggestions and requests of their own about the current system in WEEE management for the future. In addition to the annual meetings, the ELY Centre has frequent contact with the PROs. For instance, the senior advisor of the ELY Centre reported that they have discussions with Elker on an almost weekly basis. This indicates that the communication threshold is very low, and the informant confirmed the common practice of rather fast and casual communication in different issues.

Whenever or not the issue becomes significant will determine if it will be transformed into a formal one and communicated accordingly.

One of the biggest duties of ELY Centre is the connection between the Finnish national system and the European Commission (EC). ELY Centre reports to the EC every second year and communicates all the official issues that occur in the WEEE field. A PRO has a possibility to discuss issues with the ELY Centre that later on will be communicated to the EC level. On the other end, the ELY Centre is occasionally contacted directly by individual producers or the ELY Centre representatives may hear from other informal channels that some manufacturers are dissatisfied about some decisions made by the PROs. However, this is quite rare and the informant reported that in most of the cases the producers are content with the current situation.

Recyclers are in an interesting situation in Finland particularly now under the changing waste law and its becoming ordinance that is still under preparation. The recyclers' position in the WEEE management field actually changed significantly in Finland along with the WEEE Directive. According to both of the interviewees from two different recycling companies, the recyclers are strongly striving for their rights to participate in the WEEE management process as freely as they used to before the legislative changes. The recyclers had the right to open recycling points independently and collect the waste from the consumers. The current waste law has limited them out, and sets the primary right on the waste to the manufacturers and importers instead of the recyclers. Before the Directive, the recycler Stena was even an owner and a board member of the PRO Nera which later on changed to ERP Finland. At that time the PROs whole collection network was based on Stena's collection points. Now Stena's collection points have been reduced significantly as the PROs are making the primary collection agreements with the municipalities. Both the interviewed recyclers expressed their dissatisfaction on the fact that they have now been left out from the primary WEEE management system which has been even influencing their businesses.

From the discussions with the recycler representatives it became apparent that they would be very willing to get a bigger share from the current WEEE amount that comes to the market. One of the interviewees implied that the manufacturers and hereby PROs are having too much power in the decision making of the recycling operators. Both of the interviewees indicated that they would prefer to have more discussion and compromises about the waste management. The biggest issue that is occurring between the PROs and the recyclers concerns the by-flows of the valuable e-waste. The PROs are aiming at collecting all the WEEE very carefully but the recyclers are also interested in fixing some B2B products and selling them for re-use. This causes some disagreements between the parties.

Municipalities are the parties that the PROs traditionally have made the collection contracts with. Additionally, municipalities distribute the collected WEEE to the recyclers from where it is transported for recycling. The municipal network is the widest collection network in Finland and hence the municipalities have become the primary collectors of the e-waste. The informant from the Finnish Solid Waste Association (FSWA), described the municipal waste companies' relationship to the PROs as a well-functioning routine. The FSWA represents 90% of Finland's regional and municipal waste management companies. The producer responsibility in WEEE is clear and the cooperation between different parties is rather effortless. The FSWA prepares the national contract frames for the municipalities and the PROs after which the issues become local between the actors. The FSWA is operating as a discussant towards the authority ELY Centre as well as towards the PROs. Along with other

interviewed stakeholders the informant described the national relationships in the field very informal and functioning.

Other PROs' representatives were also interviewed in order to get a more comprehensive picture of the PRO operations in Finland. Similar from all stakeholders; Finnish PROs reported the threshold for communication between different stakeholders, including the competitors, as very low which makes the interaction on WEEE issues easy. As previously mentioned, this was not the case when the PROs were established. The management of the then founded PROs were arguing about the best practices and prices and were heavily competing for the clients. However, the current situation has settled down and the PROs cooperate. The managing director of Serty tells how the competition actually is rather minimal between the PROs. The old members are not being persuaded to change PROs but the competition occurs when new manufacturers appear to the market. The producer responsibility field has settled and drastic changes do not happen. An example of a big manufacturer change was when Sony switched from Serty to ERP Finland which was ordered by company's European head office.

Serty is facing similar difficulties as Elker's PROs when it comes so member activity in decision making. The manufacturers are rather passive and mostly fulfilling only the legally required reporting activities. The informant concludes that even the small producers have good opportunities to influence the PRO decision making and actions as they get their voice easily heard due to the inactiveness of other members. Serty is providing information via the online platform that each member has his personal access as well as via email information letters.

ERP Finland has similar issues to the other PROs in Finland too. The members are not as active as they could be. Most of their members are big foreign corporations, and the decision making issues concentrate on European-level decisions. The Finnish representatives in the PRO are rather passive. The PRO has also an electronic reporting platform where the manufacturers have access. ERP Finland provides also frequent information to the manufacturers upon the WEEE issues.

5.1.3 Analysis of the Finnish Case

Upon review of the chains of delegation (Vaubel, 2006) in the relationship between the manufacturer and the PRO, it can be noted that they are rather short in the Finnish systems, as the manufacturers are represented by themselves in the board and annual meetings of the PRO. The link between the PRO ICT for instance and Elker which is the operator, is direct as the board members of ICT are also part of Elker's board which is supervising the managing director and the operations of the PRO. This enables more direct communication and the risk of agent taking over the decision making processes should be low. The chain of delegation for Nokia is presented in the Figure 5-1. below.

Figure 5-1. Chain of Delegation for Nokia and its PRO in Finland.

Nevertheless in the other two PROs outside of Elker organisation in Finland the chain of delegations are even slightly shorter as presented in Figure 5-2. below.

Figure 5-2. Other Finnish PRO-Manufacturer Chains of Delegation.

According to the common opinion of the multiple stakeholders in the Finnish PRO system, the preferred state of the agent-principal relationship (Waterman & Meier, 1998) is the Scenario 7 where both the agency and principal share information. However, a critical observation reveals that the current state actually is more in the Scenario 6 where the information asymmetry favours the agent (see Figure 5-3.). The information supply from the agents' side is actually comprehensive, but the passivity of the manufacturers in the information acquiring and participation in the common information sessions is causing the formation of the information asymmetry. An example of the passivity was described by an interviewee from a Finnish PRO; a common information and advisory event for the EEE manufacturers was arranged in cooperation of the PRO and the government authority ELY Centre regarding the WEEE Directive's recast. Only a handful of manufacturer representatives out of several hundred members took part at the event.

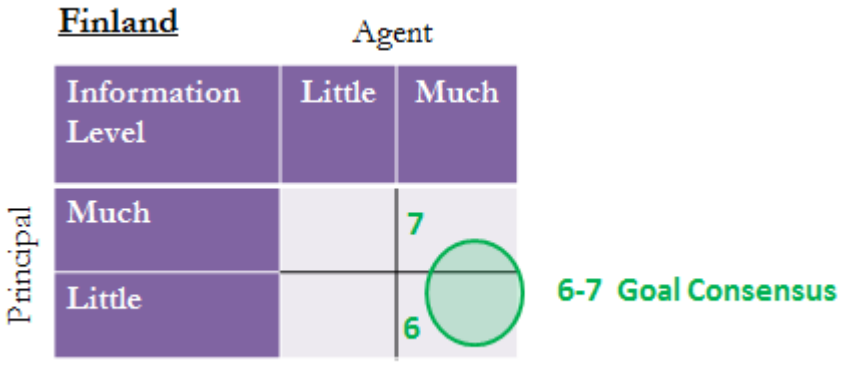

Figure 5-3. The Finnish state of the Principal- Agent Scenario reflecting the manufacturer-PRO goal consensus and information sharing.

In the current situation, the manufacturers' main expectation for the PRO is the fulfilment of the compliance. As long as the operations and responsibilities are run smoothly and without distracting the core business operations, the status quo is satisfactory for them. Nevertheless, the few principals that are involved in the decision-making processes actually turned out to be building their knowledge on the technicalities of the WEEE issues well consistently with the Scenario 7. Therefore it is not claimed that the information asymmetry is completely widespread. The manufacturers involved in the decision making have great significance in the estimation of the suitable scenario of the Finnish case.

The Finnish WEEE management system is based on the waste law that was already in force when the EU WEEE Directive was implemented. The Federation of Finnish Technology Industries gathered a working group which consisted of representatives of different EEE manufacturers with the aim at forming a shared responsibility organisation. The main objectives of the PROs had been established at that time, and the legal basis of each PRO approved by the government authority ELY Centre. Also the external actors have affected the formation of the PROs strongly, and are still influencing their operations. Before the New Waste law was implemented, the government formed a working group from representatives of different stakeholders in the WEEE management field, and took into account their perspectives when forming the new legislation. The currently prepared new WEEE Decree is reviewed by all the related parties and the commentaries from each are considered when finalising it. The ELY Centre is the supervising authority that has ability to decide the guidelines for the PRO operations. Thus, it can be said that the external stakeholders have had significant influence on the formation of the current practices and still are.

5.2 Sweden

In this chapter the information on Nokia Sweden representative's experiences with the PRO are combined to the PRO representative's statements in order to achieve an understanding of the current relationship of the actors. All together the goal consensus and information supply from agency theory point of view are evaluated in the set-up as well. Furthermore other stakeholders' responses upon their relationship with PROs are presented before the country-specific analysis.

5.2.1 Nokia and El-Kretsen

Nokia has been a member of El-Kretsen since it was established. The company is a member through the mobile phone branch organisation that it is owned by the member companies. Like explained above, the decision making in El-Kretsen is based on the suggestions that the branch organisations bring to the agenda. Nokia's Swedish representative meets the other members of the mobile branch organisation (MTB) frequently in service manager meeting which is a forum for all the actors in the mobile phone sector. In the meetings the representative of MTB informs the manufacturers on what is going on in El-Kretsen and any issues with the WEEE Directive and related issues. The current managing director of Nokia Mobile Nordic is in the chairman of the MTB board hence is very actively involved in its operations and decisions. Nokia's operative contact (the interviewee) alongside with the MTB managing director describes the possibilities to bring issues to El-Kretsen very easy. They call each other frequently and discuss any issues whenever they arise. The managing director of MTB has the contacts to each direction; media, labour unions, and other manufacturers, so Nokia is most often operating via him. When MTB's common decisions that will be forwarded to El-Kretsen are made, the manufacturers discuss the issues all together. Good initiatives, related e.g. to refunding or recycling of products, are commonly accepted straightforwardly by other companies. Any issues that arise are handled and usually solved by MTB. Similarly, if Nokia has issues that are wished to be presented directly at El-Kretsen, the representative from the company discusses withthe managing director of MTB who in his turn approaches El-Kretsen. According to the managing director of MTB all the manufacturers have good chances to bring issues to El-Kretsen, as it is a service organisation obligated to serve the members.

El-Kretsen aims at operating beyond the legal compliance and Nokia is content with these objectives. The information that El-Kretsen provides to the members is sufficient according to the Nokia representative. He has access to El-Kretsens producer database with member

log in and finds that the amount of information is actually very wide even in that extent that he does not have time to go through that. Nevertheless, the interviewee from Nokia Sweden indicated that he does not actually have need to go through as he feels confident on what El-Kretsen is doing. The informant's expectations for the PRO are that the compliance issues be fulfilled and that issues are solved in sensible time. The pricing of El-Kretsen has been an issue earlier years but recently the recycling fees have become on a satisfactory level also for Nokia. The mobile phones have today a positive value and this has been considered in the pricing. The Nokia interviewee states that El-Kretsen's operating model is adequate and that Nokia's producer responsibility targets are met along the operations.

5.2.2 Other Stakeholders

El-Kretsen is operating as a dominant producer responsibility actor in the Swedish market. Nevertheless, there are several other stakeholders involved that are influencing the operations of the El-Kretsen.

Other manufacturers were also interviewed about the relations with El-Kretsen as well. The interviewed manufacturer representatives are from Samsung Nordic, Canon and Hewlett-Packard (HP). The representative of Samsung Nordic is a very active member of the PRO as he is also representing the ICT trade association as a member of its environmental council. When discussing his viewpoints from a single manufacturer point of view the interviewee indicated that the opportunities to influence PRO's decisions and actions are very strong as the branch organisations are very active when it comes to cooperating with its owning members as well as with El-Kretsen. Samsung is satisfied with El-Kretsens work and the expectations for the company have been met, according to the informant. The main expectation is that the producer responsibility issues are handled efficiently and that any changes are met proactively in order to ensure the manufacturer's smooth adaptation to them. The information supply by El-Kretsen is satisfactory, as well as other informants; also Samsung's representative has the access to the web based data platform provided to the manufacturers. In addition to that he receives regular information bulletins and emails that keep him up to date. The interviewee indicates that the cooperation via the branch organisations and El-Kretsen is taking efficiently even the competitors common causes.

The interviewed Canon representative describes the company's relations with El-Kretsen good. The PRO has been the company's choice due to lacking other relevant options. Nevertheless, they are content with the PRO. Canon has been an active member of their industry branch organisation for several years but stepped aside from the decision making committee three years ago. Nevertheless, they still experience the opportunities to influence good as they can bring up issues to the branch organisation that takes them forward to El-Kretsen. Yet, the interviewee criticises that changes happen rather slowly and even though the producers are heard, not everything is executed. For example Canon wanted to establish smaller collection points for small and medium sized companies. Information supply from El-Kretsen is considered to be good and transparent. The producer can access info through the web based platform but adds that it is not viewed so often. El-Kretsen provides information through bulletins and meetings that are arranged twice a year in order to discuss bigger issues with all the producers. Canon aims to always have representation in these meetings. The PRO is fulfilling the company's expectations; it complies with the legislation with a good price and keeps up the relations with other stakeholders. All together the PRO is fulfilling the expectations of the manufacturer well and the information change is good and transparent. However, competition on the PRO field would be welcomed by Canon and a national clearing house system would be pleasant for them.

HP's representative had the most critical perspective about El-Kretsen and its position in Sweden. The interviewee has been involved with the WEEE and PRO set-up in Sweden since the beginning. He reports, that HP was strongly arguing for competitive PRO set-up in the national system. He thinks that monopolistic PROs, which El-Kretsen almost is, weaken the producers' possibilities to influence the actual environmental goals of WEEE collection by focusing on contracts and collection methods. It took several years to set a satisfactory system for everyone and the variety of producers have brought own challenges in the process. The interviewee sees the positive in the system with the industry branch organisations; they have brought clearness in the consensus as the issues are first handled on specific industry level. In the beginning HP was communicating with El-Kretsen at least every second month, but the frequency has diminished due to the settling of the whole system. HP is satisfied with the information supply that El-Kretsen provides, and utilises only a limited amount of the information from the system. HP Sweden's reporting is made in Germany, and the local environmental manager is taking care of the policy issues and today specifically the WEEE Recast issues. HP is rather concerned about the price changes that El-Kretsen has executed. For a big producer, like HP, even smaller percentage deviations have influence. Only the past year has been satisfactory due to the changed situations with the WEEE prices. HP is striving for its own goals and that they would be met also by El-Kretsen.

The **other operator in the PRO field** in Sweden is the Elektronisk Återvinning I Sverige Ekonomisk Förening (EÅF) that is based on an insurance system. The organisation's decision making happens in the board that has two producer representatives. The other members are specialists in logistics, insurance, politics etc. The managing director is assisting them by introducing issues and executing the operative functions. The interviewed managing director of EÅF indicated the same issue that is facing El-Kretsen and the Finnish PROs as well; the passivity of the manufacturers. They do not interact much with the PRO, mostly only about the price issues, whenever they arise.

El-Kretsen and EÅF are interacting on regular basis due to the clearinghouse arrangement they have. The clearinghouse is operating specifically in the Northern Sweden where EÅF does not have a wide collection network. According to the informants from both sides, the cooperation is working well; the representatives of the competing PROs meet quarterly in the clearinghouse board meetings. Meetings deal for instance with legislative issues and clearing calculations and even according to the representative of the Swedish EPA, the consensus and dialogue has been found courteously.

Naturvårdsverket, the Swedish EPA, is the **supervising authority** for WEEE issues in Sweden. It operates under the environmental ministry of Sweden. The EPA is the national connection to the European Commission; whenever there are new WEEE issues coming from the EU level it is the Swedish EPA transposing and distributing the information in Sweden. When discussed with the representative of the EPA, it became apparent that the communication between the other actors is very active. The EPA is supervising but also advising the manufacturers in order to meet the producer responsibility requirements. The agency is also communicating the WEEE issues to the government; at the moment for instance the WEEE Recast issues.

According also to the Swedish **EPA representative**, the dialogue with El-Kretsen is very active. They have discussions at least twice a month, and in case there are some special cases that require more attention, they might communicate even twice a day. However, the EPA does not have enforcement power on El-Kretsen but on the manufacturers. Via El-Kretsen though they reach most of the Swedish producers very efficiently and they use this

opportunity to communicate new legislative issues. Nevertheless, it can sometimes be also slightly troublesome; when then EPA needs specific information from individual manufacturers they tend to stay behind El-Kretsen and expect the PRO to give the information on behalf of them. El-Kretsen is most often willing to give this information upon request as the contract between the PRO and the manufacturer allows that without risking confidentiality. Most often all the communication upon the manufacturer issues happens via El-Kretsen as they are also reporting almost all their members' annual WEEE figures.

The informant from a **recycler** Stena Technoworld ("Stena") in Sweden has a distinct relationship with El-Kretsen; the company operates only as the pre-treater and recycler for the consumer appliances as the municipalities have the exclusive role of the collection and transportation. Stena reports all their activities once a year to El-Kretsen who in addition also audits them. Nearly all other communication happens through El-Kretsen as well; for instance Stena barely interacts directly with the municipalities as the contracts are dealt by El-Kretsen. Stena has big lobbying initiatives especially in other European countries. In Sweden the system is so long developed that the lobbying is not seen necessary. According to the informant from Stena, the Swedish system with El-Kretsen's domination is in a good form as the system has been established so early on in 2001. The informant considers El-Kretsen the best functioning PRO when compared to other Stena's operating countries. The main competition in Sweden happens between the three biggest recyclers; Stena, Kuusakoski and Sims.

Municipalities' national network's representatives from Avfall Sverige describe the WEEE collection scheme reasonably clear in Sweden, compared to e.g. packaging system. The responsibilities and rights to the waste are clearly defined by the law, and each party is operating accordingly. According to the informants from Avfall Sverige, the weaknesses are only the distances that cause logistical challenges from smaller villages. This El-Kretsen has been working on together with the municipalities by arranging different types of collection points for small household electronic appliances, for instance in the connection to local super markets. This is a good example about the good cooperation between El-Kretsen and municipal collectors. El-Kretsen has also very close relations to Avfall Sverige and together these two organisations aim at directing the campaigns at consumers. All the practical communication from the municipalities towards the manufacturers happens through El-Kretsen. El-Kretsen and Avfall Sverige meet annually two or three times. The municipalities ask Avfall Sverige's representative to discuss certain issues with El-Kretsen and this way the information is distributed to the manufacturers side as well. This way all the stakeholders are continuously informed.

Throughout the Swedish WEEE system the municipalities have been content to the responsibilities and compensation they receive from the collection services. Constantly the municipalities and their representatives from Avfall Sverige are negotiating upon the most efficient ways of collecting the WEEE. In 2012 the municipalities will actually even get extra pay-back from El-Kretsen due to the increase material prices and this will be tied to the efficiency of the collection system.

5.2.3 Analysis of the Swedish Case

The Swedish system is based on the different interest groups and their cooperation on different levels. El-Kretsen has an extremely dominant role in the whole system. This however was not seen as a negative aspect by nearly any of the interviewed stakeholders.

When the chain of delegation (Vaubel, 2006) between the manufacturer and El-Kretsen is estimated it can be noted it is consisting of four links as presented in Figure 5-4. For example for the mobile phone manufacturers the first link of the chain is the link between them and the branch organisation MTB. The manufacturers form the board and assign the operations to the managing director of the MTB who then represents the whole branch organisation and its members in the board of El-Kretsen. This board in its turn makes the decisions and assigns them to the managing director of the organisation. Despite the longest chain of delegation in the studied cases, the communication level is very good. This probably happens because of the strong representation and specialist knowledge of the branch organisation. The cultural informality between the actors enables very direct and open communication. Sometimes one link is even left aside when the manufacturer contacts the managing director of the MTB directly.

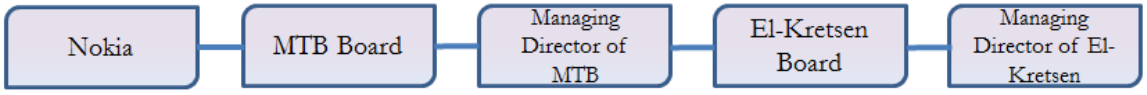

Figure 5-4. Chain of Delegation for Nokia and its PRO in Sweden.

The aim of the Swedish PRO system is also to uphold open discussion and share information. From Waterman and Meier (1998) Scenarios the desired one is Scenario 7 where the both the principal and agent have information and the technical expertise is developed by each over long period. Nevertheless, after discussing with representatives of different stakeholders in the chain of delegation, it has become apparent that the current situation is similar to the Finnish one where the manufacturers are not being very active thus the information is getting asymmetric bringing the scenario closer to Waterman and Meier's number 6 (see figure 5-5). The manufacturers' main goal also in Sweden is to comply with the WEEE legislation and as long as there are not any business distracting issues they tend to stay out from the PRO activities unless they are members of a board. The PRO is providing information and updates of the current WEEE issues but most often that is not very high on the manufacturer's interest lists.

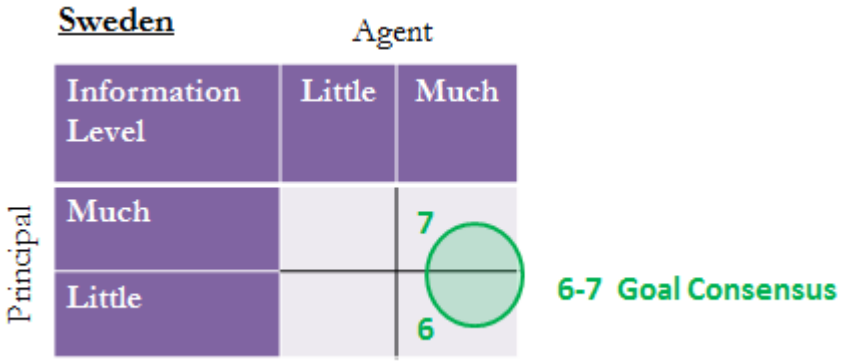

Figure 5-5. The Swedish state of the Principal- Agent Scenario reflecting the manufacturer-PRO goal consensus and information sharing.

The influence of other external actors on the PROs' operations is obvious. The close cooperation based on agreed systems and the waste collection responsibilities for municipalities is setting the PROs in close relationship with one external actor. The PROs do not make decisions on waste collection operators by themselves but the municipalities are a solid part of the process. Also the supervision by the Swedish EPA is influencing and guiding the operations to the direction it sees is the correct one. However, El-Kretsen has a stable and extremely influential position on all the WEEE issues in the Swedish market.

5.3 The UK

In this chapter the information on Nokia UK representative's experiences with the PRO are combined to the PRO representative's statements in order to achieve an understanding of the current relationship of the actors. All together the goal consensus and information supply from agency theory point of view are evaluated in the set-up as well. Furthermore other stakeholders' responses upon their relationship with PROs are presented before the country-specific analysis.

5.3.1 Nokia and Valpak

In the UK Nokia does not have the same status within a PRO than it has in the Nordic countries. The UK system is a fully competitive where the PROs are profit making organisations. This causes specifically a strong price competition between the PCSs. According to the representative of Nokia UK, price undeniably is the most crucial factor today when choosing the PCS. Initially, when the producer responsibility legislation came into force in the country and along came the PCSs, the criteria Nokia had in choosing the PCS were good technical knowledge from the PCS side as well as good understanding of the legislative processes. Today the PCSs are seen more as commodity; you go and buy the services from the ones who are most cost efficient.

When Nokia needs to contact the authorities this does not happen through the PCS like in the Nordic countries, but by direct contacting. According to the interviewee from Nokia UK, they have reasonable relationships to the government department. The interviewee reports that they don't need Valpak or any other third party to communicate on behalf of them. The governmental agency keeps direct contact with the UK manufacturers and for instance the Nokia representative is on the government's mailing lists where he receives up-to-date information directly. Nokia does not directly rely on Valpak as a consultancy in WEEE issues. For the company Valpak is functioning only for data submission services only. However, the interviewee underlines that there no conflicts of interests with Valpak.

As the PRO is basically providing the data submission services, Nokia does not have other deeper expectations when it comes to Valpak's operations. The interviewee is satisfied with the information amount he receives from the PCS; they have a quarterly discussion upon required issues, and in he can access Valpak's online information bank with free compliance services whether extra information is needed. This web based platform is actually an extra service that is not a standard provision by all the PCSs. The interviewee from Nokia UK does not have sufficiently time to go through all the information provided by Valpak, and besides he is not that concerned about the supply. What is the most important driver in the operations between Nokia and Valpak is eventually just the price, he concludes. However, he adds that whether he needed some information quickly he could contact the Valpak representative directly and he would get the info without delays.

Nokia has considered changing the PCS in the UK. The consideration was caused by dissatisfaction in certain services provided by the PRO. Nokia arranged a tendering to PROs

but eventually Valpak could response still with the best price due to the long cooperation period earlier. Nokia re-accepted Valpak's offering and eventually also the administrative problems that were faced earlier were fixed. Today the cooperation is working on a satisfactory level again and Nokia's representative does not have intentions of changing.

5.3.2 Other Stakeholders

Other manufacturers' representatives from Sony Computer Entertainment Europe (Sony PlayStation) as well as Samsung UK were interviewed also. These both are members of ERP UK. Sony is the founder member and the owner of ERP and has always had a strong position in the PRO. Nevertheless, the company is aware of the competitive markets and observes them in order to keep their own contract competitive. For Sony PlayStation it is important that the prices are stable throughout a year and competitive enough. The most important role of the PCS for them is to keep Sony PlayStation compliant. Other qualities that are looked after are the possibility to review and discuss the contract conditions and also that the communication is on a good level so that the PCS listens to the producer. The interviewee states that the best and basically only phase where the producer can really influence the PCS is the contract making phase. After that the responsibility has been transferred to the PCS and the producer actually does not even expect to know all the operative decisions. However, the interviewee indicates satisfaction to the information system transparency of the PCS; he can contact the ERP committee whenever and gain information. In addition to the main ambitions of price efficiency and compliance, the interviewee indicates long-term strategic development as an important element. As the producer commitment to PCS is often very long, it is important that the PCS has clear and satisfactory views also on long term strategies.

The representative from Samsung UK is on the same track with his peer from Sony PlayStation; he tells that the contract formation is the most important phase when it comes to the manufacturer opportunities to influence on the PCS organisation's decision making. Later on, the producer can participate on influencing the policies but the operational topics are not in the scope any longer. The interviewee tells that they respect the autonomy of the PSC; the organisation is doing an outsourced job that it is paid for. The company expects the PCS to be compliant, to operate with good quality and to bring positive image in the PCS's marketing promotion. Samsung's representative is satisfied with the information supply provided by the PCS. They communicate on monthly basis on the return shares, charged amounts and other spending. Quarterly they also meet to discuss any constant issues. Samsung reviews the PCS contract annually. However, changing the scheme is not simple and would require a lot of effort. The company still aims at having an active role in the discussions with the PCS as it does in all its European PROs.

Government authority Environment Agency in the UK is the supervising authority for the PROs/PCSs in England and Wales. According to Environment Agency's informant, with regards to their interactions with the Schemes, they are responsible for assessing their initial application for approval as a PCS. Once approved, PCS's are assigned an Account manager – a member of the Environment Agency's Producer Responsibility Regulatory Services (PRRS)– to whom they are accountable and can contact if they have any queries. PRRS regulate PCSs, by monitoring their operations to ensure that they are complying with the conditions of their approval, and that they are on track to meet their producer members' obligations. The Environment Agency also offers advice to PROs with regards to the Regulations.

As the EEE producers must register with a PSC, the scheme will then register the producers with the Environment Agency on their behalf. EEE producers submit details of the amount

of EEE they are placing on the market to their scheme who will submit this data on a quarterly basis so that the agency can calculate a scheme's obligation. According to the informant of the Environment Agency, the agency sometimes receives queries directly from manufacturers in relation to their obligations under the WEEE regulations. For example, quite frequently they get enquiries as to whether specific products are covered by the regulations and hence whether the producer in question is required to join a PCS. The **municipalities** do not have a similar substantial independent role in the WEEE management system, like in the Nordic countries. They have responsibility to collect from the households and then they can sell the collected WEEE according to the contracts with the producer or to other operators.

A representative of a **recycler and PCS** Datec was interviewed about the communication issues in the WEEE field as well. In the UK it is possible for recyclers also to register as PCS and operate in both fields. For instance, for Datec not all the recycling service customers are PCS customers. According to the informant, they are allowed to sell parts of contracts meaning that they can operate in very specific WEEE sectors if wanted. For WEEE PCS they have 13-14 customers and the company is not aiming to look for more but to look after the current ones needs better. As a recycler, Datec has also authorised WEEE treatment facilities that receive material from all around the Europe. The interviewee underlines the responsibilities of the PCS; by providing the compliance services to the manufactures, they take the responsibility on behalf of the manufacturers. The information received from the clients is crucial for them; if they don't receive all the data, the Environment Agency sets the sanctions on Datec, not the customer. The scattered responsibilities can therefore bring more challenges, as some customers report parts of their data to other recyclers; it can be challenging for Datec to get all the information they actually should acquire. Because of the importance of the data for the responsibility bearing PCS, it is most often them who strive for information sharing meetings and communication with the customer. The interviewee from Datec states that they have at least one annual meeting where they walk through the compliance requirements and environment for the client.

As a recycler, Datec is specified in WEEE category 3 appliances. The company is rather specialised and small compared to other actors in the UK market. However, Datec has a solid customer base and the company treats WEEE that is distributed from all over the Europe. The company has also a facility in Sweden and they operate together with El-Kretsen to whom they report. Most of Nokia's mobile phones in the UK are treated by Datec.

5.3.3 Analysis of the UK Case

The system for meeting the compliance requirements set by WEEE Directive in the UK is representing very differing operations compared to the Nordic corresponding systems. The PROs, or more precisely the PCSs operated by private companies, provide their services for the manufacturers and are compensated accordingly. The organisations behind the PCS are most often private companies that provide the compliance services, sometimes as a service among other services like recycling. The chains of delegation (Vaubel, 2006) are very short due to the relationship of the parties (Figure 5-6.). The manufacturers communicate directly to the organisation administering the PCS, which in turn operates according to its own operating principles. The manufacturer does not directly influence the strategic decisions made by the operating organisation but its opinions are heard as clients' opinions are heard in profit organisations.

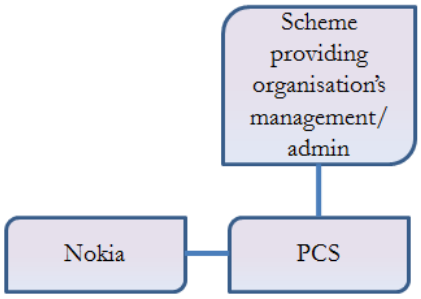

Figure 5-6. Chain of Delegation for Nokia and its PCS in the UK.

When estimated the information change and goal consensus, the UK system is settled to the Scenario 6 by Waterman and Meier (1998). Like in the Nordic systems, the information is supplied by the PCS operators, but the clients are not that interested in getting very much involved in it. Again, due to the passivity of the manufacturers the Scenario 6 is the corresponding one for this case as can be seen in Figure 5-7.. On the other hand, when reflected the answers from a representative of a PCS and his view about how it is sometimes hard to receive information from the manufacturers, the scenario could be even number 4. In this setting, the principals have information but the agents do not, and hence the principals dominate the interactions with the agents with their knowledge, and agents serve them just as personal staff. This kind of a situation can evolve when the actors don't have as close relationship as they do in the Nordic models. Nevertheless, the information change benefits all the parties and in most of the cases it happens well. Thus, the Scenario 6 is valid also for the UK case.

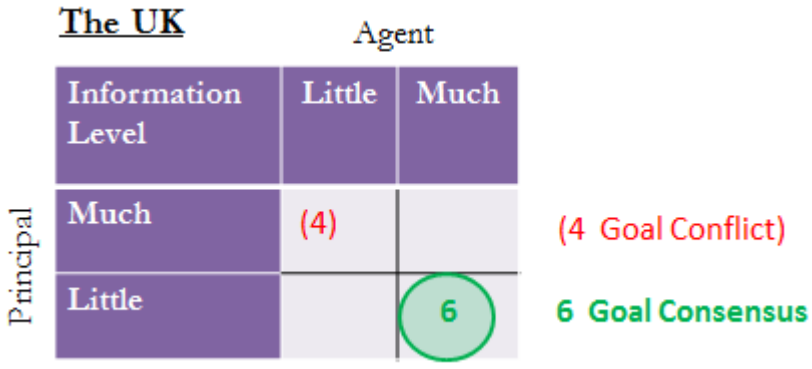

Figure 5-7. The UK state of the Principal- Agent Scenario reflecting the manufacturer-PCS goal consensus and information sharing.

The external actors are influencing the set-up between the manufacturers and the PCS as well. The Environment Agency is supervising the actors and the recyclers are free to collect and buy WEEE. Due to the collection targets that the PCS have to fulfil, they sometimes buy WEEE from each other or from the recyclers. This brings the external actors very tightly along in the field.

6 Cross-National Analysis

In this chapter the three countries' cases are compared with each other and analysed from the principal-agent elements perspective. Following the categorisation of the responsibilities suggested by Lindhqvist (1998) the cases' national WEEE responsibilities are first compared with each other. The influence of the legislative WEEE structures are estimated and then reflected whether they affect the principal-agent relationship. After this, the possibilities for the manufacturers to have influence on the decisions made in the PRO are compared between each case country's PROs. Finally the effect of the other stakeholders on the WEEE management field is compared across the three countries. In the last subchapter other possible theoretical approaches are considered.

6.1 Principal-Agent Elements' Comparison Between the Manufacturers and PROs

The **economic responsibility** in all the case countries – Finland, Sweden and the UK – is allocated to the producers in line with the WEEE Directive. The producers are obliged to respond to the economic liability on their own but also given the possibility to join a common scheme and to transfer the economic responsibility to a PRO or a PCS. In each country the producers pay recycling fees that are set by the PROs in order to cover the WEEE management costs and administration costs. The Swedish PRO El-Kretsen is based on a non-profit principle where the PRO covers only the operating and administration costs with the fees. The pricing did change slightly when the small competitor EÅF entered the market, but all in all, the informants agree that the Swedish cost system is not changing fast, due to the nearly monopolistic position of El-Kretsen. However, in the recent years the costs for the producers have decreased due to the increasing value of the WEEE in general. Unlike the Swedish system, the Finnish system is based on competing PROs. However, the actual competition happens mostly only when a new producer enters the Finnish markets. Nokia's PRO ICT Co-operative is also a non-profit organisation that is collecting fees in order to cover the WEEE management costs. The same price development has happened in Finland as in Sweden and the manufacturers are more content today with the realistic prices of the WEEE management than before. In the UK the system is based on free markets and competition. The producers in the UK are obliged to join a PCS and the effect of the competition between the schemes inevitably influences the pricing. Furthermore, the competition on waste influences the producers financially. They pay for the third party e-waste collection as well as the recycling fees based on the put on market fees, but still do not have the primary access to the waste with positive value. The manufacturers do not have much possibility to "fight" the high prices that generate the PCS organisations' profit, as the cost structure is very similar in all the PCSs.

Costs for the producers in the PRO very concretely affect the relationship between the actors. *The producers expect value for their fee payments and whether the prices get too high they can either change the PRO or in other cases bring the price issue to the board (specifically in PROs where producers are the owning members). Thus economic responsibility does have influence in the principal-agent scenario.* In the Nordic case countries the prices are set as low as possible just to cover the operative and administrative costs of the PROs. This year in Sweden the producers even got paid back due to the positive value of the e-waste. In the UK the costs are notably higher due to the business nature of the PCSs. However, in principle the price competition between the multiple PCSs enables the producers to tender the schemes and require lower prices proportionally. The principal-agent relationship can also be influenced by the monetary measures when it comes to the information sharing and goal consensus; transparency in the

recycling fee formation ensures to the producers that the PROs are operating on their behalf, not the PROs goals primarily.

The **physical responsibility** varies slightly in the case countries. The common principle is that the producers are primarily responsible for organising the physical collection, treatment and recycling and then those they pay accordingly. In Finland the responsibility is appointed only to the producers who in turn have outsourced the responsibilities mostly to the PROs that arrange the activities with the municipalities and recyclers. In Sweden, the producers have the primary responsibility to arrange the WEEE management. Like in Finland, this is most often done through a collective responsibility organisation El-Kretsen. The municipalities are contracting with El-Kretsen and take care of the collection. Also in the UK the law sets the primary waste management responsibility to the producers: They are obliged to finance the processing of household WEEE by operating through designated collection facilities if not joining a PCS in order to ensure the collection, subsequent treatment, re-use, recovery, recycling and proper disposal. Nevertheless, any individual actor such as recyclers or municipalities has a right to collect e-waste.

The issue of physical responsibility is of great interest to each stakeholder. The Directive requires clear physical collection targets and in every country each actor works on collecting the maximum possible of the collectable WEEE, for legal compliance purposes and also for earning purposes. *In the interviews of both the manufacturer and the PRO representatives, in every case country, it became apparent that they share the goal of collecting the required quantities and beyond whenever possible. In the principal-agent setting, the consensus over physical responsibility opinions was the biggest consensus is what tthe producers and PROs in every country had in common.*

Furthermore, the reporting requirements to the authorities unite the producers and PROs when it comes to common aims. This can be seen when comparing the **information responsibilities** in each case country. In Finland and Sweden both the producers are responsible for reporting the collected WEEE to the PRO which in its turn reports to the authorities. In the UK the setting is slightly different: the law makes the PCS the officially responsible party for the reporting after the contract with the producer has been made. Nevertheless, *in all cases the stakeholders are obliged to report the WEEE data forward and hence there is goal consensus in the sense that the WEEE data needs to be provided timely and correctly.*

When **other elements for influence** are reflected upon in the principal-agent setting between the manufacturers and PROs, the *ownership structure* is one of the key fundamentals. In Finland and Sweden Nokia was one of the founder members of its PROs. In Finland the company has had significant status in the national industry and it has gained a strong influencer position from the beginning even though the company's total WEEE quantities in tonnes are lower than e.g. the white goods' volumes. Since the establishment of the producer responsibility system, Nokia has had a solid position in its PRO as a board member and hence has had the possibilities to influence the direction of the system. Both in Finland and Sweden the historical setting has given Nokia a rather strong position in the system. In Sweden Nokia has also been part of the industry branch organisation since the beginning when these organisations set up El-Kretsen. The difference between these countries' PRO ownership structures and the length of chains of delegations are apparent. In Sweden where the ownership occurs through the industry branch organisation, the chain of delegation is longer than in Finland. Contrary to Vaubel (2006) theory where the longer chain indicates more difficulty in circumstances for gaining influence, it seems that the Swedish system is actually more efficient than the Finnish one when it comes to influencing the PRO decisions. In Sweden the mobile telecom industry branch organisation (MTB) is strongly dedicated to industry specific issues and the producers do not have to individually agree with other EEE

categories as the MTB representative does it on their behalf. It is mostly enough for the mobile phone producers to agree with each other first. In Finland the producers respond for themselves in the PRO which brings them to the decision making processes along with other WEEE categories in ICT. Resultantly, consensus building can be more challenging.

In the UK however the company has not been involved with the establishment of its PCS. The completely different operational environment has led the UK system rather far from the Nordic systems. The company's opportunities to influence occur in the contracting phase, but after it is made, the responsibilities are transferred to the PCS and the company cannot participate in the operational decision making process. Despite the differing structure, all the stakeholders seem to agree with the common goal of collecting all the available WEEE.

Probably the most significant element in the principal-agent set-ups was *information*. Its sharing, transparency and the activeness of the parties in utilising it were the aspects assessed. From all the different case countries the message from the manufacturers was the same; information supply from the PRO is sufficient even to the extent that the producer does not have time or even interest to view all of it, but just what is most relevant. In most of the PROs the reporting system is electronic which also provides a company-specific log in for the producer to the information database. What became obvious was that the producers are not keen on viewing additional information but they use only what is necessary. The producers in all the countries in question replied that after transferring the responsibility to the PRO or PCS, they like to be involved only in the basic reporting activities. This causes the information asymmetry when evaluating the Finnish and the Swedish systems. According to the multiple principal-agency theory the asymmetry occurs when parties do not provide all the information to each other. However, in this case the information is provided but it is neither viewed nor utilised by the producers. In the UK especially where the price is so much more significant than in the Nordic countries, the producers expect to get services for their money. Thus, they do not want to interfere in the PCS operations and are not actually expected to, due to the content of the contract between producers and the PCS.

The evaluation of the goal consensus and information supply was made based summing up the replies the interviewed producers and PROs gave. The producers agreed that the PROs are operating towards the same goal they have when it comes to their expectations: legal WEEE compliance. This was also the main target of the PROs. Hence it was unanimously evaluated as a situation from the goal consensus matrix where both agree. The producers experienced that also the information supply was on a satisfactory level, as did the PROs; and again it was evaluated that the consensus was good on this level too. Hence the Scenario 6 by Waterman and Meier (1998) was chosen to represent the current situation. However, the result may have had been different if small and medium sized producers were also interviewed. The least active producers might experience the inquired questions differently. Also if the scenarios were viewed from other than producers or PRO's point of view, differing views might have been attained.

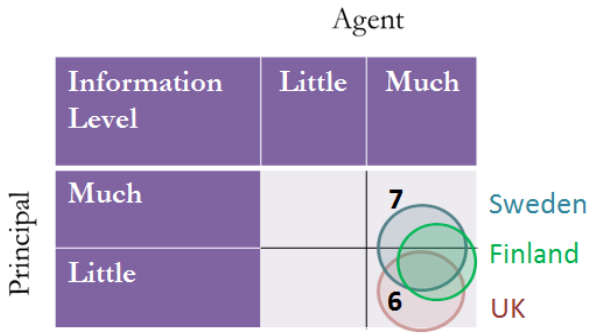

Figure 6-1. Cross-national Principal-Agent Scenario of the case countries reflecting the manufacturer-PCS goal consensus and information sharing.

6.2 Other Stakeholders

The other stakeholders in this study include the recyclers, authorities, and municipalities. During the interviews it became apparent that all of these have influenced the WEEE management system in the countries in question and simultaneously also the operating situation between the producers and PROs.

The recyclers are significant actors in each country. They are the contracting parties with the PROs in all the cases. In each case country also the recyclers have been heard by the authorities when the national WEEE legislation and producer responsibility was defined. In Sweden the interviewed recycler indicated that they are content with the situation. Despite the competition between the recyclers, they are equal when it comes to El-Kretsen's tendering rounds. The interviewee also revealed that they have the right to collect WEEE by themselves as well parallel to the municipal collection system. This WEEE is mostly B2B appliances and it is reported to El-Kretsen annually who in its turn report it Swedish EPA. Contrary to this, in Finland the recyclers are not as content with the way the Decree situated them in the waste management field. The Decree states that the producers exclusively have the primary right to the waste. The new upcoming Decree leaves the recyclers off from the waste collection scope and gives them the sole right to tender for treating of the collected WEEE from the manufacturers. The recyclers have strongly indicated their dissatisfaction on this decision and see the decision is discriminating them. This causes tension between the recyclers and the manufacturers every now and then. In the UK on the other hand the recyclers operate in the free markets and often even as PCS. This allows them to operate in WEEE collection and treatment without restrictions as long as the facilities fulfil the legal requirements. The competition over the waste is most observable in the UK but still it has by far the highest prices which make the setting rather unique.

The municipalities are most involved in Sweden where they have a solid role as the household WEEE collector. The agreement with the PRO El-Kretsen has ensured that they became significant actors in the WEEE management field. In Finland the municipalities have also gained a stable position as the collector of household waste. This is not specifically set in the legislation, but yet their collection work cooperation is the only way for the PROs to ensure that the legal requirement of covering the collection network in the whole country is met. The municipalities have also been heard as a stakeholder group in the Decree formation. On the contrary in the UK the municipalities are a minor player in the WEEE collection

field. They do collect household e-waste but are competing with the other actors such as private collectors and recyclers. Hence, the municipalities are considered an influencer equal to other WEEE collectors in the UK WEEE management system.

The authorities are obviously strongly involved with the WEEE management field in each country. They are the supervisors and the regulators of all the activities that concern the WEEE issues. In all the case countries the PROs and PCSs are obliged to report to the authorities. All the same, the government agencies provide information and often have open dialogues with the manufacturers. As a consequence the authorities could be considered as one of the principals in the multiple principal and agency setting, as they require transparent information and compliant activities (information supply and goal consensus) from the PROs in order to enhance environmentally sound WEEE management with the purpose of being able to report national collection rates at the EU level.

6.3 Other Reflections

In several occasions it became apparent that the relationship between different stakeholders in both Finland and Sweden is very casual and the barriers to discussing issues are very low. Interviewees from the Nordic case countries reported that they can contact any stakeholder representative directly without formalities. This did not come up in the UK case: Perhaps due to the intense competition the stakeholders in the UK are not willing to share knowledge as much. Another reason can be in the formal and more bureaucratic underlying practices when working with each other. As well as this the difference in the sizes of the national markets could affect this issue. The WEEE systems are built on existing national systems that have evolved over decades. This might suggest a need to reflect upon the cases and the set-ups from cultural and societal point of view. For instance the differences in national WEEE operation behaviour between all the stakeholders could have been studied through Hofstede (1982) cultural dimension framework. On the other hand different types of societies could have been studied closer in order to find out whether their structures might have influence on the formation of the current EPR and also PRO systems.

The study in terms of the research questions and objectives was set up in such way that it could be conducted in any other European country's producer-PRO system. However, as seen already in the results between the Nordic case countries and the UK, the generalisation is not simple as the set-ups are profoundly different. If other European cases were included it would be very probable that there would be new types of set-ups and new types of viewpoints. In this study it was found that the internal differences and challenges inside Europe can be indicative of challenges in the implementation of PRO systems elsewhere. However, in between all the policy twists and stakeholder competition, the most important issue remains the focal issue; the individual producer's responsibility to manage the product's end-of-life phase in environmentally sound way even when the operative responsibility is transferred to a PRO. Here would also be a chance to see the influence of the PRO actions to the design change: Whether sufficient information from the different contracting parties PRO is operating with is provided to the producers in order for them to make environmentally sound design changes.

7 Conclusions

The European WEEE Directive was written to meet the growing volumes of e-waste. Along with the extended producer responsibility principle the producers have been strongly engaged in and taking responsibility for the products' end-of-life management. The idea of the EPR has been to ensure the correct treatment and maximal collection of the WEEE and eventually also influencing the design of the products towards more environmentally friendly qualities. The implementation of the Directive has varied in each country as it has been transposed to match the national legislative systems. This has resulted several different practices not the least in the producer responsibility systems. In most of the European countries the producer responsibility system is based on collective responsibility and PROs. The first research question of this study aimed to map out the current circumstances for WEEE management in the chosen case countries; Finland, Sweden and the UK, as well as reflect the differences of the set-ups between the countries.

RQ1: What are the current set-ups of the WEEE PROs and how do they contribute to the differences in manufacturer–PRO relationships?

- What are the legal requirements for the product take-back and information provision and are they in line with practice?
- How does the structure of a WEEE PRO affect the manufacturing companies' opportunities to have influence on the PRO decisions and actions?
- How do the operations of WEEE PROs correspond to the expectations of the manufacturer?

The WEEE set-ups in the case countries were analysed based on the categorisation of responsibilities suggested by Lindhqvist (1998) mapping out the economic, physical and informative responsibilities in the national legislation. The legislation gives also the framework for the producer responsibility as well as PRO operations in each country. The relationship question was reflected using the principal-agent theory, where specifically multiple-principal approach was used.

In the two Nordic countries the WEEE PROs have been established by the producers themselves in order to meet the responsibility obligations collectively. The government authorities defined the regulations and the PROs were formed accordingly. In Sweden El-Kretsen was established by the industry branch organisations and is still governed by the manufacturers via them. Nokia has been involved through the mobile telecom industry branch organisation since the beginning. Later on a small competitor EÅF entered the Swedish PRO market with another type of WEEE insurance system, but could not initiate a proper competition until today. In Finland Serty, the other of the first two set-ups of the PROs, was a joint scheme with a recycler and producers. ICT Co-operative, FLIP and SELT (PROs operating through Elker) operated without the similar connection to the external recyclers. Recyclers were considered as service providers to be managed and coordinated through Elker. Nokia is one of the founder members of ICT Co-operative. In the very beginning after these above mentioned PROs had been established, also ERP was registered as a PRO with strong connection to a recycler. Serty and ERP have now changed into independent actors where the recyclers are external service providers. The PROs want to distinguish the difference between the manufacturers and recyclers, as the manufacturers do have the primary right to the waste. In the UK the system didn't restrict the right for any kind of operator to establish a PCS. Some of the schemes were established by the producers themselves, like Sony established ERP, and some for instance by recycling companies. The

market is free for any actor to set up a PCS as long as they fulfil the requirements of the authorities and comply accordingly. Nokia has chosen its PCS Valpak on the grounds of price initially.

The set-up between the manufacturers and PROs was studied through principal-agent theory. In multiple principal scenario by Waterman and Meier (1998) the main interest is in the relationship between the principals and the agent. The eight scenarios suggested by Waterman and Meier (1998) were estimated in each of the three Nokia cases and the most suitable ones chosen. In the scenarios the information supply and the goal consensus between the actors was estimated. Another principal-agent relationship influencing issue, chain of delegation by Vaubel (2006), was also assessed in each case.

The outcomes showed that today the WEEE PROs after running their operations from five to seven year have found the balance and are forming best practices in the field. Despite the differences in the original basis of the PROs and the current operating systems, the principal-agent relationship is rather similar in each of the case countries. The PROs provide transparent information to the principals, and it is up to the manufacturers themselves whether they utilise it excessively or not. Thus, the scenario 6 by Waterman and Meier (1998) was the most dominant. In this scenario the principal and agent have a goal consensus and share the relevant information. In several cases the producers are not keen to familiarise themselves with all the data available, and hence it could be thought also that the information asymmetry defined in the scenario 7 occurs. A common opinion from the producer interviewees was that they have outsourced their WEEE responsibility operations to the PROs and hence the producers expect the PROs to manage without producers interfering. The main producer expectation for the PRO was the assurance of legal compliance and they did see this being fulfilled and thus were satisfied.

When the chains of delegation were compared, it became apparent that the two Nordic PROs operating with the non-profit principle had longer chains than the UK examples where the producers were not directly included in the decision making process. Although Vaubel (2006) claimed that the longer the chain of delegation is, the harder it is for the principal to influence the agent, it turned out that the Swedish system which had the longest chain was estimated as the most efficient when it comes to consensus and decision making.

The second research question was then viewed by mapping out the other stakeholders' views in the national WEEE management field.

RQ2: How do the other stakeholders affect the WEEE management system in the case country?

Different stakeholders such as municipalities, government authorities and competitors have strong influence on the national WEEE management. The WEEE Directive has influenced all the stakeholders strongly. Even though the countries had already existing WEEE collection systems, the Directive and its requirements changed each of the national laws. In all the countries the stakeholder groups were heard and the dialogue has been open between the government authorities and the other actors. Especially in the Nordic countries the interaction between all the stakeholders is very informal and the threshold to call for a short discussion upon the WEEE issues is very low. The legal framework has not addressed the responsibilities excessively detailed and the stakeholders have had the possibility to form the best practices together. In the UK the different parties do not have such direct way of communication with each other and the responsibilities are more addressed in the legislation, causing a lower need for discussing and agreeing upon issues.

In each country the government consulted with all the stakeholders when the WEEE Directive was transposed in the national legislation. Also in every case country the different interest groups had their own lobbying concerning WEEE issues on their agenda. The new WEEE Recast especially has caused several discussions between the stakeholder groups. Hence, it can be said that the other stakeholder groups have influence on the WEEE management and even the producer responsibility when it comes to forming the legislation. The recyclers and municipalities are influencing the field strongly by being the collectors and recyclers of the e-waste that the PROs are contracting with.

7.1 Recommendations and Future Research

This study found that WEEE PROs have adjusted after seven years in the surrounding national WEEE systems. A company like Nokia selling the same product in all the European countries must attune with each countries' differing regulations. This this was found to be challenging in any country, especially when smaller producers with rather small were examined. This investigation found that a small company's representative responsible for the WEEE issues is not involved with other environmental or sustainability issues. From the PROs point of view this increases the risk of becoming a passive producer. It is recommended that company should have a designated person for WEEE compliance and PRO issues whenever possible. This step would ensure that each company is up to date. Furthermore, in order to avoid the scenario where the agent takes over and the principal lacks information, it is important for the company to have regular interaction with the PRO. Nokia currently has a good representation of environmental professionals who are involved with the WEEE issues around Europe. It is recommended that at least the current status of the WEEE related activities is maintained in the company. Increasing the awareness of WEEE issues internally can enhance the common aims of the company with regards to waste prevention and would eventually advance design change of the products.

The research on PROs is lagging behind. In order to form a better picture on the whole European PRO field, more research on country specific systems should be done. More detailed research involving small producers without an active role in PROs should be conducted. This would produce a more comprehensive understanding on the small producers' possibilities to influence the decision making processes of the PROs and the dynamics in the European PRO systems before taking the next step in the research. Including the retailer sector in the stakeholders would bring interesting research set-ups.

Interviewee Mr. Scuderi from Samsung Europe stated: "The producer responsibility schemes have reached a certain level of maturity [since the establishment of the WEEE Directive]. They went through the childhood and now they are grown-ups". The PROs have settled and found their ways to operate and interact with the producers as well as other stakeholders. Future questions surrounding PROs will not be about the management structures, but about the issues that need to be governed. For instance the price changes of raw materials may increasingly affect the producer responsibility management. Thus, it is possible that the increasing positive material values of e-waste cover all the costs for collection, logistics and treatment and this may change the nature of the PRO activities. Another future research potential lies in the emerging markets. The EPR is "bubbling" both within and also outside of Europe. The same producers who operate outside Europe must comply even when operating outside EU borders. Whether or not the common responsibility system similar to the European one would work in conjunction with other types of legislation, remains to be seen.

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Legislation

EU Directives
Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) (Recast)
Directive 2002/96/EC on waste electrical and electronic equipment (WEEE)
Directive 2008/98/EC on waste (Waste Framework Directive)
Directive 2000/53/EC on End of Life Vehicles
Directive 2006/66/EC on Batteries and Accumulators

Finland
Finnish Waste Law (646/2011) & (1072/1993)
Decree on Waste Electrical and Electronic Equipment (852/2004)

Sweden
Producer Responsibility for Electrical and Electronic Equipment (SFS 2005:209) & (SFS 2000:208)

The UK
Environmental Protection Statutory Instruments (2009 No. 2957) & (2006 No. 3289)

Appendix I: List of interviewees

Country	Type of the organisation	Name of the organisation	Date in 2012	Name & position of the interviewee
Finland	PRO	Elker Oy	June 28th	Sakari Hietala, Managing Director
	Branch organisation	The Federation of Finnish Technology Industries	June 29th	Peter Malmström, Specialist Producer Responsibility, Waste and New Technologies
	PRO	Elker Oy	July 4th	Anu Toppila, Project Manager; Jenni Saarela, Communications Manager; Tuomo Räsänen, Operative Manager
	Recycler	Kuusakoski Oy	July 5th	Risto Pohjanpalo, Director Communication and Corporate Relations
	Recycler	Stena Technoworld Finland	July 6th	Jouni Spets, Managing Director
	Government	Pirkanmaa Economic Development, Transport and the Environment Centre / Producer Responsibility	July 20th	Teemu Virtanen, Senior Advisor
	Manufacturer	Canon Finland	August 9th	Jaakko Muilu, Manager, Environment, Quality & Product Safety Operation
	PRO	Serty	August 2nd	Arto Puumalainen, Executive Manager
	PRO	ERP Finland	August 10th	Juha Rytkönen, Country Manager
	Manufacturer	Nokia Finland	June-Septermber 2012	Helena Castren, Senior Sustainability Manager Europe
	Municipal	JLY - Finnish Solid Waste Association	August 16th	Timo Hämäläinen, Development Engineer
Sweden	PRO	El-Kretsen	July 17th	Jan-Olof Eriksoon, CEO
	Branch organisation	MobilTeleBranchen	August 8th	Mats Holme, Executive Director

	PRO	Elektronikåtervinningsföreningen, EÅF	August 3th	Tomas Tengå, Executive Manager
	Municipal	Avfall Sverige	August 9th	Jon Nilsson-Djerf, Senior Advisor
	Recycer	Stena Technoworld Sverige	August 10th	Johan Herrlin, Marknadschef
	Manufacturer	Nokia Sweden	August 13th	Anders Larsson, Care Manager Sweden
	Municipal	Avfall Sverige	August 13th	Jessica Christiansen, Technical Advisor Hazardous Waste & WEEE / Education Manager
	Government	Naturvårdsverket (Swedish EPA))	August 14th	Pär Ängerheim, Senior Advisor
	Manufacturer	Samsung Electronics Nordic AB	August 21th	Thomas Hedin, Environmental Affairs Manager
	Manufacturer	Hewlett-Packard	September 4th	Hans Wendschlag, European Environmental Program Manager
	Manufacturer	Canon Svenska	Email exchange	Linda Elmén, Manager Environment, Product Safety and Quality Operations
U.K.	Manufacturer	Nokia UK	July 26th	Steve Smith, Nokia UK Care Consultant
	PRO	Valpak	Email exchange	Tilly Necar, Policy Advisor
	PRO	Comply Direct	Email exchange	Moira Drummond-Burnett, WEEE Compliance Manager
	PRO/Recycler	Datec Technologies Ltd.	July 31th	Jeff Borrman, Business Development Director
	Government	Environment Agency	Email exchange	Becca Hartley, Regulatory Officer Producer Responsibility Regulatory Services part of National Trading & Regulatory Services
	Manufacturer	Sony Computer Entertainment Europe Limited	August 30th	Kieren Mayers, Head of Technical Compliance
	Manufacturer	Samsung Electronics European Headquarters	August 31st	David Scuderi, Environmental Affairs Manager