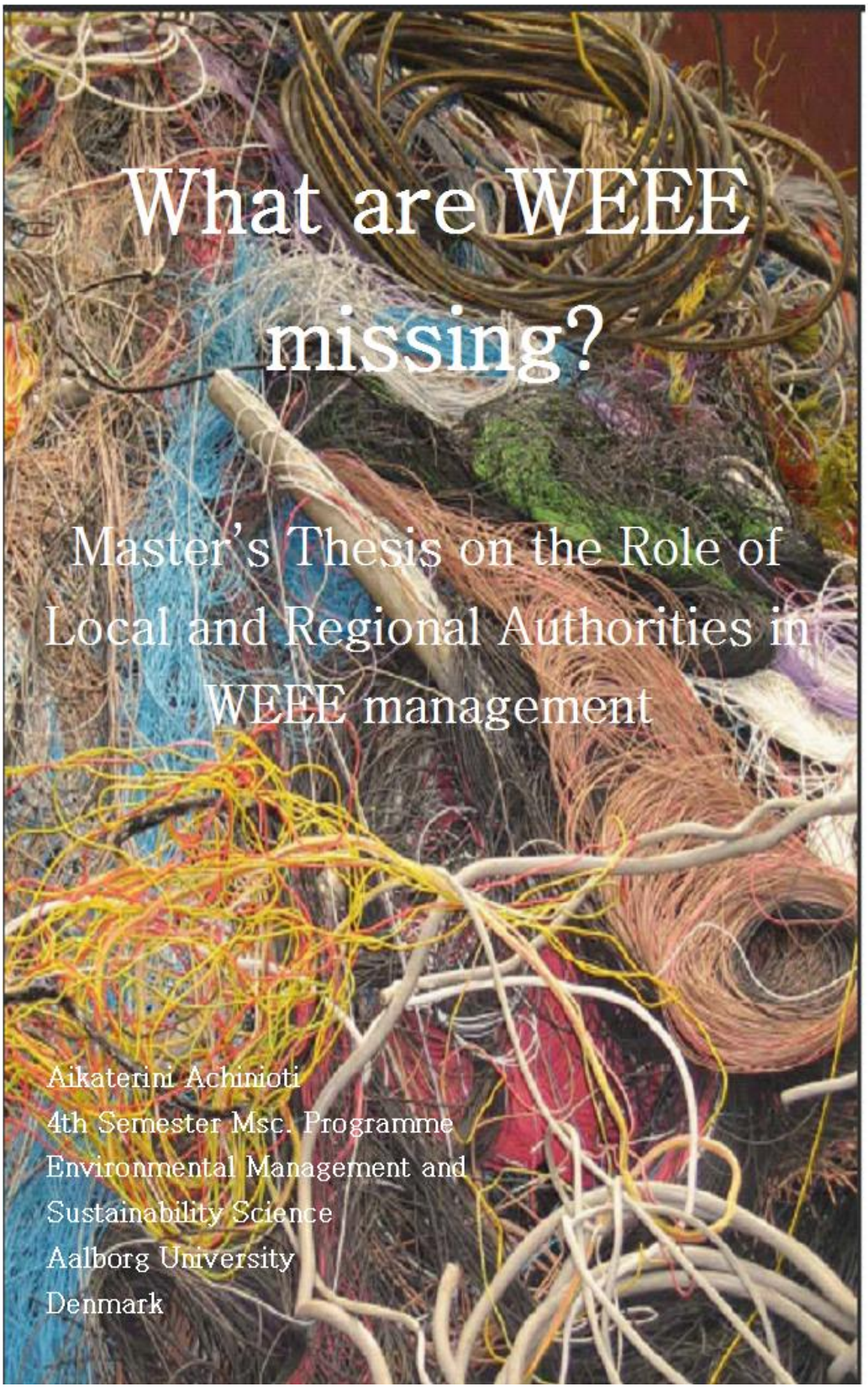

Picture Source: WEEE Forum Annual report 2009

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PREFACE

This thesis is written from February 1, 2012 until June 7, 2012 by Aikaterini Achinioti, student on the 4th Semester at Msc Programme, Environmental Management and Sustainability Science, at the Department of Planning at Aalborg University, Denmark. The theme of the 4th Semester of the Msc Programme is the completion of the Master's thesis. The topic chosen for the thesis is the roles that local and regional authorities should have in order to secure an environmentally sound WEEE management.

The references are stated according to the "Chicago style", surname of the author followed by the year of release. The full reference can be found at the reference list at the back of the thesis. When there is direct quotation, a number after the year appears which indicates a specific page in the reference. If there is more than one publication from the same author, a letter (a, b, c,...) appears after the year of publication.

Appendices A.1-5 can be found at the back of the thesis. Appendices B.1-5 can be found at the attached CD.

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To start, I would like to thank my supervisors Arne Remmen and Kasper Dirckinck-Holmfeld who help me to find my way when I was lost between theory and practice. Your contribution has been valuable for the continuation and fulfilment of my thesis.

Special thanks are definitely due to Anne Herrmann who was kind enough to not only stand me during this period but also actively contribute to my research by:

1. Helping me define my theoretical framework
2. Providing me with literature on governance theory
3. Being present in the interview with Laurent Grouwels, keeping notes and interpreting when needed
4. Helping me with transcribing and translating the aforementioned interview from French into English
5. Providing me with internet
6. Proofreading and commenting my thesis

In addition, I would like to thank Cristina Guardamino who was kind enough to help me with translating the questionnaires into Spanish. Special thanks to Alvaro Lozano who allowed me to use his software in order to call to Spain and he has also helped me with translating from English to Spanish and vice versa.

As a part of my thesis, several interviews have been conducted and I would like to give special thanks to the informants who participated:

1. Laurent Grouwels, Communication manager of Bruxelles-Propreté
2. Javier Ferrer Roig, Project manager of the Ecovitrum project
3. Katrien Verfaillie, Communication manager of Recupel
4. Rodolphe Paternostre, Responsible for EPR in IBGE
5. Peter Sabbe, General manager of Recupel

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ABBREVIATIONS

AIDICO	Asociación de Investigación de Industrias de la Construcción
CRT	Cathode Ray Tubes
EC	European Commission
EEE	Electrical and Electronic Equipment
EPR	Extended Producer Responsibility
EU	European Union
LRAs	Local and Regional Authorities
MS	Member States
OECD	Organisation for Economic Co-operation and Development
PPP	Public and Private Partnership
WEEE	Waste Electrical and Electronic Equipment

ABSTRACT

Waste Electrical and Electronic Equipment (WEEE) is a waste stream that has significantly increased over the past years in European Union (EU) and it is expected that it will keep increasing with a yearly rate of at least 3-5%. WEEE is a complex type of waste which needs special treatment as it contains hazardous materials and precious metals. Acknowledging the seriousness of the issue, the EU adopted the WEEE Directive which allocates the WEEE management responsibility to the Electrical and Electronic Equipment (EEE) producers. However, the following points are out of the Directive's scope: (i) while there is a target for qualitative prevention, quantitative prevention is out of the scope; (ii) while allocating responsibility to EEE producers, no reference is made to traditional actors of waste management, such as local and regional authorities (LRAs).

Extended producer responsibility (EPR) has been the promoted policy tool for WEEE management over the past 20 years with LRAs contributing to WEEE collection. EPR has changed the way of managing WEEE, or the way of governing as the responsibility is shifted from the LRAs to the producers. However, this policy may not be able to secure that WEEE management is done in an environmentally sound manner and traditional actors should be actively involved. The purpose of this thesis is to search for roles that LRAs (as traditional actors not aiming to profit maximisation) should have in order to secure an environmentally sound WEEE management.

Firstly, in order to comprehend the rationale behind WEEE management policies and the roles that LRAs hold, I study governance theory. Secondly, in order to have a practical approach on my focal issue, I chose to study two cases which represent two different types of governance: the case of Brussels region, where EPR has fully applicability and the regional authorities have limited roles; the case of Valencia region, where the regional authority has followed a different approach on managing WEEE by initiating and being the coordinator of the Ecovitrum project.

By studying these two cases, I map out the existing roles in WEEE management and identify the ones that LRAs have and their influence on the environmental performance. However, the mapping shows that some roles are missing as the existing ones are efficient only to ensure and not secure an environmentally sound WEEE management. The latter can happen, with the active involvement of LRAs in actions related to WEEE prevention and reuse.

INTRODUCTION

Humans have never been as dependent on electrical and electronic appliances as we are today. Appliances like mobile phones, PCs, laptops, notebooks, MP3s, televisions, have entered into our daily life and changed it remarkably. People tend to replace their electrical and electronic appliances at a high rate having caused a significant increase in the generation of waste electrical and electronic equipment (WEEE) over the last years. In a study conducted by the United Nations University in 2008, it was estimated that the generated amount of WEEE in the European Union (EU15) in 1998, was 6 million tons (Huisman, et al. 2008). It is expected that the generated amount of WEEE in Europe will increase with a rate of at least 3-5% per year (Hischier, Wager and Gauglhofer 2005).

WEEE is a complex type of waste. It contains different types of materials, several of which are considered as rare. If WEEE were disposed in landfills, this would mean a significant loss of natural resources. The Table 1 below illustrates the percentage of the materials that are contained in EEE, as published by the Association of Plastics Manufactures in Europe (APME) in 1995. (Cui and Forssberg 2003)

Material	**Percentage**
Ferrous	38
Non-Ferrous	28
Plastics	19
Glass	4
Wood	1
Other	10

Table 1: Main materials found in EEE (Cui and Forssberg, 2003)

In several cases, WEEE contains hazardous substances such as mercury, sulphur, cadmium, lead, which can be harmful both to the environment-contributing to global warming, depletion of ozone layer, acidification-and human health (Huisman, et al. 2008). Therefore, WEEE needs special treatment in order to remove the hazardous materials and recover the ones that can be reused.

Acknowledging the seriousness of the issue, the EU adopted a Directive regarding WEEE, the 2002/96/EC Directive of the European Parliament and the Council, which was entered into force in February 2003.

Description of the WEEE Directive

The WEEE Directive sets the general framework for WEEE management which the Member States (MS) shall integrate into their national legislation.

The Directive has been developed within the environmental policy framework of EU which aims at the protection of the environment and the sustainable use of the natural resources (Preamble 1). The purpose of the Directive is to improve the "*environmental performance of all the operators involved in the life cycle of WEEE*" and to ultimately achieve a sustainable WEEE management (Article 1). In other words, the Directive targets to reduce the impact of WEEE and WEEE management operators on the environment.

Article 4 introduces prevention objectives as it prescribes that the design of the electrical and electronic equipment (EEE) should be such that will facilitate dismantling and recovery. Article 5 prescribes that the MS shall establish separate collection systems of WEEE. The Directive further prescribes, that the producers shall be responsible for setting up treatment systems for WEEE (Article 6). In other words, the Directive uses the tool of extended producer responsibility (EPR) for managing WEEE. (Directive 2002/96/EC 2003)

The prevention objectives of the Directive have a qualitative focus and quantitative prevention targets-meaning the reduction of the generated amount of WEEE-are out of the Directive's scope. Although EU claims that "*waste prevention has been the paramount objective of EU waste management policies for many years"* (European Commission 2005, a, 5), the WEEE Directive does not include targets about quantitative prevention creating a gap between the promoted EU policies and their actual applicability. According to the waste hierarchy[1], prevention (quantitative and qualitative) is not only part of waste management, but on the top of it. Reuse comes after prevention and it is worth mentioning that the WEEE Directive does not include specific targets for reuse either. Qualitative prevention and reuse can contribute to waste minimisation and consequently to the environmental protection and the sustainable use of resources (Phillips, et al. 1999). Since WEEE is a waste stream that keeps increasing every year (Eurostat 2012), it would be relevant to involve objectives that will aim to the reduction of the generated amount of WEEE and thereby be in line with EU's environmental policy framework.

While the Directive gives a clear role to the producers, it does not specify the roles that other actors can undertake in WEEE management. For example, Article 5 does not specify how and by whom the collection systems should be set up. The Directive does not provide a mapping of roles of actors that are usually part of waste management systems, such as local and regional authorities (LRAs), consumers, and others more specific to WEEE management, such as EEE retailers and recycling companies.

The European Commission (EC) in an attempt to strengthen the effectiveness of the WEEE Directive has made a proposal for recast. The EC proposes actions to be taken under each stage of the WEEE management. For example, there is a proposal for reuse to be taken into account as recycling target and maintain and even encourage the producer's responsibility regarding financing (European Commission 2008, b).

The proposal does not include any targets for quantitative WEEE prevention. Moreover, there is still no proposal on how or who should have the responsibility of setting up the collection systems. Also, the proposal keeps the focus on the producer's responsibility without suggesting roles that other actors involved in the WEEE management system can have.

[1] Waste hierarchy as presented in the Waste Framework Directive: prevention, reuse, recycling, recovery, disposal (Directive 2008/98/EC 2008).

In the last twenty years, EPR has been used as an environmental policy tool which sets the producers responsible for the entire life-cycle of their product with a special focus on the end-of-life phase (Lindhqvist 2000). The EU has been promoting this policy tool in several waste streams, such as WEEE, packaging, end-of-life vehicles, batteries etc (Sachs 2006). EPR shifts responsibilities that are "*traditionally assigned to consumers and authorities responsible for waste management to the producers of the product*" (Lindhqvist 2000, ii). In other words, one could argue that the traditional ways of governance have changed, as the responsibility has moved from the authorities (public) to the producers (private). EPR could be considered as a different way of governance.

However there are scholars who criticize the effectiveness of EPR. Sachs (2006, 97) mentions that "*EPR may not be living up to expectations*". He argues that EPR does not guarantee that producers will "*design for environment*" and consequently "*sustainable production and consumption*" is hard to be achieved (Sachs 2006, 97). Producers focus on issues that satisfy their interests, and that is usually the maximisation of their profits (Primeaux and Stieber 1994). In other words, they may not be willing to contribute to the environmental protection at any cost. Therefore, in relation to WEEE management, to what extend the EPR tool can secure that the environmental protection comes first in the producers' interests? Should LRAs, as public administrations-meaning non-for-profit organisations-be more actively involved in order to secure an environmentally sound WEEE management?

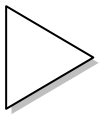
LRAs around the EU have usually an active role to play in relation to managing waste coming from private households as they are responsible for waste collection, recycling and disposal (European Commission 2010, c). According to Eurostat, the majority of collected WEEE comes from private households (Eurostat 2012). LRAs contribute to WEEE management through collection either directly by providing collection points or indirectly, "*through contractors*" (European Commission 2010, c, 17). WEEE management is an extra administrative and financial burden for LRAs. EPR is the promoted policy tool for managing WEEE. (European Commission 2010, c) For example, in Belgium, EEE producers have set up and they operate the WEEE management system in which LRAs have a limited role (ACR+ 2003).

The issue of the role of LRAs in WEEE management was discussed in a seminar entitled "The role of the Local and Regional Authorities in managing the Waste Electrical and Electronic Equipment within the EU framework - A case study: the ECOVITRUM project" organised by the Committee of the Regions[2], in October, 28th 2011, in Brussels. During this seminar people from different scopes (public-private) presented their perspectives regarding WEEE management. The Ecovitrum project is implemented in the region of Valencia, Spain and it is about recycling cathode ray tubes (CRT) screens (coming from televisions and computers) and using them as secondary raw material in producing construction materials. This project is initiated by the Provincial Council of Valencia with the participation of public, private and not-for-profit partners (for further description of the project see Section 3.3).

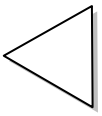
[2] The Committee of the Regions is a consultative body of the EU which provides the local and regional parts of EU a platform to have a voice in the EU decision-making process (Committee of the Regions 2012).

The fact that the WEEE Directive uses EPR as its main policy tool, without describing roles that other important actors (which traditionally have an active role in waste management) can have, prompted me to question if this is enough in order to secure an environmentally sound WEEE management. Given that EPR is a way of governance (in managing WEEE) prompted me to study the ways of governing. In addition, the fact that the Directive leaves out of its scope quantitative prevention targets or direct reuse (neglecting the role that these can play in tackling WEEE growth), prompted me to search for other roles that might be missing and should exist in a WEEE management system.

This thesis initially maps out the different roles that LRAs undertake in WEEE management and the influence they have on managing WEEE in an environmentally sound manner. Ultimately, the purpose of this thesis is to identify the roles that LRAs should have in order to secure an environmentally sound WEEE management. Consequently, this thesis seeks to answer to following research question:



What kind of roles should be undertaken by LRAs in order to secure an environmentally sound WEEE management?



My focal issue is the environmental impact of these roles, meaning that these roles are assessed in regard to their influence on the environmental performance of WEEE management. The framework within which I study the roles is defined according to the definition of the OECD[3] for environmentally sound waste management:

> *"A scheme for ensuring that wastes and, used and scrap materials are managed in a manner that will save natural resources, and protect human health and the environment against adverse effects that may result from such wastes and materials"* (OECD 2007, 9).

Reflecting upon this definition, an environmentally sound management of WEEE assures that WEEE is treated in such way that both human health and environment are protected from the negative impacts that will have a mistreatment of it.

I have chosen to approach the answer to my research question from a practical perspective by studying the case of Valencia and the Ecovitrum project and the case of Brussels region. The cases have a different scale as the WEEE management in Brussels covers the ten categories of WEEE as defined by the WEEE Directive, while in the case of Valencia my main focus is the Ecovitrum project which covers one type of WEEE. Nevertheless, the two cases are not selected in order to be compared but because they represent two different ways of governance which enables me to explore the rationale behind LRAs roles in WEEE management. In the case of Brussels, EPR has fully applicability and the regional authorities have a limited role. In the case of Valencia, by initiating the Ecovitrum project, the regional authority has an active role. By studying these cases, I map out the existing roles in WEEE management and identify the ones that LRAs undertake. This enables me to initiate the discussions on different roles which can be promoted for LRAs in order to secure an environmentally sound WEEE management.

In my thesis, I use governance theory as my theoretical framework. Governance theory helps me to further comprehend the underlying rationale which drives LRAs to undertake specific roles during the

[3] OECD: Organisation for Economic Co-operation and Development

policy-making process, in particular under the implementation phase. In other words, I use governance theory in order to understand the trends of governing and the rationale in WEEE management policy.

In both cases, WEEE management results from partnerships between the public and private sector which entails to discuss the potential advantages and disadvantages of developing public and private partnerships (PPP) as a way of managing WEEE.

The following working questions formulate the general outline of my report and gradually enable me to reach the answer to my research question:

- Which are the main trends of governance theory?
- Why LRAs undertake different roles in WEEE management systems?
- What kind of roles are there in the WEEE management systems?
- What kind of roles LRAs undertake in WEEE management systems and how these roles influence the environmental performance of WEEE?

In the first part of this thesis, I firstly present the methodology used to answer my research question, and, secondly, I introduce my theoretical framework. The second part starts with describing and then analysing the two cases which draws a map of the roles that exist in WEEE management and an identification of the roles that LRAs undertake. In the last part, I discuss the different roles that should be undertaken by LRAs in order to secure an environmentally sound WEEE management.

1. METHODOLOGY

The purpose of this chapter is to explain the methodology implemented to collect and analyse the relevant data in order to ultimately formulate an answer to the research question addressed in this thesis.

1.1 Step one: Literature review

The point of departure of my thesis is the current WEEE Directive, as this has provided me with knowledge on the legal framework set by the EU regarding WEEE and how responsibility is allocated. In order to have an overall perspective on this specific legal framework, I have reviewed studies related to the WEEE Directive, the effectiveness of it, and the relations between LRAs and WEEE management (ACR+ 2003; Davis and Herat 2008). Reviewing studies related to EPR (Lindhqvist 2000; Tojo 2004) helped me to understand the concept of EPR and its usage as a policy tool; critical studies to EPR have also been reviewed (Sachs 2006; Mayers, France and Cowell 2005).

The literature review provided me with the relevant background which enabled me to initially question the effectiveness of the EPR as the promoted policy tool for managing WEEE. Since the WEEE Directive does not provide a listing of the existing roles in WEEE management, I found it necessary for my analysis to map them out. As there are few studies focusing on the roles that LRAs usually undertake in WEEE management and the impact that these roles have on the environment, I identify them in relation to my mapping and later on I discuss if these roles are enough in order to secure an environmentally sound WEEE management.

1.2 Step two: case study method

I have chosen the case study as my research method in order to have a practical approach on:

(i) Mapping out the roles that exist in WEEE management
(ii) Identifying the roles that LRAs have undertaken in my cases and study how these roles influence the environmental performance of WEEE management
(iii) Understanding the underling rationale that makes LRAs to undertake these specific roles (and thereby making the connection to the governance theory).

McNeil and Chapman (2005, 131), when referring to case study as a research method, mention that:

> *"A case-study involves the in-depth study of a single example of whatever it is that the sociologist wishes to investigate. This may be an individual, a group, an event or an institution".*

A case study usually examines a single or two cases, or maybe a group of people or a community and this means that it cannot be representative or generalised. However, it can supplement "*our knowledge and understanding of aspects of social life"* (McNeil and Chapman 2005, 132) and it "*can point to issues which can or should be investigated over a wider range"* (Wellington and Szczerbinski 2007, 93). My conclusions are based on the data as collected and analysed according to my cases. They cannot be representative for all the LRAs around the EU, as each of them has to operate under different

circumstances. However, they can contribute to knowledge related to the roles that LRAs should have in WEEE management.

A case study usually involves the use of several types of methods, such as interviews and observations, which assist the researcher in the collection of the qualitative data (McNeil and Chapman 2005; Wellington and Szczerbinski 2007). In order to collect my qualitative data I have conducted three face-to-face and one telephone interview, and I have sent five questionnaires.

1.3.1 Interviews design

The interviews were designed following four main stages as defined by Wellington and Szczerbinski (2007).

Stage one: *Brainstorming:* At this initial point, I kept notes on all the ideas that I had about questions and areas on which I mostly wanted to focus.

Stage two: *Classifying and categorising*: I created categories and grouped each question under them.

Stage three: *Interview guide:* I sorted the questions and kept only the most relevant to my focal issue.

Stage four: *Interview schedule:* At that last point, I adjusted the language of the questions according to the informants, trying to make the questions as clear as possible.

These stages enabled me to formulate clear questions in order to avoid pitfall misunderstandings which could diminish the validity and credibility of the data.

The method of interview enables me to gather data from specific sources related to my focal issue and it would be difficult to collect from other type of sources. The method that is used to conduct the interviews is qualitative semi-structured interview (Bryman 2004). I have chosen the semi-structured interview form to keep dialogue open while maintaining the opportunity to structure the interview beforehand. In this way the interview stays within the study focus, but still with the possibility to open up new aspects in the interview situation. The questions in the interview guide are designed in such a way that it gives the informant a chance to talk freely about certain areas within some frames. Furthermore, the interview guide is flexible with changes in the order of the questions, making me able to ask additional questions in response to the answer given by the informant. (Bryman 2004).

The interview guide was formulated in accordance with my focal issue and theoretical framework. I have transcribed the interviews in order to provide the readers with all the received information. However, as my aim was to gain knowledge from my informants, I omitted the silent points, face and body expressions (The interview transcripts can be found in Appendix B.1). Table 2 in Appendix A.1 is an overview of the conducted interviews. Table 2 includes a description of the informant, what I planned to gain from the interview, the method used to conduct the interview and considerations regarding the informant. All the interviews, apart from the last one on the table, were scheduled. The last one was an informal discussion and was conducted during my participation in an event of WEEE Forum[4]. In addition,

[4] WEEELABEX Testimonials, event organised by the WEEE Forum on May, 21st 2012, in Brussels, Belgium. http://www.weee-forum.org/weeelabexproject

all the interviews were conducted in English, apart from the first one on the table which was conducted in French. A person mastering both languages was present during the interview and also helped me to transcribe and translate the interview from French into English.

1.3.2 Formulating the questionnaire

In order to further supplement the data relative to the Ecovitrum project and also have the perspective of the partners on the project, I sent questionnaires to the partners which participate in the project. Two main reasons triggered my choice for this data collection method: (i) considering the time frame set for this thesis, I could not have proper time to arrange and conduct interviews with all the partners; (ii) the fact that I do not master the Spanish language. Therefore, my capacity to conduct an elaborated discussion with informants from each partner was limited. The questionnaire was translated into Spanish by a native speaker in order to be sure about the validity of the data collected. The questionnaire and the responses can be found in Appendix B.2.

A questionnaire includes two types of questions: open-ended and closed questions. Open-ended questions give room to the informants to express their own perspectives on the issue. However, this type of questions may require some time to answer and usually the informants avoid answering them. (Williams 2003)

Closed questions provide a "*choice of predetermined answers"* (Williams 2003, 248) and they are fast to answer. The answers can vary from being as simple as a Yes/No answer, to multiple choice or asking from the informants to rank a list of answers. This last type is called Likert scale and the answers have a form of usually 5-level scale. However, the nature of the closed questions may mislead the informant to choose an answer just because it is on the list. (Williams 2003)

In my questionnaire I used both open-ended and closed questions: open-ended, in order to give to the informants the opportunity to express their own point of view regarding the role of LRAs in WEEE management; closed questions, as this enabled me to include specific questions and predetermined answers formulated according to the PPP theory; this enabled me to examine the level at which the theory is implemented in practice. I used Yes/No answers, multiple choice and answers formulated according to the Likert scale.

Table 3 in Appendix A.2 is an overview of the partners to whom the questionnaires were sent, followed by a description of the partner. My main aim is to gain knowledge on why they wanted to be part of the Ecovitrum project, their perspectives on the role of LRAs in WEEE management and the advantages and disadvantages by participating in this partnership. The questionnaires were sent to the partners via e-mail and they all included the same questions. Three questionnaires received back from organisations that represent two different spheres: not-for-profit and private, and this allowed me to assess their participation in the project according to my PPP theory.

The method that I have used to analyse the interviews is by interpreting the answers, meaning that I go beyond what the informant says and try to seek the underlying point. (Kvale and Brinkmann 2008) From the questionnaires, I extracted the points related to the reasons that made the partners to participate to the Ecovitrum project, what kind of advantages and disadvantages they see in the partnership, how do they assess the role of the regional authority in the project, and I integrated them into my analysis and discussions. In order not to lose track due to the amount of the data that each informant provided me, I often returned to my research and working questions and tried to reflect upon the collected data according to them (Wellington and Szczerbinski 2007). This method allowed me to structure my discussions according to my focal issue, my theoretical framework and my informants' answers. Through my discussions, I finally managed to reach the answer to my research question.

1.5 Delimitations

When studying a specific case, a method that can be followed in order to collect data is by undertaking a study trip. Despite the fact that a study trip to Valencia would have offered me the opportunity to see the project in real time and collect practical and updated data, it has not been possible due to lack of economic resources from my part. I could have avoided going into this specific case study, but I found it too interesting to leave it aside. Therefore, I decided to have a long-distance research and gather as much qualitative data as I could through the phone interview, the questionnaires, literature review and the seminar (See Problem formulation) that I have participated.

In regard to the case of Brussels, the description of the specialized processing and recycling companies is done according to the website of Recupel and the interview with Verfaillie (2012). I have persistently tried (through emails and phone calls) to schedule an onsite visit at one of the recycling plants that Recupel collaborates with (Coolrec), but at the end I did not manage to arrange a visit.

2. THEORETICAL FRAMEWORK

This chapter refers to definitions regarding governance theory and the two main perspectives related to governance discourse. A description of PPP and potential advantages and disadvantages of establishing a PPP is also included.

2.1 Governance theory

Lately the discussions about the term of governance have been intensifying. Scholars from several scientific spheres have different approaches on interpreting the term. For example, some dictionaries define governance as a synonym of government (Stoker 1997) whereas Rhodes, who is among the most well-known theorists about governance, states that governance is "*a change in the meaning of government; referring to a new process of governing; or a changed condition of ordered rule; or the new method by which society is governed*" (Rhodes 1996, a, 652).

The notion of governance is intensively discussed within the EU. In 2001, the EC published the White Paper on European Governance in which the term *"European Governance"* refers to "*rules, processes and behaviour that affect the way in which powers are exercised at European level"* and its core characteristics are *"openness, participation, accountability, effectiveness and coherence"* (European Commission 2001, d, 8).

Rhodes (2007, b) states that, the core elements which prompts the discussions about governance are the establishment of "*policy networks"* and the "*hollowing out of the state".* The term of "*policy networks"* means the connection and the relationships developed between "*governmental and other actors"* in order to achieve positive outcomes that fit common interests. Rhodes (2007, b) believes that the establishment of these networks derives from the idea that organisations depend on each other's resources in order to achieve goals. By the term "*hollowing out of the state"* Rhodes means the decline of the state to the extent where the state is not enough or does not have enough resources to steer effectively. (Rhodes 2007, b)

On the contrary, Bell and Hindmoore (2009) argue that governments have to cope with several "*policy challenges",* but it does not mean that they have lost their capacity of governing. They believe that the state is "*pre-eminent"* and they define governance as "*the tools, strategies and relationships used by governments to help govern"* (Bell and Hindmoor 2009, 4). Bell and Hindmoore argue that governance is a matter of quality (how) and not a matter of quantity (how much) and they believe that "*government (...) and all the public bodies which together constitute the state are and should remain central players in governance processes"* (Bell and Hindmoor 2009, 2).

Bell and Hindmoore (2009, 2) also argue that the state, in an attempt to improve its governing capacity, collaborates "*with a range of social partners and groups".* This means that in order for the state to have good governance, it involves in its policy planning execution actors that might belong to other sectors besides public.

The governance theory helps me to understand why EPR has been the promoted policy tool for managing WEEE. Moreover, it helps me to understand the rationale behind LRAs roles in WEEE

management. The two selected cases and the two different ways of governance that they represent are examined within the boundaries as set by the two governance theories.

In the framework of the governance debate, PPP is seen by policy-makers as an adequate tool to delivering public services in a cost-efficient manner. The next section provides a description of the PPP concept which enables me to further understand the existence of PPP in the cases that I study.

2.2 Public-private partnerships

PPPs have evolved as "*key tool for public policy*" over the last two decades all over the world (Hurst and Reeves 2004, 379). In 2002, the Earth Summit in Johannesburg concluded that PPPs "*should be one of the pivotal mechanisms for sustainable development*" (Lehmann 2006, 236). A partnership between the public and private sector usually occurs with the purpose of providing a "*public service*" (Hurst and Reeves 2004, 380) which the public sector may not be able to deliver alone or it would be more efficient to be delivered by the private sector, in terms of costs and quality. Nelson and Zadek (2000) mention that, the complexity of issues in combination with the scarcity of financial and managerial resources generate the need of creating partnerships (Nelson and Zadek 2000).

PPPs usually consist of partners that come from three different spheres: (1) the public sector, which consists of governmental bodies or international organisations which are controlled by governments, (2) the private sector, which includes companies and industries and (3) the civil society, which consists of non-governmental organisations or any other kind of non-profit organisations (Widdus 2005). Figure 1 below illustrates the three usual spheres of a PPP. However, Nelson and Zadek (2000, 16) argue that partnerships may vary a lot and no "*single description*" can be used to define all of them.

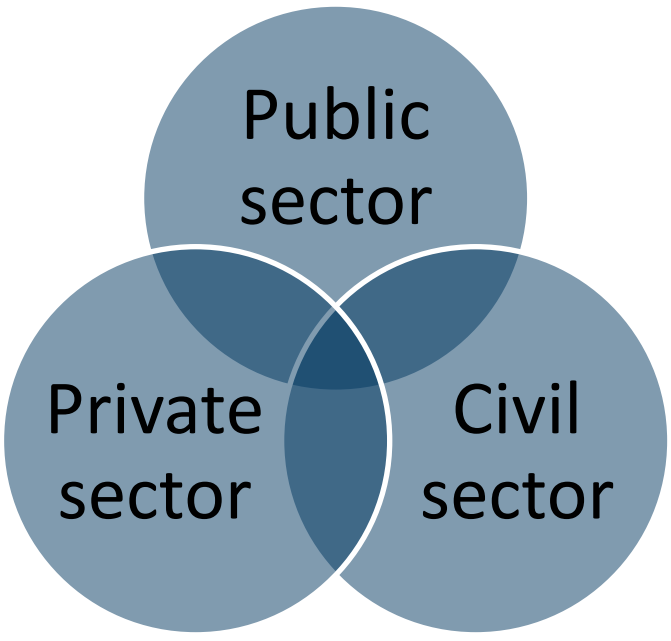


Figure 1: The three spheres of a PPP (own figure)

Several scholars argue that the participation in a PPP can bring potential advantages to the partners. First and foremost, they argue that the public sector can save a valuable amount of resources (financial, managerial) and use them efficiently (Tang, Shen and Cheng 2009). The implementation of a project

includes a certain level of risk. In a PPP this risk can be shared among all the partners and, thereby, be reduced (Shen, Platten and Deng 2006). A PPP can be an efficient way for each of the partners to be involved mainly in the areas where they have a better experience with (Li and Akintoye 2008). A better allocation of responsibilities among the partners may lead to a "*faster delivery*" of a project and finally to the reduction of the project's costs (Li and Akintoye 2008, 8).

PPPs may as well bring potential disadvantages to the partners. Tang, Shen and Cheng (2009) mention that, before proceeding further with the agreement, the legal framework of a PPP should be well-investigated in order to clarify the role that each partner should have. In fact, a partnership consists of partners with different backgrounds and interests, which may therefore cause a confusion regarding common goals and targets. For instance, conflicts may arise in cases where a partner has stronger interests than another partner and the power to impose them. These disadvantages may create a weak partnership with high possibilities of project failure. (Walsh 2004)

Table 4 below summarises the advantages and disadvantages that a PPP can bring to the partners.

Potential Advantages	**Potential disadvantages**
Efficient resource management	Lack of common goals and targets among the partners
Reduction of risk	Disparity of interests and power among the partners
Efficient allocation of responsibility	
Reduction of delivery time	
Reduction of project costs	

Table 4: Advantages and disadvantages of PPP for partners (own table)

The concept of PPP has fully applicability in the cases that I study as WEEE management results from a partnership created between the public and private sector. The existence of PPP initiates the discussions of using it as a tool for managing WEEE.

3. DESCRIPTION OF THE CASES

This chapter provides a description of the cases of Brussels and Valencia region according to the data as collected from websites, articles and the interviews.

3.1 The case of Brussels region

Belgium consists of three regions: the region of Flanders, Brussels and Wallonia. In Brussels, private households can dispose free of charge their WEEE in three ways: by going to the container parks; by returning them to retailers that sell the same type of appliance; by giving them to used-good centres which repair them (if they need any repair) and put them back into the market at a lower price. WEEE is sorted at the collection points according to the ten categories of WEEE as defined in the WEEE Directive. From there, WEEE is transferred to specialised processing companies for dismantling and decontamination and finally to the recyclers. (Verfaillie 2012) Figure 2 in Appendix A.3 illustrates how the WEEE management system functions in Brussels.

3.1.1 The establishment of the system

In the past, before the setting up of the current WEEE management system, WEEE was sent to the incinerators and 20 years ago was disposed in landfills (Grouwels 2012). In 2001, the EEE industry took the initiative to set up a take-back system in order to comply with the take-back obligation (Recupel 2012, a). The system was established at a national level and implemented at regional level through the Environmental Policy Agreements signed between the industry and the three regional parts of Belgium (ACR+ 2003). In order to deal with WEEE management, EEE industries founded a number of sector organisations responsible for managing the ten categories of WEEE. For example, the federation of technological industry Agoria, founded Recupel AV, Recupel ICT, Recupel SDA, LightRec and MeLaRec sectors and the federation of Electricity and Electronics FEE founded the BW-Rec and LightRec sectors. (Recupel 2012, b) In total, seven non-profit organisations were founded. These organisations take strategic decisions regarding the budget, the fee and the scope of their actions (Sabbe 2012, a) and are organised in such way that all WEEE categories are covered:

- ***BW-Rec*** *– Large household appliances, professional large and small white goods and dispensers*
- ***Recupel AV*** *– Household and professional audio-video equipment*
- ***Recupel SDA*** *– Small household appliances*
- ***Recupel ICT*** *- Informatics, telecommunications and office equipment, professional ICT equipment and dispensers*
- ***Recupel ET&G*** *– Household and professional electric and electronic (garden) tools*
- ***LightRec*** *– Lighting equipment and corona discharge bulbs*
- ***MeLaRec*** *– Household and professional medical devices, lab equipment, sports equipment, thermostats, testing and measuring equipment, blood glucose metres and smoke detectors* (Recupel 2012, b).

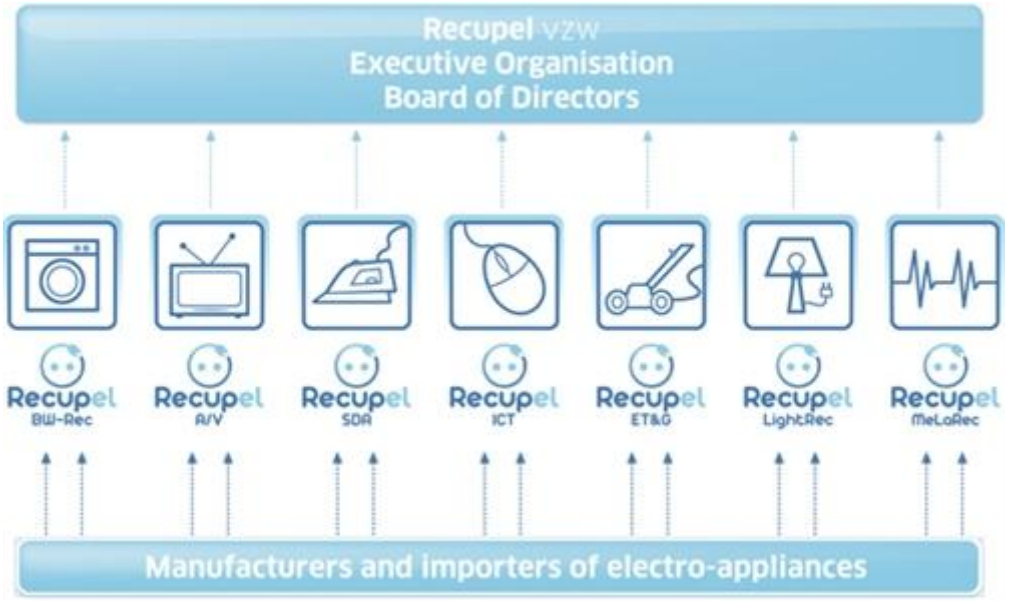


Figure 3: Structure of Recupel (Recupel 2012, b)

Figure 3 above illustrates the structure of Recupel. A lot of actors are involved in WEEE management system which requires a lot of coordination. Therefore, these seven organisations founded Recupel vzw which is the executing organisation responsible for coordinating the collective scheme at a national level (Recupel 2012, b). Recupel is a not-for-profit organisation which is however controlled by the EEE industry (Verfaillie 2012).

3.1.2 Main actors of the system and their roles

Bruxelles Environnement Institute (IBGE[5]) is the regional authority which formulates environmental policies for Brussels region. IBGE formulates policies and plans related to waste management. In regard to WEEE management, IBGE sets the legal framework, making sure that the expected results are achieved in an environmentally sound manner. (Paternostre 2012)

Bruxelles-Propreté is the regional authority dealing with the waste management of the 19 municipalities which belong to Brussels region. It owns two container parks where all the collected waste is sorted, recycled and recovered. Recupel has a contractual agreement with Bruxelles-Propreté to collect WEEE in the container parks. WEEE is automatically sorted in the container parks according to the ten WEEE categories. In addition, Bruxelles-Propreté is about to initiate a project which is called "Ressourcerie" and will repair WEEE and put them back into the market at a lower price. (Grouwels 2012)

Used-good centres receive appliances which they repair and put back into the market at a lower price in order to be reused (ACR+ 2003). Used-good centres are second-hand shops managed by NGOs such as Oxfam.

Retailers are obliged to accept back appliances in case they sell a similar product. Then they have to dispose it in the container parks or, under certain circumstances (for example, a big amount of collected WEEE in the shop), arrange with Recupel a collection directly from the retailer's store. (Recupel 2012, c; Verfaillie 2012)

[5] IBGE: Institut Bruxellois pour la Gestion de l'Environnement

Recupel is responsible for the coordination of the WEEE collective scheme. Recupel coordinates the activities among the EEE industry, the seven sector organisations, Bruxelles-Propreté, the retailers, the used-good centers and the recyclers. For example, Recupel has contractual agreements with specific recyclers in order to recycle WEEE. Recupel also prepares national communication campaigns regarding WEEE. (Verfaillie 2012)

Specialised processing companies are private companies responsible for dismantling and decontaminating WEEE; they collaborate with Recupel through contractual agreements.

Recycling companies have contractual agreements with Recupel for recycling WEEE.

3.1.3 Financing the system

The system is financed by consumers, meaning that there is a visible fee included in the purchase price of new appliances. This fee is called "Recupel contribution" and finances the collection, sorting, processing and recycling of the WEEE. (Recupel 2012, d)

3.1.4 The relation between Recupel and IBGE

Recupel works very closely with IBGE. In Recupel's website (2012, a) it is mentioned that IBGE is invloved in several parts and more specific:

- *they sit as observers at Recupel's Board of Directors and the Board of Directors of the sectors;*
- *they approve the Recupel contributions and are involved in awarding the contracts regarding collection and processing;*
- *they receive Recupel's communication campaigns in advance;*
- *they play an important role in all major decisions, such as approving the annual budget, the year-end accounting, new contributions, etc* (Recupel 2012, a).

In the website (Recupel 2012, a) it is also mentioned that there was a collaboration between them from the very beginning in order to set up the system. Every year Recupel has to send to IBGE the Waste report of the previous year regarding the performance or Recupel, including for example numbers about the collected and recycled WEEE. (Verfaillie 2012)

3.2 Details of the case

Before the establishment of the collective scheme in 2001, the network for collecting WEEE (Bruxelles-Propreté, retailers) and the infrastructure for recycling (recycling companies) already existed. What Recupel did was to coordinate the activities among actors involved in the WEEE management. (Verfaillie 2012) However, according to Verfaillie (2012), the discussions for setting up a WEEE recycling system had already started in 1996, as the "green" government of the time was putting pressure on the EEE industry to undertake this responsibility. Peter Sabbe (2012), the general manager of Recupel, assured the fact that the government of the time "*warmed the industry that legislation was about to come*" and ask them to take the appropriate measures in order to cope with the take-back obligation (Sabbe 2012, b).

Recupel is a not-for-profit organisation and its financial resources come from the Recupel fee, and they are reinvested for managing the system (Verfaillie 2012). Regarding the environmental aspect of the WEEE management, Verfaillie (2012) said that at the beginning the main goal was to comply with legislation and it was only recently that Recupel started to care about its green image. At the question "*which aspect of sustainability (environmental-economic-social) has a greater value for Recupel*", Verfaillie (2012) answered that Recupel cares about the environmental aspect but driven from cost-efficient reasons because, as she said, "*it is more cost efficient to use materials that come from the recycling process than going and producing a material right from the beginning*" (...) "*this is a win-win situation*". Moreover, Verfaillie (2012) said that in the contracts signed with the recyclers, "*depollution targets*" are set, meaning that the recyclers do not only have to recycle the materials which will bring them some revenue, but they also have to remove carefully the hazardous materials and decontaminate them.

Recupel has to report to the three regional authorities of Belgium about its performance and in accordance to the Environmental policy agreements. As Paternostre (2012) mentioned during the interview, IBGE sets the legal framework within which Recupel has to reach the desirable results. Recupel has the freedom of choosing the appropriate means for reaching these results and IBGE plays the role of supervising ("*watchdogs*") and making sure that everything is done in accordance with the legal framework. Paternostre (2012) added that not all actions of Recupel need approval from IBGE in order to proceed-some of them (such as communication campaigns) need a simple consultation. In this partnership all decisions are taken together, with Recupel being the coordinator and IBGE the supervisor, making sure that everything is done according to the legal framework and avoiding the negative environmental impacts (Paternostre 2012). Recupel is the main player in WEEE management, but there are also recycling companies which do not belong to the collective scheme of Recupel and therefore they do not report to the regional authorities about their performance (Sabbe 2012, a).

3.3 The case of Valencia-the Ecovitrum project

This section describes shortly the management of WEEE in Spain before and after the integration of the WEEE Directive into the national legislation. Before, the main stakeholders of the WEEE management system in Spain were the producers, the government and the recycling plants. Government in Spain has three levels: central, autonomous communities and local authorities. The central government is the one that integrated the WEEE Directive into the national legislation and reports to EU about the numbers achieved regarding WEEE collection and recycling. Autonomous governments manage the collection points and the local authorities collect household waste and transport it to the collection points. Before the integration of the WEEE directive, retailers were collecting the 75% of the large household appliances by consumers who were buying a new appliance and bringing back to the shop their old ones. The 25% was going to the municipal collection points and from there WEEE was sent to "*metal managers*" or to landfills. (Queiruga, Benito and Lannelongue 2011, 2)

On 25 February 2005, the WEEE Directive was integrated into the national legislation by the Royal Decree 208/2005 giving to the producers the responsibility of setting up and financing WEEE collection and treatment systems. Producers have had to either establish an individual WEEE management system for the products they have been producing, or be members of a collective scheme. (Queiruga, Benito and Lannelongue 2011) The collection and treatment of older appliances (defined by the WEEE Directive as those put on the market before August 2005) have been "*financed by all producers in the market*

according to their market share" (Queiruga, Benito and Lannelongue 2011, 58). Queiruga, Benito and Lannelongue (2011, 58) mention that these collective schemes have to "*be authorized by the governments of autonomous communities in which they were territorially implemented".* In other words, WEEE management in Spain is organised by the EEE producers with the LRAs organising the collection and giving authorisations to collective schemes.

3.3.1 The Ecovitrum project

In 2010, the Provincial Council of Valencia launched in collaboration with seven partners the Ecovitrum project in order to cope with the increasing number of television and computer CRT screens disposed in clean points (collection points). The project has a lifespan of 3 years (from January 2010 to December 2012) and is co-financed by Life+, an EC's programme which finances environmental projects. (Ecovitrum 2012)

Before the development of the project, the TV and computer CRT screens were disposed in recycling centres or taken back to retailers. Then they were transferred to WEEE treatment plants where they were dismantled and decontaminated. The metallic and plastic components of the screens were recovered as there is a market demand for this kind of materials. The glass needs special treatment as it contains hazardous substances that need to be removed carefully. The low market demand could not absorb the high volume of the generated glass waste, meaning that this amount ended up to landfills. (Ferrer 2011, a)

The aim of the Ecovitrum project is to offer a solution to this issue by developing

> "*A new model of integral management for CRT TV and computer screens by transforming this glass into a high quality resource for the manufacture of construction materials*" (Ferrer 2011, a, 2).

The materials that are produced are ceramic components such as tiles and so far they have a good market demand (Ferrer 2012, b). Figure 4 in Appendix A.4 illustrates the stages of the project.

3.3.2 The partners of the project and their roles

The **Provincial Council of Valencia** is the main coordinator of the project, meaning that is responsible for the "*implementation, co-ordination, justification and dissemination of the project*" (Ferrer 2011, a, 3). Dissemination means the communication of the project to third parties through the organisation of communication campaigns, paying visits to schools and informing students about the project (Ferrer, 2012, b).

Fundación Eco-Raee´s is an organisation which was founded by the EEE manufacturers and importers in order to develop an integrated management system for WEEE (ECO-RAEE 2006). In the Ecovitrum project, it coordinates the actions between manufactures and waste managers (Ferrer 2011, a).

Recytech Iberia S.L is a company providing services such as collecting, classifying and managing products and electronic components for later recycling in authorised plants (Recytech Iberia SL 2006). Its role in the Ecovitrum project is "*designing the prototype for obtaining glass from cathode ray tubes ready for using it as raw material in the construction material industry*" (Ferrer 2011, a, 3).

Asociación de Investigación de Industrias de la Construcción (AIDICO) is a research institute which helps industries specialised in the production of construction materials to improve the efficiency of their products by conducting research in its laboratories (AIDICO 2012). In the Ecovitrum project, AIDICO has conducted research regarding the ways that the CRT glass can be used to produce construction materials and the quality of them (Ferrer 2011, a).

Cullera Town Council belongs to the region of Valencia (See map in Appendix A.5) and in the project is responsible for collecting WEEE in its eco-park.

Esmalglass is a Valencian multinational company producing ceramic enamels; it uses the CRT glass as secondary raw material in the manufacture of construction materials (Ferrer, 2012, b).

Electro-Coord is a Hungarian company coordinating WEEE management in Hungary and together with Eco-Raee's they work on the preparation of a European good practice code for WEEE[6] (Ferrer, 2012, b).

Fundación Comunidad Valenciana-Región Europea is a Valencian regional foundation based in Brussels and its role in the Ecovitrum project was to help the Council of Valencia to present the project to the EC but due to internal financial issues, they have stopped been part of the project (Ferrer, 2012, b).

3.3.3 The financing of the project

The total investment of the project is €2,397,711. 48% of this amount is financed by the EU, 14% by the Council of Valencia and 38% by the partners of the project.

3.4 Details of the case

In 2009 the Provincial Council of Valencia took the initiative to propose the Ecovitrum project in order to find an eco-friendly solution for the increasing amounts of CRT glass and therefore reduce its negative environmental impact. As Ferrer (2012) mentioned in the interview, the WEEE collecting network and the recycling infrastructure already existed before and what they did was to bring these different parts in contact. Ferrer (2012) added that the company Esmalglass did not know that this type of glass could be used in their production line. Their involvement in the project helped them to discover this new way of manufacturing (Ferrer, 2012, b).

The Provincial Council of Valencia is a regional authority, meaning a public administration. As Ferrer (2012) said during the interview, they are a public administration and therefore they do not think in economic terms, meaning that they do not try to make profit from the project. They initiated the project for the deriving environmental benefits as tons of glass do not end up in landfills (Ferrer, 2012, b). Ferrer (2012, b) added that the Council aims to offer improved public services to the citizens of Valencia.

WEEE management in general is organised by the producers with the Council being responsible only for the management of the municipal collection points. Nevertheless, the Council of Valencia took the initiative to propose this project and thereby put in contact all the different actors related to WEEE management. The Council's involvement will end together with the project's lifespan (2009-2012).

[6] For more information on this project, check the webpage of WEEE forum regarding WEEELABEX http://www.weee-forum.org/weeelabexproject.

Afterwards, the partners will have to continue operating without the Council's coordination. The Council has to report to the EC regarding the progress of the project. (Ferrer, 2012, b)

Regarding the partnership, Ferrer (2012, b) said that this was necessary in order to propose the project to the EC and receive the fund. But as he added, the creation of the partnership was inevitable, as the Council did not have neither the knowledge nor the infrastructure to deal with such project. Ferrer (2012, b) underlines the fact that the partnership has played an important role in the success of the project. But as he said, the private companies may have been driven by economic reasons for participating in the project, but this does not mean that they do not care about the green image of their companies.

From the answers received back from the partners of the Ecovitrum project, it appears that only one partner (AIDICO) rates the economic driver (increase of profit) as important, while the other two partners (Eco-Raee's and Esmalglass) rate it as neutral. However, it appears that the environmental aspect of the project (reduction of the environmental impact of WEEE) was the major driver for them to participate in the project as they rate it as important (Esmalglass) and very important (AIDICO, Eco-Raee's). In regard to their perspective on the role of the Council in the project, Eco-Raee's believes that the Council plays an important role as its actions are more popular than actions coming from the private sector which usually cares about the economic aspects more than the common welfare. The other two partners have underlined the importance of the Council's role on collecting and protecting WEEE from damages and robberies.

It appears that the environmental benefits which result from this project have been an important factor for making not only the Council of Valencia, but also the partners to participate in the project. The partners acknowledge the importance of the Council's participation in the project.

4. ANALYSIS

This chapter maps out the roles that exist in WEEE management and identifies the roles that each actor of both cases have. The focus is on the roles that the regional authorities have undertaken in each system and the influence that these roles have on the environmental performance of WEEE management. The chapter concludes with the analysis of the rationale behind WEEE management policies and the roles of LRAs.

4.1 Mapping of the existing roles in WEEE management according to the cases

By analysing the two cases, I mapped out the roles that the actors from the public and private sector have in WEEE management. Figure 5 summarises the roles that public and private organisations can undertake in the WEEE management system. Under each role, actors from each case are introduced. The blue colour represents the organisations as mapped out in the case of Brussels region and in black are the ones of the case of Valencia.

The role of **authorising/supervising**: authorising has the meaning of "*giving to somebody the official permission of doing something*" and superivising the meaning of "*observing and directing the execution of a task*" (Oxford Dictionaries 2012). In the case of Brussels region, IBGE is the one who has the role of authorising, since it has authorised Recupel to organise the WEEE management system. IBGE has to approve Recupel's annual budget, tenders and fee and it is aslo the one who makes sure that the system is operated in compliance with the legal framework avoiding negative environmental impacts. In the case of the Ecovitrum project, the Council of Valencia has to follow the guidelines for managing European funded projects set by the EC and the Life+ programme.

The role of **coordinating**: coordination means, bringing in contact the different actors involved in the WEEE management like collection networks and treatment infrastructures; reporting to the authorising authorities; dealing with the communication to internal and external stakeholders. Recupel has this role in the case of Brussels region. In the Ecovitrum project, this role is shared between the Council and the Fundación Eco-Raee´s: the Council is responsible for the general implementation and the communication of the project and the Fundación Eco-Raee´s coordinates the activities between the EEE manufactures and the WEEE managers.

The role of **collecting**: collecting means providing with the relevant facilities in order for WEEE to be collected. In Brussels, Bruxelles-Propreté, the retailers and the used-good centres have the role of collecting and in the case of Ecovitrum project the Cullera Town Council collects CRT screens in its eco-park.

The role of **sorting**: after WEEE is collected, it needs to be sorted according to the ten WEEE categories. In Brussels, sorting is done at the container parks managed by Bruxelles-Propreté. In the case of Ecovitrum porject, sorting is done already at the eco-parks managed by the local authority (Cullera Council).

The role of **reuse**: reuse means the continued use of the equipement or components of it with its initial purpose (Directive 2002/96/EC 2003). In Brussels, the used-good centres repair and put back into the market WEEE. In the Ecovitrum project there is no actor dealing with reusing of WEEE.

The role of **processing**: when WEEE is processed is dismantled and the hazardous materials are removed. In Brussels, the processing is done by companies with which Recupel has contractual agreements and in the case of Ecovitrum project this is done by the company Recytech.

The role of **recycling**: in Brussels, the recycling is done by companies with which Recupel has contractual agreements and in the case of Ecovitrum project, by the company Esmalglass, which produces construction materials by using the glass coming from the CRT screens.

4.2 Identification of LRAs' roles and their impact in an environmentally sound WEEE management

The two cases represent two different ways of governance with the LRAs having different roles. In the case of Brussels, IBGE supervises the system making sure that it does not have a negative environmental impact and Bruxelles-Propreté is involved in WEEE collection. The role of IBGE may seem less active but is still important for the sound operation of the system. In 2011, the recycled WEEE in Belgium reached the number of 110000 tons (Verfaillie 2012). It appears that this way of governance, with the producers having the main responsibility and the authorities a less active role, mainly acting as observers or dealing with the collection of WEEE, have a positive environmental impact as a significant amount of WEEE is treated in an environmentally sound manner.

However, there are still challenges to be faced. The number of the collected WEEE keeps increasing every year in Belgium: the collected amount in 2008 was 86940, in 2009 98738, in 2010 101772 and in 2011 110000 tons (Recupel 2012, c). One the one hand, this increase might mean that as the years pass by, the citizens are better informed on how they should dispose their WEEE and bigger collected amounts are achieved. On the other hand, since the system operates for more than 10 years, the citizens should have been mature already and the collection numbers should be kept steady. This might show that there are roles missing from WEEE management which could contribute to WEEE minimisation. In addition, the fact that there are companies that do not belong to the collective scheme of Recupel and act without reporting to IBGE might mean that the latter has to reinforce and systematize its supervision in order to ensure that everything is done within the legal framework.

The case of the Ecovitrum project represents a "traditional" way of governance applied in a modernised form. By initiating the project, the Council of Valencia has an important and active role which does not demand extra financial costs and in addition ensures the environmentally sound treatment of the CRT glass. Up until 2011, when the first results were measured, "*800 tons of glass had been used as raw materials for the production of construction materials*" (Ferrer 2011, a, 4). This means that 800 tons of CRT glass have been recycled and not disposed to landfills.

However, apart from these positive aspects of the project, there are still challenges that the Council of Valencia will have to face at a regional level. According to the article of Queiruga, Benito and Lannelongue (2011) about the allocation of responsibilities in WEEE management, Cullera Town Council collects and transports WEEE (of all the ten categories) to collection points; the Council of Valencia manages the collection points and authorizes the collective schemes of the region. Managing WEEE collection causes extra financial and administrative costs to the Councils in a period of limited financial capacities due to the economic crisis. In this case, the LRAs of Valencia will have to examine other roles in WEEE management which will unburden them from the extra financial costs while securing an environmentally sound WEEE management.

In both cases, the roles that the LRAs have undertaken ensure an environmentally sound WEEE management; however, roles which could contribute to WEEE minimisation, unburden the LRAs from extra financial costs and, overall, secure an environmentally sound WEEE management, are missing.

4.3 Rationale behind WEEE management policies and LRAs roles

As it is previously mentioned, in both cases, WEEE management results of a partnership between public and private sector. After having interviewed informants belonging to public and private actors of both cases and received answers back from the questionnaires sent to the partners, I firstly found out that both sides (public-private) believe that partnerships are the most suitable tool to deal with WEEE management, as each partner deals mainly with the aspects that is an expert of (Ferrer 2012, b; Paternostre 2012; Verfaillie 2012). They have also underlined the benefits coming from the partnership. More specifically, through partnerships the public sector avoids extra financial costs and the involvement in something that it does not have knowledge on (Ferrer 2011, a). For the private sector, the partnership is a way to share costs and risks (answers from AIDICO, Eco-Raee's and Esmalglass). Reflecting upon the partnership theory as described in Section 2.2, these are the common advantages that a PPP can bring to the involved partners: "*efficient resource management*", "*efficient allocation of responsibility, reduction of project costs and risks*". Through my research I also identified one disadvantage that might exist due to the partnership and this is the "*lack of common goals and targets among the partners*". In the case of Ecovitrum project, it is clear that the Council's goal is to reduce the negative environmental impact of the CRT screens whereas, as Ferrer (2012) mentioned, the private partners may be driven by economic motives. AIDICO answered that the disparity of interests among the partners is a potential disadvantage of partnerships. In the case of Brussels, first priority of IBGE and Recupel is the environment, but from Recupel's part the motives are economically driven (Verfaillie 2012).

Reflecting upon governance theory according to Bell and Hindmoore (2009), WEEE management could be considered as a "*policy challenge*" which the state faces by using the EPR tool. By using this policy tool, the state collaborates with actors that are not public in order to deliver the service of WEEE management. Therefore, PPP is a way of managing WEEE which derives from the EPR tool. Looking at my two cases, EPR, and consequently PPP are not used because of the "*hollowing out*" of the state as Rhodes argues, but because the state-and in my cases the regional authorities-tries to improve the way it governs and thus provide better public service. In both cases, the regional authorities have still a very important role to play-in the case of Brussels the role of authorising/supervising, in the case of Valencia, the role of coordinating the project. Hence, it appears that the regional authorities have not lost their capacity of governing. As Bell and Hindmoore (2009) mention, they still remain "*pre-eminent*". In both cases, the rationale behind IBGE's and the Council's role in WEEE management is the improvement of their governing capacity and thus the public service they offer to their citizens. Therefore, they collaborate with "*execution actors*" which might come from the private or civil sector, while still holding an important position.

Reflecting upon the current WEEE Directive, having the EPR as the main policy tool for managing WEEE can reduce the environmental impacts of WEEE. The informants from IBGE and Bruxelles-Propreté were certain that the current WEEE system works properly. However, what they did question was the clarity of Recupel's environmental concerns. Looking at Verfaillie's (2012) answer regarding Recupel's economic perspective on environmental issues, this doubt might be valid. In other words, Recupel (and

consequently the EEE industries which control Recupel) may not be willing to contribute to the environmental protection and the sustainable use of resources at any cost.

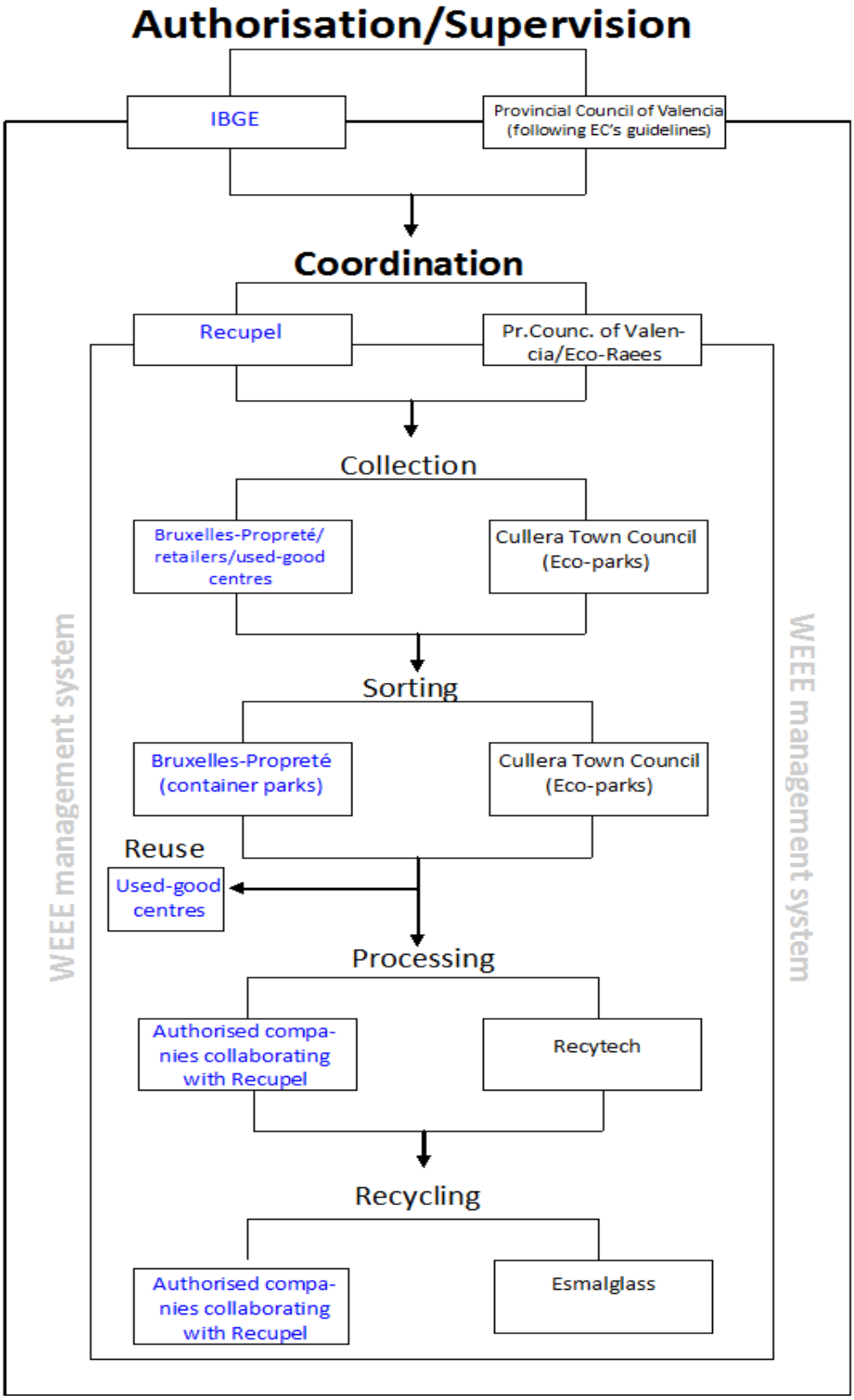


Figure 5: Mapping of the roles for WEEE management system. (own figure)

5. DISCUSSIONS

This chapter discusses the roles that the LRAs undertake to ensure an environmentally sound WEEE management, and the roles that they should undertake to secure it.

In order to ensure that WEEE management is done in an environmentally sound manner, it is crucial that LRAs undertake important roles such as the role of authorising/supervising which IBGE has in the case of Brussels. This brings to LRAs two benefits: firstly, they still have the control of the system, therefore ensuring that everything is done in compliance with the legislation. Secondly, they avoid the negative environmental impacts-without the burden of extra administrative and financial costs for setting up WEEE management systems. However, the case of Valencia and the role that the Council plays in the Ecovitrum project has brought new knowledge on the way that LRAs can be involved in WEEE management. The Council of Valencia has-in a smaller scale-the same role as Recupel does in the case of Brussels. The case of Valencia is a perfect example of a regional authority having an active role in WEEE management without (i) having extra financial costs and (ii) doubting on the existence or not of environmental motives behind the Council's initiative, with the improvement of the offered public services being one of the main objectives.

These roles are crucial in order to ensure an environmentally sound WEEE management, but are they sufficient to secure it? The WEEE Directive has a clear focus on taking all the appropriate measures in order to facilitate the recycling and recovery of WEEE. Even the way that prevention and reuse are mentioned in the Directive, leads to facilitating the recycling and the recovery of materials. In relation to my cases, it is obvious that the main focus is on recycling and recovering and not many actions are done regarding WEEE minimisation. The current roles in WEEE management (as mapped out in the previous section) are not sufficient to contribute to the minimisation of the generated amounts of WEEE which keeps increasing every year. Therefore, key roles are missing from WEEE management. These roles are related to WEEE prevention and reuse and are not covered by the EPR umbrella as this would mean that EEE producers would have to promote notions that are against their interests. Considering the fact that nowadays LRAs have to operate while confronting with many types of challenges, such as limited financial capacities due to the economic crisis, the protection of the environment and the sustainable use of resources, it might be relevant for them to focus on increasing their action in WEEE management and in particular through prevention and reuse.

LRAs are the ones that have a closer relationship with citizens and citizens show more trust towards public authorities than the private sector (Ibitayo 2002). LRAs can start a dialogue with their citizens about WEEE prevention by underlying its importance for waste minimisation and thus the reduction of the environmental impact. Through the development of well-planned projects, such as raising-awareness campaigns which should mainly aim in sustainable consumption, LRAs can encourage citizens to actively contribute to the reduction of the increasing number of WEEE. By contributing to WEEE minimisation, the LRAs will have to manage less WEEE in their collection points (meaning less administrative and financial costs) and in general they will actively contribute to the sustainable use of natural resources. In Brussels this role can be undertaken by IBGE where a specialised unit about waste prevention already exists. However, in relation to WEEE prevention, there is neither a numerical target

nor plans for more specific actions. The only action so far was the creation of a short video promoting the sustainable use of WEEE[7] (Van Bambeke 2012).

In Valencia and in relation to the Ecovitrum project, no prevention actions are taken (as this would be against the whole concept of the project). Nevertheless, the Council of Valencia can promote prevention actions for the other categories of WEEE. As it has already been mentioned, the Council is responsible for the communication of the Ecovitrum project to citizens and students of Valencia region spreading the importance of recycling WEEE. This means that the Council has already a valuable experience in raising-awareness campaigns regarding WEEE recycling. In order to tackle the growth of WEEE, actions need to be taken regarding WEEE prevention, including all the WEEE categories.

LRAs are the ones dealing with WEEE collection and this gives them a direct access to WEEE. There are equipments still functioning when reaching the collection points. LRAs can develop projects that will check the equipments, do the appropriate repairing, and then put back into the market at a lower price. By being more actively involved through reusing, the LRAs can have two benefits: (i) increase their revenues and reinvest them internally in order for the public administration to have a healthy management. (Grouwels 2012) (ii) Actively contribute and secure an environmentally sound WEEE management. As it has been previously mentioned, given the constrained financial capabilities, money is crucial in order for the public authorities to keep delivering good quality public services. After having interviewed informants from Bruxelles-Propreté and IBGE, it seems that they are both very keen in WEEE reusing and that is the way that they are going to follow in order to be more actively involved in WEEE management. The "Ressourcerie" project that Bruxelles-Propreté plans to launch proves that the regional authorities can be actively involved in WEEE management.

In the case of Valencia, reuse is not compatible with the concept of the Ecovitrum project but reuse can be promoted for other types of WEEE. The Council of Valencia can initiate reuse projects, such as "Ressourcerie", gaining the above mentioned benefits. The Council can as well support the actions of used-good centres, or organise fairs where people can bring equipments that they do not need and exchange them with other ones.

Approaching the answer to my research question, through my investigation, I found out that in order to ensure an environmentally sound WEEE management, LRAs should have the role of supervising and, if applicable, even coordinating WEEE management systems. However, in order to secure an environmentally sound WEEE management, LRAs should be more actively involved through actions related to WEEE prevention and reuse.

[7] The relevant video can be found in the following link: http://www.bruxellesenvironnement.be/Templates/Particuliers/Informer.aspx?id=2006&langtype=2060&detail=tab2

CONCLUSIONS

The purpose of this thesis was to search for roles that LRAs should have in WEEE management in order to secure that this is done in an environmentally sound manner. In order to be able to initiate the discussions about these roles, I found it necessary to firstly explore the roles that LRAs usually hold and their influence on the environmental performance of WEEE.

I chose to approach the issue from a practical perspective by studying the cases of Brussels and Valencia region. By studying these cases, I managed to map out the existing roles in WEEE management and identify the ones that the LRAs of each case have undertaken. The roles of authorising/supervising and coordinating that IBGE in Brussels and the Council of Valencia has respectively, ensure that WEEE management is done in an environmentally sound manner. In order to comprehend the rationale behind WEEE management policies and the roles of LRAs, I studied governance theory which helped me to conclude that: (i) WEEE management is a policy challenge which the state faces by using the EPR tool. (ii) EPR produces PPP, as the state collaborates with non-public executors in order to deliver a public service. (iii) The state, and in my cases the regional authorities, remains pre-eminent and uses EPR tool in order to improve its governing capacity and thus the offered public services.

Approaching the answer to my research question, the above mentioned roles can ensure an environmentally sound WEEE management but in order to secure it, LRAs should undertake roles related to WEEE prevention and reuse. These roles can bring two main benefits to them: (i) be actively involved and contribute to waste minimisation and consequently to an environmentally sound WEEE management, as potentially less WEEE will be generated. (ii) increase their revenue which could be internally reinvested for a healthy management of the organisation in a period of strict financial constrains.

Given that each case is different and LRAs around EU have to operate within different circumstances, more studies need to be done in the future in order to further examine roles in WEEE management that can bring benefits to LRAs, with the environmental protection being the first priority.

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Appendices

Appendix A.1

Table 2: Conducted Interviews

Informant	Description	My aim	Method	Considerations
Laurent Grouwels	Communication Service Bruxelles-Propreté, Brussels Region	To gain general knowledge about WEEE management in Brussels and the role of Bruxelles-Propreté	One face-to-face interview	He works with the Communication Service of Bruxelles-Propreté and therefore he might not be familiar with the technical details relative to WEEE management policies
Katrien Verfaillie	Communication Manager of Recupel	To obtain Recupel's perspective on WEEE management system in Brussels and gain some information about how the system was set up	One face-to-face interview	She might not be able to develop a critical point of view on the environmental impact of the WEEE management due to her lack of technical background in environmental science. In addition, she has been working for Recupel for the past 5 years. Consequently, she might lack familiarity with the detailed process for the establishment of the current WEEE management system.
Javier Ferrer Roig	Coordinator of the Ecovitrum project	To gain specific information on the Ecovitrum project and on the reasons which drove the Provincial Council of Valencia to develop the Ecovitrum project and to implement it through a PPP	One interview over the phone	He holds a position at the Provincial Council of Valencia. As a result, he might not be free to develop critical argument on the project.
Rodolphe Paternostre	IBGE-responsible for EPR (WEEE, packaging, batteries, used eatable oil)	To have the regional authority's perspective on the WEEE management system in Brussels	One face-to-face interview	He has been working for IBGE for the past two months. Therefore he might not be familiar with the entire system yet.

Peter Sabbe	General manager of Recupel	To gain specific knowledge on who initiated the discussions for the establishment of the WEEE management system in Belgium	One informal face-to-face discussion	

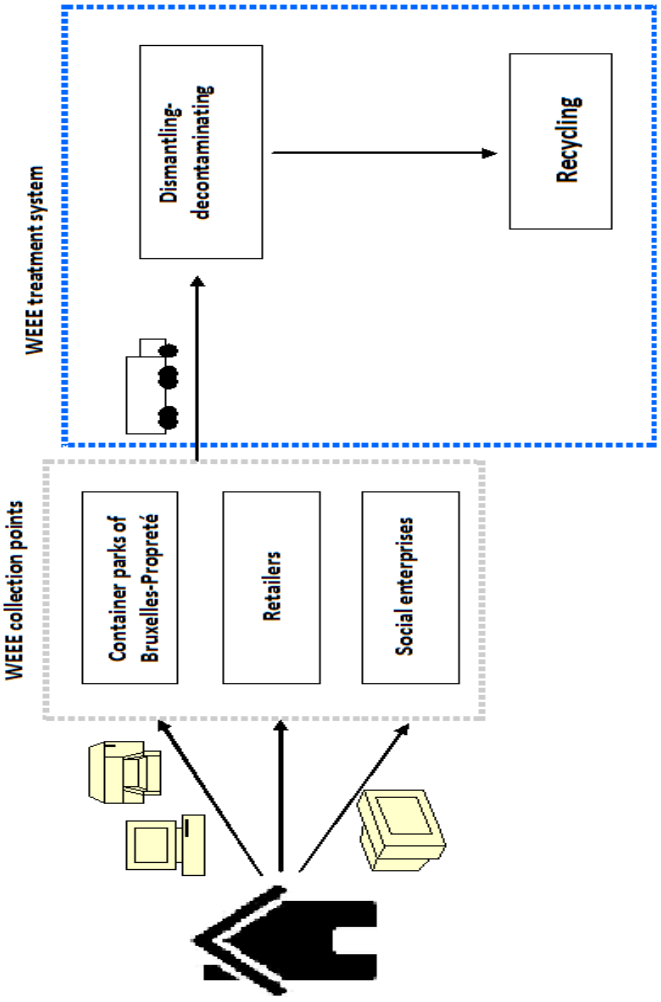
Appendix A.2

Table 3: Overview of Ecovitrum partners who received the questionnaire

Informant	Description	Responded
Fundación Eco-Raee´s	Not-for-profit organisation, founded by manufacturers and importers of electrical and electronic equipment (EEE) in order to deal with the take-back obligation for WEEE.	Yes
Recytech Iberia S.L	The company which collects, classifies and manages products and electronic components for later recycling in authorised plants.	No
Asociación de Investigación de Industrias de la Construcción (AIDICO)	AIDICO is an institute which aims at optimising the capacity for innovation, quality, safety and sustainability of companies in order to enhance their competitiveness on domestic and international markets.	Yes
Esmalglass	A Valencian multinational company which produces ceramic enamel.	Yes
Electro-Coord	A Hungarian company specialised in the treatment of e-waste.	No

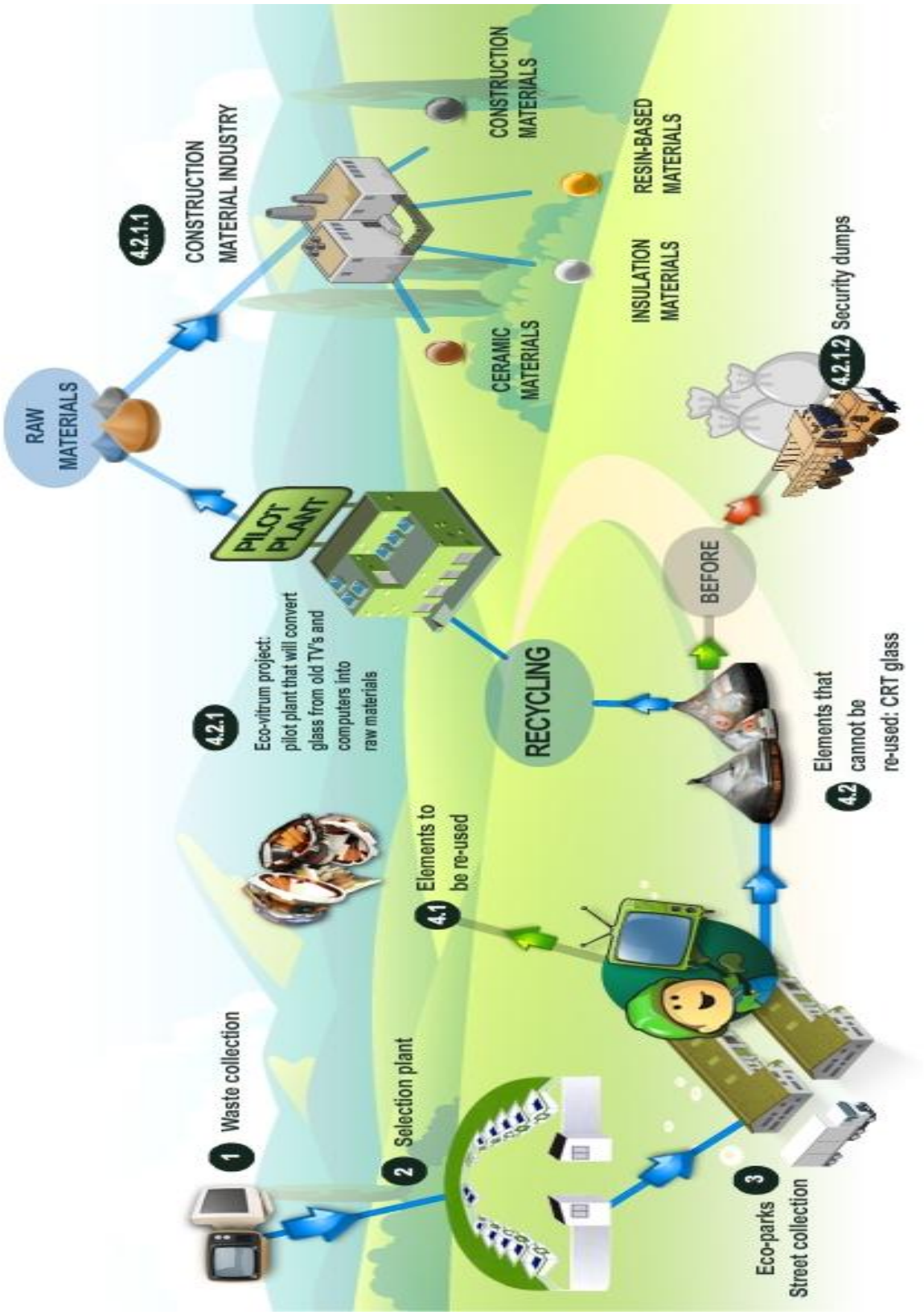
Appendix A.3

Figure 2: WEEE management system in Brussels (own figure)



Appendix A.4

Figure 4: Stages of the Ecovitrum Project (Ecovitrum 2012)



Appendix A.5

Map of Valencia Region

Source: http://www.holiday-villa-select.com/spain/valencia-province/